ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING

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CONTENTS

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SIMULATION OF LED EMISSION USING MONTE-CARLO PHOTON TRACING TECHNIQUE

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Annotatsiya. Monte-Karlo fotonlarini kuzatish yordamida LED nurlanishining fazoviy xususiyatlarini modellashtirishning yangi usuli taklif etildi. Ushbu yondashuvning asosiy afzalligi uning ishlab chiqaruvchi tomonidan taqdim etilgan emissiya qonuniyatlaridan to‘g‘ridan-to‘g‘ri nurlanish xususiyatlarini modellashtirish qobiliyatidir, bu o‘z navbatida fotonlarning paydo bo‘lish sohasidan boshlab ularning yorug‘lik diodi yuza sirtidan chiqquniga qadar trayektoriyalarini kuzatish va ideal modellashtirish jarayonida inobatga olinishi kerak bo‘lgan qurilmalarning murakkab ichki fizik strukturasini modellashtirish zaruratini yo‘qotadi. Taklif etilgan yondashuv real yorug‘lik diodi nurlanish qonuniyatlarini simulyatsiya qilishning aniqlik darajasini tushirmagan holda umumiy modellashtirish jarayonini soddalashtiradi. Taklif etilgan usulning moslashuvchanligi va ko‘p qirraliligini ko‘rsatish uchun uch xil yorug‘lik diodi ishlab chiqaruvchilarning qurilmalari modellashtirildi va shu orqali usulning turli xil konstruksiyalarda samaradorligi namoyish etildi.

Kalit so‘zlar: *yorug‘lik diodi, nurlanish qonuniyatlari, nurlanish xususiyatlari, simulyatsion model, Monte-Karlo foton kuzatish yo‘li metodi.*

Аннотация. Предложен новый метод моделирования пространственных характеристик излучения светодиодов с использованием трассировки фотонов Монте-Карло. Ключевым преимуществом этого подхода является его способность моделировать характеристики излучения непосредственно из предоставленных производителем закономерностей излучения, что устраняет необходимость моделирования траекторий фотонов через сложную внутреннюю физическую структуру светодиодов, что в идеале потребовало бы отслеживание фотонов от их источника генерации до выхода из поверхности светодиода. Предложенный подход упрощает общий процесс моделирования, не теряя точности имитации реальной

диаграммы излучения светодиода. Чтобы проиллюстрировать гибкость и универсальность предлагаемого метода, были проведены моделирования для светодиодных устройств трех разных производителей, что продемонстрировало его эффективность в различных конструкциях.

Ключевые слова: *светодиоды, диаграмма направленностей, излучательные характеристики, симуляционная модель, фотонная трассировка методом Монте-Карло.*

Abstract. A new method for modeling the spatial radiative characteristics of light-emitting diodes using Monte Carlo photon tracing has been proposed. The key advantage of this approach is its ability to model radiative characteristics directly from manufacturer-provided datasheet emission patterns, eliminating the need to simulate photon trajectories through the complex internal physical structure of light-emitting diodes, which would ideally require tracing photons from their generation origin to their exit from the LED surface. The proposed approach simplifies the overall modeling process without losing preciseness of mimicking the real LED emission pattern. To illustrate the flexibility and versatility of the proposed method, simulations were conducted for LED devices from three different manufacturers, demonstrating its effectiveness across varying designs.

Keywords: *LEDs, emission pattern, radiation characteristics, simulation model, Monte-Carlo photon tracing method.*

Introduction

Light-emitting diodes (LEDs) have become ubiquitous, appearing in various forms and applications ranging from general lighting to pumping solid-state laser crystals [1-9]. Their growing dominance over traditional light sources is due to their appealing characteristics [10–12]. As LEDs evolve and their applications expand, precise modeling of LED emission patterns remains crucial for interpreting experimental results and predicting the performance of systems involving LEDs. However, modeling LED emissions is not straightforward primarily due to existence of the wide variety of LED emission patterns. An emission pattern describes how the intensity of light varies with direction from the source. When LEDs are modeled as Lambertian emitters, their intensity can be described by $I = I_0 \cos\theta$ with I_0 represents the intensity along the normal ($\theta = 0°$), and θ is the radiation angle. However, commercial LEDs differ from ideal Lambertian emitters because the LED chip is either fully encapsulated in epoxy resin (as in through-hole designs) or mounted on a ceramic substrate and covered with epoxy (as in surface-mount devices, or SMDs). The shape and material of the encapsulation significantly affect the LED's emission pattern. This allows engineers to design LED packages optimized for specific applications.

Literature Review

Given these variations, multiple approaches have been developed to model LED emissions. Current models fall into two broad categories: analytical approximations [13–15] and statistical methods, such as Monte Carlo simulations. Analytical models are useful for studying and optimizing radiation transfer from the light source to a target

without intermediate complex optics. On the other hand, simulations offer an advantage when designing LED packages or secondary optics, as LEDs often incorporate integrated optics. Moreover, simulation models can be based on data directly from the manufacturer's datasheets, leading to results that are closer to real-world performance than those obtained from analytical approximations.

Research Methodology

In this paper, we decided to introduce the capabilities of the Monte-Carlo photon tracing simulation technique for modeling LED radiation patterns. MCPT was developed as an alternative to the traditional ray-tracing method, addressing some of its limitations, particularly when dealing with complex emission sources like LEDs. Unlike ray tracing, which primarily models light as rays and often struggles with accurate representation of diffuse sources, MCPT excels at simulating the stochastic nature of light propagation, making it particularly useful for LEDs and other sources with intricate radiation profiles.

MCPT has already proven effective in the design and optimization of solar-pumped lasers in previous studies [16–18], where its ability to model light distribution in systems with complex geometries has been well-documented. By applying this technique to LED modeling, we can achieve a more realistic representation of the light emitted from these devices, capturing the variability and directionality of radiation patterns more accurately.

It is important to clarify from the outset that the 'photon' concept we use here differs from the quantum mechanical photon, which exhibits wave-particle duality. Instead, in the context of MCPT, we treat photons as point-like entities with defined physical properties, such as direction and energy, which interact with the environment in a probabilistic manner. For simplicity, we will refer to these point-like entities as *photons* throughout the text.

Analysis and Results

To accurately simulate the spatial characteristics of LED emissions, two primary parameters must be defined: the initial coordinates (x, y, z) and the direction cosines (a_x, a_y, a_z). The initial coordinates are uniformly generated across the LED's emitting surface, considering the geometric dimensions of the device to ensure a realistic spatial distribution of emission origins. This approach accounts for the physical size and shape of the LED, ensuring that the emission simulation begins from points that reflect the actual light-emitting surface.

The direction cosines ($a_x = sin\,\theta\,cos\,\varphi$, $a_y = sin\,\theta\,sin\,\varphi$, $a_z = cos\,\theta$) are initialized based on the LED's radiation pattern as specified in the manufacturer's datasheet. This allows the simulation to reflect the directional intensity of the LED's light output, ensuring that the angular distribution of emitted light matches the real-world performance of the device.

In the simulation commercial LEDs, the azimuthal angle φ is determined by $\varphi=2\pi\xi$, where ξ is a random variable uniformly distributed in the interval [0,1]. This randomization ensures that the emission is distributed uniformly around the azimuthal angle. The elevation angles θ are sampled from the radiation pattern provided in the

datasheets [19-21], allowing the simulation to accurately reproduce the LED's specific angular emission characteristics.

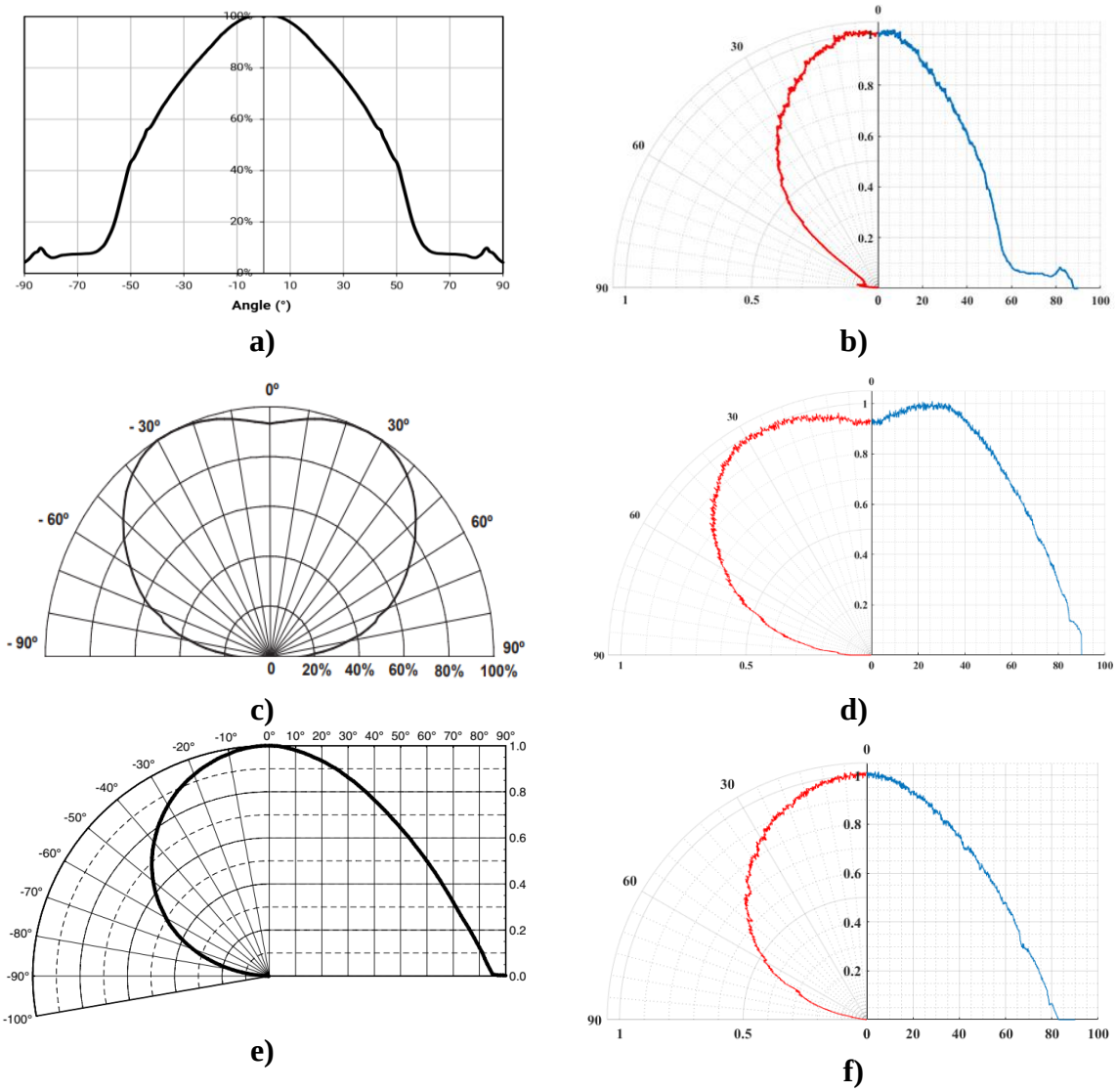

Figure 1. Emission patterns of different LEDs: CREE XLamp XR-E-LED (a-b), LUXEON K2 (c-d), OSRAM LEBP2MQ (e-f); a, c, e -from manufacturers' datasheets [19-21]; b, d, f - for sampled θ with 10^6 photons statistics using Monte-Carlo technique.

Figure 1 presents the simulated radiation patterns of three LEDs from world-renowned manufacturers (Cree, Luxeon, Osram). For greater clarity and identity, the θ distribution is shown in Cartesian (blue line) and polar coordinates (red line) simultaneously. Direct use of specifications from datasheets ensures high-accuracy simulation of real LED characteristics from different manufacturers. Moreover, Figure 1 illustrates the versatility and flexibility of our approach in simulating the emission characteristics of different types of LED devices.

To qualitatively assess the propagation of LED radiation, we simulated photon registration on planar detectors positioned at various distances from the LED along the radiation direction, using a sample size of 10 million photons (Figures 2-4). These figures show the relative distribution of radiation intensity as the distance from the emitter increases, with the number of photons contained in individual cells represented. For the simulation, the 100 mm planar detectors were divided into a 1000-cell grid,

with each cell measuring 0.1 mm by mm. The color bar indicates the number of photons detected in each cell. The top figures present the photon count in 2D, while the bottom ones provide a 3D visualization, offering insights into the beam's propagation profile.

For the CREE XLamp XR-E LED (Figure 2), which has a circular emitting surface area of 24.5 mm² (radius 2.8 mm), the simulation shows that the emission maintains a relatively narrow divergence, as expected. At a distance of 40 mm from the LED, the beam profile becomes nearly uniform. Notably, within a 10 mm radius from the center, each unit cell contains over 30 photons, representing only about 0.1% of the total photon count in this region. The remainder of the emission experiences significant angular divergence.

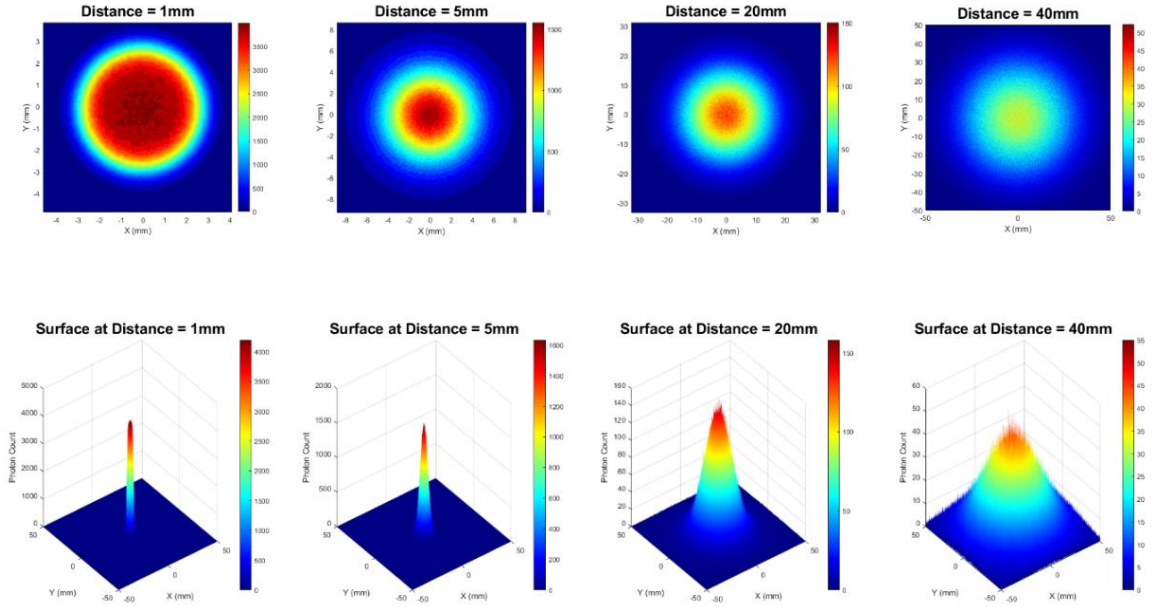

Figure 2. Radiation beam divergence characteristics of LED: CREE XLamp XR-E-LED.

The curvature of the beam profile (deviation from a perfectly circular shape), particularly noticeable at shorter distances, is linked to the LED's intrinsic radiation pattern (Figures 1a–b), where a small but distinct increase in intensity occurs near the 80-degree divergence angle.

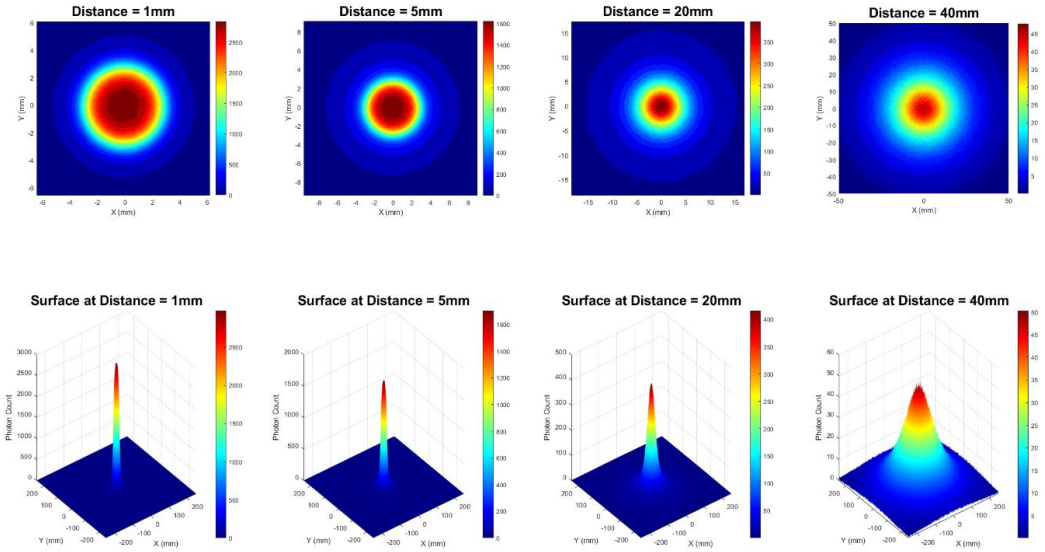

Figure 3. Radiation beam divergence characteristics of LED: LUXEON K2.

For the Luxeon LED, we observe a slightly different radiation propagation pattern, despite its emitting surface having a radius similar to the previous LED—2.83 mm. As seen in Figure 3, unlike the previous LED, the Luxeon LED maintains a higher radiation intensity at a distance of 40 mm from the emitting surface. This is due to its radiation pattern, which shows a relative efficiency of 0.9 at a divergence angle of up to 45 degrees. The noticeable curvature of the beam profile, particularly at shorter distances, is also attributed to the Luxeon LED's radiation pattern: at 0 degrees, the intensity is lower, reaching its maximum only between 20 and 30 degrees.

Unlike the first two LEDs, the Osram LEDs feature a rectangular emitting surface measuring 2.6 by 3.2 mm² and a radiation pattern closely resembling that of an ideal Lambertian radiator. As shown in Figure 4, the rectangular radiation profile is preserved at distances close to the source but dissipates as the distance increases. Compared to the other LEDs, the Osram LED exhibits the highest central intensity, with a maximum of 55 photons observed in the center.

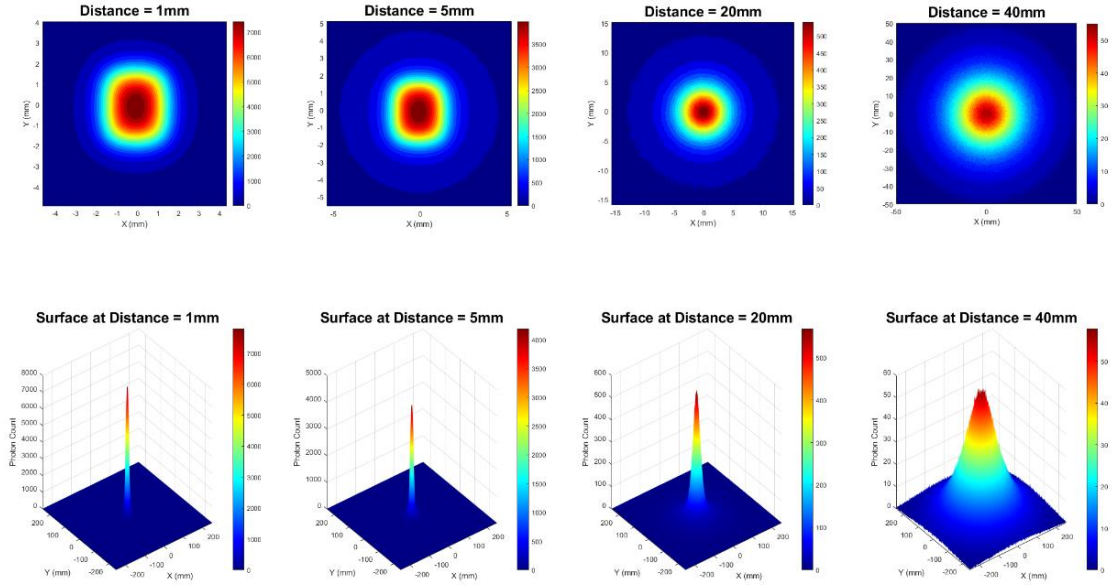

Figure 4. Radiation beam divergence characteristics of LED: OSRAM LE B P2MQ.

To enhance clarity and facilitate comparison, a 3D model of the emission propagation for each LED is presented in Figure 5. While the general shape of the first two LEDs is similar, there are distinct differences in their angular intensity distribution patterns. As shown in Figure 5, the OSRAM LED exhibits a wider divergence angle, and its 3D emission propagation model aligns with its characteristic radiation pattern.

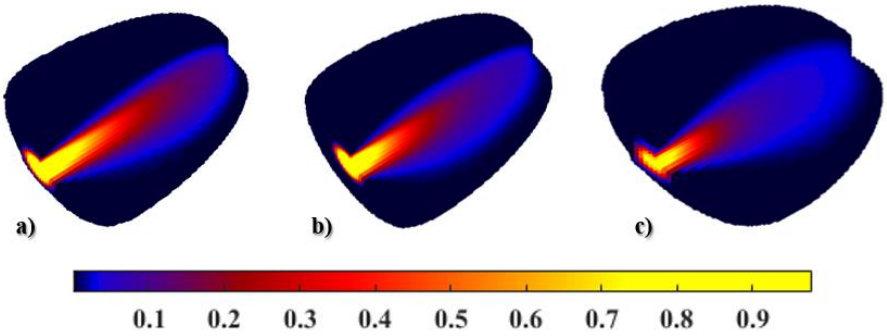

Figure 5. 3D propagation model of LED emission for: a) CREE XLamp XR-E-LED; b) LUXEON K2; c) OSRAM LE B P2MQ.

Conclusions

The proposed modeling approach demonstrates exceptional accuracy in replicating the emission characteristics of complex light sources, particularly light-emitting diodes (LEDs). This method not only aligns closely with actual emission profiles but also offers significant flexibility, enabling the accurate simulation of diverse radiation patterns. Moreover, the final radiation characteristics are often provided in the manufacturer's datasheets, eliminating the need to model secondary optical elements separately. This simplification reduces complexity while maintaining precision in simulations.

Based on the research and experience outlined in this article, the following proposals are recommended:

1. The proposed modeling technique provides accurate simulations of complex emission patterns.
2. This method significantly simplifies the development of precise simulation models.
3. The technique is flexible and can be integrated into any system involving LED illumination.

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IMPACT OF OXIDE MATERIALS ON SELF-HEATING EFFECT AND SUBTHRESHOLD SLOPE IN 2D MoS_2-BASED MOSFET

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Annotatsiya. Ushbu maqolada turli xil zatvor va orqa oksidli materiallar asosidagi ikki olchamli MoS_2 kanalli 2D MOSFET larda o‘z-o‘zini qizdirish effekti (SHE) va bo‘sag‘adan past sohada o‘tish xarakteristikasining qiyaligi (SS) modellashtirish orqali o‘rganilgan. Ushbu ishda Al_2O_3 va HfO_2 oksidlari zatvor oksidi materiallari sifatida, SiO_2 va HfO_2 esa orqa oksidi materiallari (BOX) sifatida tanlangan. Kanalning markazidagi panjara temperaturasi va SS ning zatvor uzunligiga bog‘liqligi zatvor osti va orqa oksidi materiallarining turli kombinatsiyalari uchun ko‘rildi. Zatvor oksidi materiali sifatida Al_2O_3 va BOX materiali sifatida SiO_2 dan foydalanish nisbatan past SS ga olib kelishi va zatvor oksidi materiali sifatida va BOX materiali sifatida HfO_2 oksididan foydalanish SHE ortishiga qarshi yuqori imunitet hosil qilishligi ko‘rsatilgan.

Kalit so‘zlar: *2D MoS_2, o‘z-o‘zini qizdirish effekti, bo‘sag‘adan past sohada xarakteristikaning qiyaligi, MOYa transistor, panjara temperaturasi.*

Аннотация. В этой статье эффект саморазогрева (SHE) и подпороговый наклон (SS) при различных материалах затвора и заднего оксида в 2D MOSFET на основе MoS_2 были рассмотрены посредством моделирования. В этом исследовании оксиды Al_2O_3 и HfO_2 были выбраны в качестве материалов затворного оксида, а SiO_2 и HfO_2 - в качестве материалов заднего оксида (BOX). Температура решетки в центре канала и зависимости SS от длины затвора были рассмотрены при различных материалах затворного оксида, BOX и их комбинациях. Показано, что использование Al_2O_3 в качестве материала затворного оксида и SiO_2 в качестве материала BOX приводит к относительно низкому SS, а использование HfO_2 в качестве материала затворного оксида, а также материала BOX приводит к высокой устойчивости к SHE.

Ключевые слова: *2D MoS_2, эффект саморазогрева, подпороговый наклон, МОП-транзистор, температура решетки.*

Abstract. In this paper self-heating effect (SHE) and subthreshold slope (SS) at different gate and back oxide materials in 2D MoS_2-based MOSFET were considered through simulation. In this study, the Al_2O_3 and HfO_2 oxides were selected as gate oxide materials and SiO_2 and HfO_2 as back oxide (BOX) materials. The lattice temperature in the channel center and SS dependences on the gate length were considered at different gate oxide, BOX materials, and their combinations. It is shown that using Al_2O_3 as gate oxide material and SiO_2 as BOX material result in relatively low SS, and using HfO_2 as gate oxide as well as BOX material results in high immune against SHE.

Keywords: *2D MoS_2, self-heating effect, subthreshold slope, MOSFET, lattice temperature.*

Introduction

Decreasing the sizes of metal-oxide-semiconductor field effect transistors (MOSFET) up to the nanoscale induces different degradation effects such as the impact of variability [1], short channel effects [2 - 4]. It considerably restricts the continuation of the scaling of MOSFETs. Therefore, different ways to avoid this restriction are suggested. One of the popular suggestions is the use of two-dimensional materials as a channel material in MOSFET. Two-dimensional molybdenum disulfide (MoS_2) is well known as a transition metal dichalcogenide which is suggested to using in MOSFET [5 - 7]. A two-dimensional channel in 2D MOSFET is surrounded by oxide materials: top by gate oxide and bottom by back oxide. Oxide materials have low thermal conductivity; therefore, it results in arising SHE in 2D MoS_2-based MOSFET. SHE has an essential effect on nanoscale tri-gate SOI FinFETs [8], as well as on the drain current of 2D material-based MOSFET [9].

It is known, SHE mainly is defined by thermal conductivity, while SS is defined by the dielectric constant of oxide materials surrounding the channel [10]. The thermal conductivity and dielectric constant are not connected to each other directly, therefore it needs to define an optimal combination of gate oxide and BOX material which results in low SHE as well as SS.

From this point of view, in this work, the SHE and SS dependence on oxide materials such as Al_2O_3, HfO_2, and SiO_2 and their combinations are studied by simulation. SiO_2 material as gate oxide is not considered in this study because it has a small dielectric constant.

Research Methodology

TCAD Centaurus program was used in the simulation. MoS_2 material is not included in the list of materials in this program, therefore the method for simulation developed in the [6] and applied in [9] is used in this work. For consideration of the self-heating effect, the thermodynamic transport model is included in conjugation with the drift-diffusion transport model.

Analysis and Results

The structure of the considered 2D MOSFET is shown in Figure 1. The thickness of the transistor channel is 0.65 nm. Transistor length L depending on gate length Lg is in the range from 60 nm to 300 nm and the ratio L/Lg =3. The thickness of the aluminum gate is 2 nm and the considered lengths is 20nm, 30nm, 50nm, and 100nm.

The carrier mobility in the channel depends on the gate oxide material, therefore the used mobility in the case of Al_2O_3 as gate oxide is 125 cm^2/Vs [6] and in the case of HfO_2 is 320 cm^2/Vs [11].

Four different combinations of using the oxide materials as a gate oxide and back oxide were considered (Table 1). In this combination, the equivalent thickness of gate oxide is 1nm. Using SiO_2 with a thickness of 1nm as gate oxide results in arising a leakage current between the gate and channel. Therefore, SiO_2 is not considered as a gate oxide material in the mentioned above combinations.

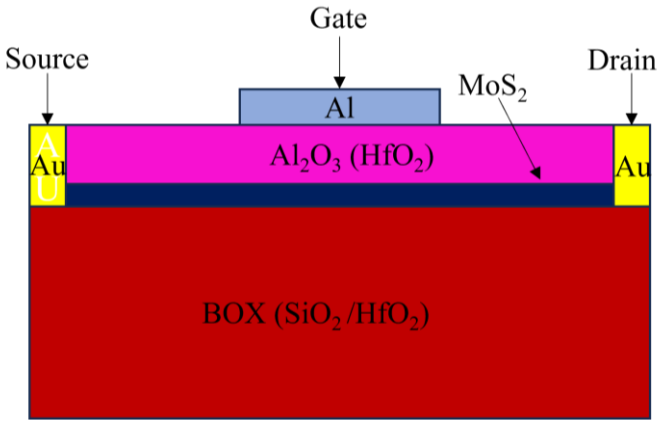

Figure 1. The structure of the simulated 2D MoS_2-based MOSFET.

Besides analysis of the literature show that Al_2O_3 is not used as a back-oxide material, therefore we also have not considered this oxide as BOX material.

The thickness of BOX considerably influences the temperature in the channel [12]. Increasing the thickness of the BOX results in increasing the temperature. The thickness of BOX considerably influences the temperature in the channel [12]. Increasing the thickness of the BOX results in increasing the temperature. Therefore, we have chosen the BOX thickness T_{box} = 80 nm as in the [13].

Table 1. combinations of the materials for gate oxide and back oxide

The number of combinations	Gate oxide material	BOX material
1	Al_2O_3	SiO_2
2	HfO_2	SiO_2
3	Al_2O_3	HfO_2
4	HfO_2	HfO_2

SHE at different combinations of the gate oxide and the back-oxide materials. SHE is defined by the temperature in the channel. The temperature in the channel depends on the heat generation as well as the heat dissipation rates. For providing the same heat generation rates, in all considered cases, the applied voltages and geometries of the transistor structures were the same. Therefore, the difference in the channel temperature for the different oxide materials combinations is defined only by the heat dissipation rate

The dependence of the temperature in the middle of the channel on the gate length for the different combinations of the oxide materials in 2D MoS_2-based MOSFET is shown in Figure 2. The temperatures are defined for gate and drain voltage V_g = 0,1 V and V_d = 0,4 V respectively. It is seen in the figure, that the temperature is increased with decreasing the gate length. At the same drain voltages for the longer channel transistors drain current is lower because of higher channel resistance. Therefore, for the transistors with shorter channels, the temperature in the channel middle is higher. Besides it is also seen the lattice temperature dependence on the oxide materials. For the transistor with a gate length 20nm, the temperature is higher for the 1st and 2nd combinations with respect to the 3-rd and 4-th combinations. It can be explained by using as BOX material SiO_2, with relatively low thermal conductivity, in the 1-st and

2-nd combinations, and HfO_2, with higher thermal conductivity (1.5 times higher), in the 3-rd and 4-th combinations.

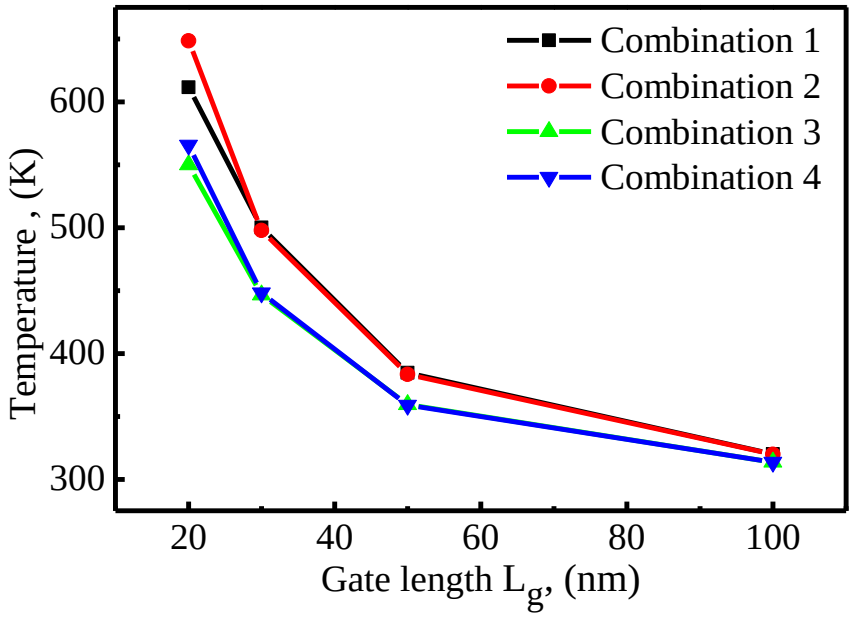

Figure 2. The dependence of the temperature in the middle of the channel on the gate length for the different combinations of the oxide materials.

The thermal conductivities used in the simulation are shown in Table 2. Obviously, BOX material with respect to the gate oxide material, has the main influence on the lattice temperature. For the first group (1-st and 2-nd combinations) as well as for the second group (3-rd and 4-th combinations) the lattice temperature is higher for 2-nd and 4-th combinations where HfO_2 is used as gate oxide (Figure 2).

Table 2. dielectric constants and thermal conductivities used in the simulations.

Oxide materials	**The thickness of oxide layers (nm)**	**Dielectric constants**	**Thermal conductivities,** $W/m \cdot K$
SiO_2	80	3.9	1.4
Al_2O_3	2.385	9.3	12
HfO_2 (gate oxide)	5.641	25	2.3
HfO_2 (Box)	80	25	2.3

Thermal conductivity of HfO_2 less by 5 times in comparing to the thermal conductivity of Al_2O_3 which is used as gate oxide material in 1-st and 3-rd combinations 4125(Table 2). Thermal conductivity for Al_2O_3 and HfO_2 depending on sizes and temperature is in the range 6–30 $W/m \cdot K$ [14] and 0,27–4,3 $W/m \cdot K$ [15] respectively.

SS at different combinations of the gate oxide and the back oxide materials.

For comparing the effects of the oxide's combinations on SHE and SS, the simulation of SS dependence on the gate length has been carried out for all 4 oxide combinations. The influence of the gate and back oxide materials on SS is the result of the dependence of the carrier distribution in the transistor channel on the dielectric constant of oxide materials. The Change of the carrier distribution results in changing of I-V and therefore of the value of SS.

Results of the simulation show a more significant dependence SS on the gate length for the second combinations group (3-rd and 4-th combinations) rather than for the first group (1-st and 2-nd combinations) (Figure 3). SS is higher for the second group in all range of the gate length. In this group, the dielectric constant of the BOX materials is higher.

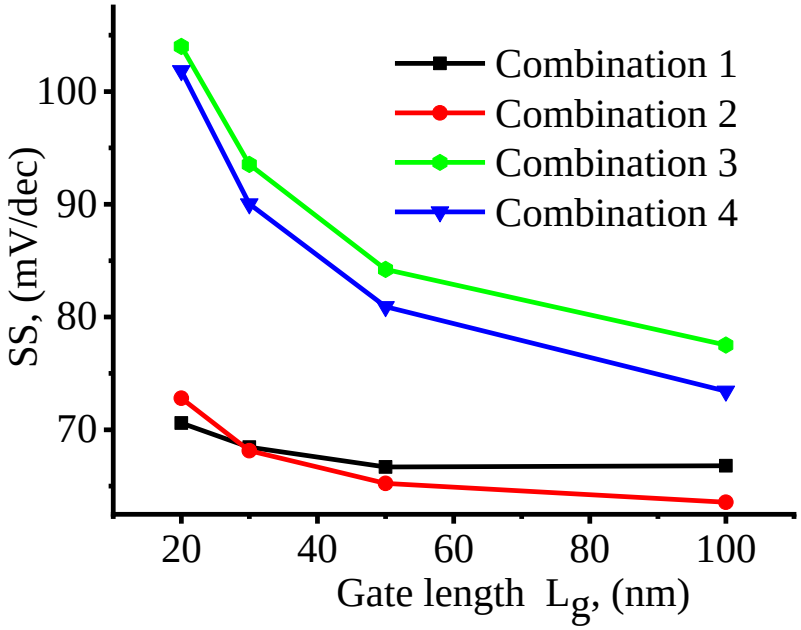

Figure 3. SS dependence on the gate length for different oxide materials combinations in 2D MoS_2-based MOSFET.

BOX material HfO_2 is used as BOX material and the dielectric constant for this is $\varepsilon_{HfO_2} = 25$. In the first group, the SiO_2 is used as BOX material, it has a relatively low dielectric constant ($\varepsilon_{SiO_2} = 3.9$) and appropriate low SS. Therefore, SS more significantly depends on the dielectric constant of the back oxide material and is higher for the higher dielectric constant of the BOX material. While in the second group, SS dependence on the dielectric constant of the gate oxide is reverse, that is at the same dielectric constant of the back oxides, SS is lower for transistors with gate oxide with a higher dielectric constant. The same dependence is also seen for the first group (1-st and 2-nd combinations) at gate length 30nm and higher.

Choice of the optimal combination of oxides to increase the immunity against both SS and SHE degradation effects.

SHE as well as SS is more significant in short channel transistors, therefore SHE and SS dependences on the combination number are presented in Fig. 4 for the transistor with a gate length of 20 nm. This figure is constructed using the data from the Fig.2 and Fig. 3. It is seen in Fig. 4, that the dependences of the SHE and SS on the number of combinations are different, even is opposite. For the first group of combinations, SHE is high and SS is low, while for the second group SS is high and SHE is low. In the Fig. 4 it is seen, for providing possible low SHE as well as SS in 2D MoS_2-based MOSFETS it is expediently to use BOX material with dielectric constant in the range from 3.9 to 25 and with thermal conductivity in the range from 1.4 to $2.3 W/m \cdot K$.

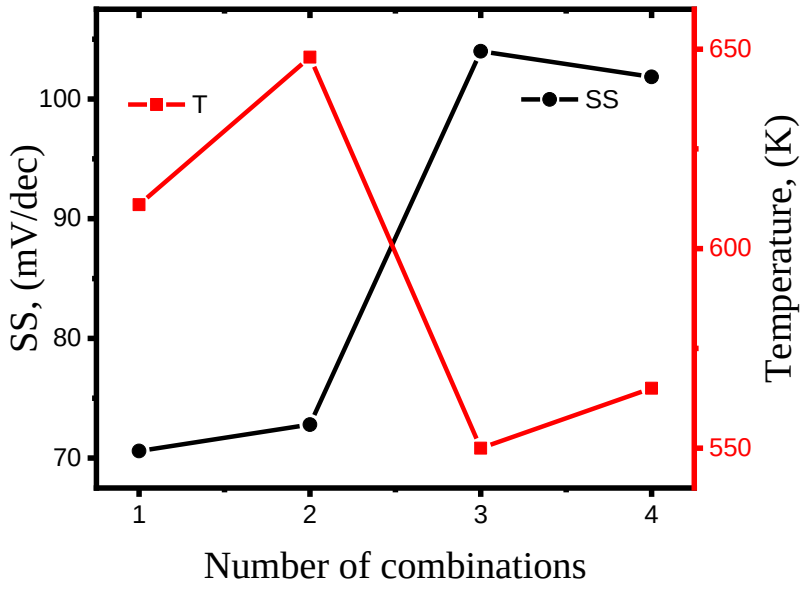

Figure 4. SHE and SS dependence on the combination number oxide materials for 2D MoS_2-based MOSFET.

Conclusions

Simulation results show in 2D MoS_2-based MOSFETs the SHE and SS are mainly defined by electrical and thermal properties of the BOX material rather than gate oxide material.

Increasing the immunity against SHE as well as SS degradation by choosing the gate oxide and back oxide materials is a problem of optimization. For providing higher immunity against SHE it is expediently to use the second group of combinations of oxide materials and for reaching high immunity against SS degradation is better to use the first group of combinations of oxide materials.

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UDC: 539.3, 550.8, 62, 624

RESEARCH OF THE PHYSICAL AND MECHANICAL PROPERTIES OF SALINE SOILS ON THE BASIS OF BUILDINGS AND STRUCTURES IN THE TERRITORY OF OUR COUNTRY

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Annotatsiya. Ushbu maqolada sho‘rlangan gruntlar mustahkamlik va deformatsiya xossalaring inshootlar asosiga ta’sirini baholash, dunyoda va mamlakatimizda sho‘rlangan gruntlardan foydalanish vaqtida sodir bo‘ladigan bino va inshootlarning avariyaviy holatlarini baholash bilan bog‘liq bo‘lgan ilmiy tadqiqotlar natijalari, sho‘rlanish darajasini uzoq vaqt suv ta’sirida o‘zgarishini hisobga olgan holda avariyali holatlarni kuzatilishi, mamlakatimizda sho‘rlangan gruntlar tarqalgan hududlarda bino va inshootlarni xavfsiz, samarali ishlashi uchun muhandislik-geologik va gidrogeologik tadqiqot ishlarini olib borish bo‘yicha ma’lumotlar keltirilgan.

Kalit so‘zlar: *gruntlar, sho‘rlangan gruntlar, mustahkamlik, deformatsiya, fizik -mexanik xossalar, filtratsiya koeffitsienti, inshootlar, yer osti suvlari, qiyin eriydigan tuzlar, sulfat-xloridli sho‘rlanish, xlorid-sulfatli sho‘rlanish, sulfatli sho‘rlanish, sodali sho‘rlanish.*

Аннотация. В данной статье представлены результаты научных исследований, связанных с оценкой влияния прочностных и деформационных свойств засоленных грунтов на основания сооружений, оценкой аварийных ситуаций зданий и сооружений, возникающих при эксплуатации засоленных грунтов в мире. А в нашей стране - информацию о солености по мониторингу чрезвычайных ситуаций с учетом многолетних изменений уровня воды под воздействием воды и по проведению инженерно-геологических и гидрогеологических изысканий для безопасной и эффективной эксплуатации зданий и сооружения в районах нашей страны, где разбросаны засоленные почвы.

Ключевые слова: *грунты, засоленные грунты, прочность, деформация, физико-механические свойства, коэффициент фильтрации, сооружения, подземные воды, труднорастворимые соли, сульфатно-хлоридное засоление, хлоридно-сульфатное засоление, сульфатно-солевое засоление, содовое засоление.*

Abstract. In this article, the results of scientific research related to the evaluation of the effect of strength and deformation properties of saline soils on the foundations of structures, the assessment of emergency situations of buildings and

structures that occur during the use of saline soils in the world and in our country, salinity information on the monitoring of emergency situations taking into account the long-term changes in the level of water under the influence of water, and on conducting engineering-geological and hydrogeological research works for the safe and efficient operation of buildings and structures in areas where saline soils are scattered in our country.

Keywords: *soils, saline soils, strength, deformation, physical-mechanical properties, filtration coefficient, structures, underground water, hard-to-dissolve salts, sulfate-chloride salinity, chloride-sulfate salinity, sulfate salt salting, soda salting.*

Introduction

In the construction of buildings and structures in the countries of the world where saline soils are distributed, during the period of their use as a basis, the issues of forecasting and reducing the consequences of emergency situations that may occur due to changes in engineering-geological and hydrogeological conditions are of great importance [1, 2]. A number of scientific studies related to the assessment of emergency situations of buildings and structures that occur during the use of saline soil are being carried out in the world. Special attention is paid to the assessment of emergency situations, taking into account the change of the salinity level due to the long-term influence of water, to the improvement of measures that ensure the safe use of buildings and structures during their use. Certain progress is being made in carrying out engineering-geological and hydrogeological research works for the safe and efficient operation of buildings and structures in areas where saline soils are scattered in our country. In particular, in the regions of Bukhara, Jizzakh, Syrdarya, Khorezm, Fergana and the Republic of Karakalpakstan, saline soils have been thoroughly studied and evaluated based on the determination of engineering-geological and hydrogeological factors [5].

Literature Review

Many scientists have worked on engineering-geological research and their use. Including, Braja M.D., David G.P., Kuhn W., Neal B.G., Harutyunyan A.R., Bartholomey I.L., Bezruk V.M., Babakhanov P.B., Glaz A.A., Grot A.I., Ziangirov R.S., Zatenatskaya N.P., Yerusalimskaya M.F., Karpushko M.O., Kiyalbanev A.K., Kirillov A.A., Klapatovskaya N.A., Kuznetsov Yu.V., Kayumov A.D., Qalandarov T.Kh., Mordovich S.S. and many scientists. To date, theoretical and practical studies on the study of the amount and type of salts contained in saline soils on the basis of buildings and structures, as well as modeling of their effect on accounting indicators, have been widely studied by scientific centers, universities and scientific research institutes of leading countries.

During the operation of buildings and structures built on saline soils, man-made level of underground water is formed under the structure due to natural and artificial factors [7, 8].

Research Methodology

Major researchers of the world and our country have conducted research on the effect of the amount and type of salts in the saline ground base on its physical and mechanical properties. The results of their scientific research are included in several regulatory documents aimed at ensuring the integrity and safe operation of buildings and structures in areas with saline soils. However, in the developed regulatory documents, changes in their physical and mechanical properties due to leaching of salts contained in saline soils have not been fully studied and paid attention to. The analysis of the emergency situation of some objects in the conditions of Uzbekistan shows that the factors affecting the change in the values of the physical and mechanical properties of the foundation soils used in the calculation of the stability of buildings and structures (for example: long-term water seepage, salt content, etc.) are not sufficiently taken into account. At the same time, as a result of the conducted research, it is shown that the actual subsidence of the existing structures increased by 1.5-2.0 times compared to the design when saline soils were wetted and water seeped for a long time.

Analysis and Results

Saline soils are divided into the following types: chloride, sulfate-chloride, chloride-sulfate, sulfate and soda, as well as according to the degree of salinity: low salinity, medium salinity, strong salinity and extremely strong salinity. Table 1 shows the amount of salinity of saline soils by district in Jizzakh region of the Republic of Uzbekistan [5, 6].

Table 1. Classification of soil salinity by districts in Jizzakh region, % (according to V.M. Bezruk).

№	Regions	Weak Salted (from 0,3 - to 1,0)	Moderately salty (from 1,0 to 5,0)	Strong salted (from 5,0 to 8,0)	Extra salted (>8,0)
1	Jizzakh	2,4	1,2	-	-
2	Sh.Rashidov district	-	2,7	3,1	-
3	Pakhtakor district	1,2	17,5	24,3	26,7
4	Zafarabad district	2,1	13,1	14,3	12,9
5	Dostlik District	2	12,1	12,2	11,9
6	Arnasoy district	2,6	12,8	13,5	12,8
7	Mirzachol district	1,6	13,7	12,9	12,3
8	Forish district	-	2,6	1,8	1,2
9	Ghallarol district	3,2	2,5	-	-
10	Bahmal district	-	-	-	-
11	Zomin district	-	-	-	-
12	Zarbdar district	1	1,1	-	-
13	Yangiabad district	-	-	-	-

In different natural conditions of Uzbekistan, in the areas of the Mirzachol plains, saline soils of different quantities and composition are found. The most common salts in soil are the following: $NaCL$, $Na_2SO_4 \cdot 10H_2O$, $MgSO_4 \cdot 7H_2O$, $MgCL_2 \cdot 6H_2O$, $CaCL_2 \cdot 6H_2O$, $NaHCO_3$, $Na_2CO_3 \cdot 10H_2O$, $CaCO_3$ ва $CaSO_4 \cdot 2H_2O$. The amount and quality of these slightly soluble salts determine the physical and mechanical properties of soils. Sources of salinity of saline soils are mineralized waters that evaporate and release a certain amount of salt, the process of enriching the composition of rocks with salts. In the territory of Uzbekistan, in particular, in the desert regions of the Jizzakh

region, there are mainly sources of two types of salinity, that is, strong and extremely strong. At the same time, salinization of soils without the influence of groundwater from saline rocks is also observed. In recent years, deformation of civil and industrial buildings built on saline soil due to the increase in the construction volume of buildings and structures in arid and semi-arid regions has been observed a lot. A distinctive feature of saline soils is the change in the physical and mechanical properties of such soils during the process of water saturation and alkali leaching of salts. Today, in the desert regions of Jizzakh region, especially in Pakhtakor district, saline areas are rapidly expanding. The leaching of salts and the rate of its continuation are closely related to the properties of saline filtration. Many studies on the filtration properties of saline soils show that the process of changing the filtration coefficient is complex due to the dissolution and leaching of salts. Methods for determining the filtration coefficient of soils in laboratory conditions are carried out according to GOST 25584-2016. Filtration coefficient: represents the permeability characteristic of the soil with respect to a certain amount of filtered water. Also, the linear filtration law is equal to the uniform pressure gradient and the filtration rate of water. In laboratory conditions, it was found that the filtration coefficient is correlated with the plastic number and porosity coefficient of the soil as follows:

For porosity coefficient $0{,}65 \le e_0 \ge 0{,}85$ and values of plastic number $0.65 \le I_p \ge 17$:

$$K_f = -1{,}05\times10^{-7}+1{,}86\times10^{-6} / I_p, \quad (\text{cm/sec}). \qquad (1)$$

For porosity coefficient $0{,}55 \le e_0 \ge 0{,}65$ and values of plastic number $3 \le I_p \ge 14$:

$$K_f = 9{,}02\times10^{-9}+2{,}33\times10^{-7} / I_p, \quad (\text{cm/sec}). \qquad (2)$$

For porosity coefficient $0{,}55 \le e_0 \ge 0{,}65$ and values of plastic number $3 \le I_p \ge 14$:

$$K_f = 3{,}50\times10^{-9}+2{,}55\times10^{-7} / I_p, \quad (\text{cm/sec}). \qquad (3)$$

On average, the following expression was adopted based on the results of all experiments (the range of variation of porosity coefficient $0{,}45 \le e_0 \ge 0{,}85$, the range of variation of plasticity number:

$$K_f = 8{,}73\times10^{-9}+2{,}37\times10^{-7} / I_p, \quad (\text{cm/sec}) \qquad (4)$$

For sandy soils, the filtration coefficient depends on the amount of particles smaller than 0.1 mm. The following relationship was determined for values of porosity coefficient $e=0.65\div0.75$:

$$K_f = 2{,}64\times10^{-4} - 6{,}33\times10^{-6} \times G \quad (\text{cm/sec}), \qquad (5)$$

here: G- the percentage of particles smaller than 0.1 mm in size.

In saline areas, subsidence and suffocation may occur due to the use of the structure or changes in the underlying hydrogeological conditions. Easily and moderately soluble salts can also be washed away, and the type of ground changes due to the release of salts from the foundations of structures (for example, when examining the ground of the foundation - solid soils, when examining the structure in a state of emergency - loose soils). As a result of water saturation and alkali leaching of such soils, the values of their deformation and strength characteristics are significantly reduced. The analysis results of the studies show strong salinity of the subsoil and leachate soils. This situation can be explained by the rise of mineralized underground water to the surface of the earth through the capillaries in them. In such conditions, an increase in the amount of salt in the surface layers of soils is observed.

Conclusions

In a number of areas of Uzbekistan where saline soils are spread, we can observe the decrease in the strength of the foundation soils as a result of the rise of groundwater and flooding of the area, as a result, the increase in the emergency condition of buildings and structures. It is desirable to conduct experiments related to studying the laws of changes in their strength during filtration washing of saline soils based on observed buildings and structures, as well as studying the microstructure of saline soils. It is necessary to give recommendations and suggestions aimed at ensuring the strength of the foundation of the developed structures and stability to deformation based on the results of researches on determining the deformation and strength of saline soils. It should be noted that when designing structures in such soils, it is necessary to take into account the decrease in strength and deformation characteristics caused by the wetting of the foundation of the structure and the leaching of easily, moderately and difficultly soluble salts.

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DEVELOPMENT OF A MATHEMATICAL MODEL OF COMFORTABLE THERMAL CONDUCTIVITY OF TEXTILE MATERIALS

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Annotatsiya. Ushbu maqolada to'qimachilik materiallarining qulay issiqlik o'tkazuvchanligining matematik modelini ishlab chiqish va uning inson tanasining issiqlik samaradorligi, ya'ni berilgan issiqlik miqdori bilan bog'liqligi, shuningdek materialning issiqlik o'tkazuvchanligini hisobga olgan holda zarur ma'lumotlar keltirilgan.

Kalit so'zlar: *model, to'qimachilik, material, kiyim-kechak, matematika, issiqlik, o'tkazuvchanlik.*

Аннотация. Данная статья содержит необходимую информацию о разработке математической модели благоприятной теплопроводности текстильных материалов и о том, что она связана с тепловой эффективностью человеческого тела, то есть количеством отдаваемого тепла, а также с учетом теплопроводности материала.

Ключевые слова: *модель, текстиль, материал, текстильная ткань, одежда, математика, теплопроводность.*

Abstract. This article contains the necessary information on the development of a mathematical model of favorable thermal conductivity of textile materials and the fact that it is related to the thermal efficiency of the human body, that is, the amount of heat given, as well as taking into account the thermal conductivity of the material.

Keywords: *model, textile, material, clothing, mathematics, heat, conductivity.*

Introduction

For a detailed description of the process of thermal comfort and heat transfer of clothing to the external environment, it is necessary to take into account the following determining factors that are associated with the heat productivity of the human body, that is, with the amount of heat given by a pregnant woman to the external environment, as well as taking into account the thermal conductivity of the material, that is, the resistance of clothing, the climate of the environment and working conditions also affect here, that is, the physical activity of a person [1].

Literature Review

Based on the above, we have developed a mathematical model of comfortable thermal conductivity. Taking into account a number of factors when developing a model helps to increase the reliability of designing comfortable clothes. Ultimately, clothing should provide thermal comfort to the body under various weather conditions and physical exertion. This is a very important, but practically a very difficult task. Therefore, there are many approaches and techniques for thermal calculation of clothing [2].

Mathematical modeling of the comfort feeling of thermal protective clothing is carried out according to the following principle. This model is based on the correspondence of human heat production (metabolism – M) with heat transfer to the external environment. The heat flow from the source into the mass of the material is distributed due to thermal conductivity. Schematically, this process can be described according to the following scheme [3].

Research Methodology

The following designations are given in this diagram: Z, X, Y – values of input and output parameters; B - a parameter that takes into account the type of material; T_h, T_0, $T_{air,}$ T_l– accordingly, the initial temperature of the source, the material (initial), the environment and the layer, °C; L_l- the thickness (m) of the material; N - number of layers; τ_h - time, °C; x – (the coordinate of the thickness of the materials; physical properties of the material: ρ_l, - Matching density (кg/m^3), c_l- average specific heat

capacity (J/(kg·°C)), and λ_l -is the thermal conductivity (W/ (m·°C)). α_{air} is the heat transfer coefficient (to air), W/(m^2·°C); t - time, s; q_{air} - heat flow per unit area (from material to air), W/m^2; q - heat flow per unit area (from source to material), W /m^2; T_w - is the temperature of the material, °C.

From logical considerations, it is clear that if heat transfer becomes greater than human heat production, then the body will be uncomfortable. Because there will be a feeling of cold. If the opposite happens, then in this case the person will feel uncomfortable, because he begins to sweat.

Sweating occurs because due to the removal of moisture from the body, additional energy is carried away, i.e. the body seeks to balance its heat production with heat transfer. Therefore, there is an optimal range between metabolism and heat transfer, at which a person feels comfortable. Thus, the task boils down to determining the heat transfer of clothing [4].

Analysis and Results

Heat transfer can be represented as:

$$Q = \alpha(T_w - T_0) \qquad (1)$$

here Q is the heat transfer having a dimension of W/m^2, α is the heat transfer coefficient, T_w is the temperature on the surface of clothing, T_0 is the temperature [3].

The movement of the heat flow from the surface of the source (from the underlying layer) into the environment is characterized not only by the properties (thermal conductivity) of the clothing material, but also by heat transfer, that is, the process of thermal interaction between the material and the medium, which is carried out simultaneously as a result of thermal conductivity [5].

It can be seen from expression (1) that the unknown parameter is the temperature on the surface of the garment T_w. To search for this unknown, consider the problem shown in Figure 1. In this figure, the human body is located along the 0Y the human body is located, from 0 to L_1 is the first fabric of clothing (undershirt, T-shirt) from x= L_1 to x=L_2 is the second fabric of clothing, $T_{тело}$ is human body temperature, T_0 is the ambient temperature. It is required to find heat transfer to the environment. To solve this problem, we denote by k_1, k_2 the thermal conductivity of the first and second clothes, and by L_1 и L_2, respectively, their thicknesses [6].

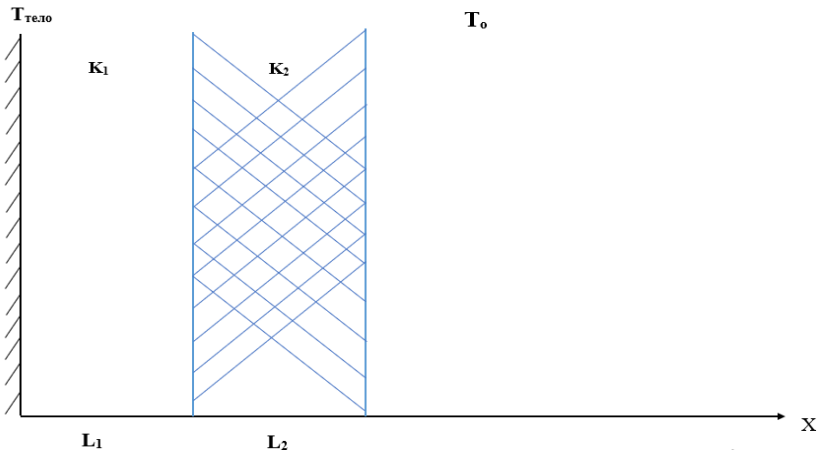

Figure 1. The area of calculation of the temperature distribution.

To solve this problem, let's consider the nonstationary equation of thermal conductivity in a one-dimensional formulation:

$$\frac{\partial T}{\partial t} = \frac{\partial}{\partial x}\left(k\frac{\partial T}{\partial x}\right) \quad (2)$$

An initial condition is set for equation (3) $T(0,x) = \mathrm{T}_{body}$ and boundary conditions:

$$T(t,0) = \mathrm{T}_{body}, \qquad -\lambda\frac{\partial T}{\partial x} = \alpha(T - T_0)\ at\ x = L_1 + L_2 \quad (3)$$

here $\lambda -$ the coefficient of thermal conductivity of clothing.

The process of thermal conductivity is determined by the coefficient of thermal conductivity λ. The unit of measurement of the thermal conductivity coefficient, W/(m K). The coefficient shows the amount of heat that passes through 1 m^2 of material with a thickness of 1 m at a temperature difference of 1 K, over time.

As can be seen from the table, the thermal conductivity coefficient of water is almost 30 times higher than that of air. This is a very important factor in assessing the thermal conductivity of clothing. The structure of textile materials is very complex. They have a porous structure that consists of fibers and air filled with these pores. The pores are distributed between the fibers, as well as inside them. Their shapes and sizes are diverse, they have micro- and macro-capillaries, they can be through and closed. [6]

The transfer of heat flow through a textile material with a complex, heterogeneous porous structure is carried out depending on the coefficient of thermal conductivity of fibers and air, which is located in closed pores, convection of the flow through pores, as well as heat emission by the pore walls. Based on the above, it can be argued that the thermal conductivity coefficient of textile materials characterizes the ability of a material to transfer thermal energy not only depending on the thermal conductivity of the material, but also by convection and heat emission [5]. According to their structure, textile materials for clothing have high porosity, a relatively small area of interaction between individual fibers and they practically do not differ in thermal conductivity. Therefore, the thermal conductivity of textile materials is characterized mainly by the thermal conductivity of air in closed pores and convection through pores [7].

This contributes to the fact that an increase in the volume of porosity of the material structure to a certain limit reduces the thermal conductivity of textile materials, due to the fact that the thermal conductivity of the fibers is higher than the thermal conductivity of the air. It should be noted that with a further increase in the volume of porosity, in the case of open through pores, the thermal conductivity of materials may increase, since the influence of another process increases here, i.e. convection already begins to play an important role.

Conclusions

Thus, a mathematical model of the thermal conductivity of layered materials has been developed, which allows you to select the control effects on the process according to the criterion of temperature comfort. A methodology and software product for thermal calculation of clothing are proposed, which specifies the following parameters: thermophysical properties of materials and clothing packages, environmental conditions, human condition, different degrees of cooling of individual body parts. This technique is the basis for designing comfortable clothes of various ranges.

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COMPUTATIONAL ALGORITHM OF THE PRINCIPAL COMPONENTS METHOD

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Annotatsiya. Ko‘p parametrli boshqaruv obyektlarning eng katta informatsion belgilarini aniqlash uchun bosh komponentlar usulini umumlashgan algoritmi ishlab chiqilgan. Omillarni sifat tahlilida qoldiq bog‘lanishlar matritsasining roli tadqiq qilindi.

Kalit so‘zlar: *ko‘p parametrli boshqaruv, matritsa, sifat tahlili, algoritm.*

Аннотация. Разработан обобщенный алгоритм метода главных компонент для выделения наиболее информативных признаков многопараметрических объектов управления. Исследована роль матрицы остаточных связей в качественном факторном анализе.

Ключевые слова: *многопараметрическое управление, матрица, качественный анализ, алгоритм.*

Abstract. A generalized principal component method algorithm has been developed to identify the most informative features of multi-parameter control objects. The role of the matrix of residual connections in qualitative factor analysis has been studied.

Keywords: *multi-parameter control, matrix, qualitative analysis, algorithm.*

Introduction

When solving a wide class of problems, one has to face the identification of patterns of changes in certain parameters in a complex. In this regard, the problem of effective modeling of the process under study using modern methods of statistical analysis, in particular, the principal component method, is of great importance.

The latter makes it possible to identify the influence of various factors and obtain relatively simple analytical models that connect these factors with the main indicators of the process under consideration [1-3].

Research Methodology

The main essence of the principal component method is that if objects are described by a state vector $X(x_1, x_2, ..., x_n)$, then you can find some functions $Z(x_1, x_2, ..., x_n)$, which are linear combinations of the components of the state vector and have the property that the contribution of each of them to the total variance decreases with the function Z_1 to function Z_n determine the bulk of the dispersion of images. Therefore, if two principal components are defined $Z_1(x_1, x_2, ..., x_n)$ and $Z_2(x_1, x_2, ..., x_n)$, then the diagram is in coordinates $Z_1 - Z_2$ allows you to find a possible partition of objects into subsets, those. solve the problem of pattern recognition [2].

The mathematical model of the multiparameter process under consideration is determined by the expression

$$Z_j = \sum_{i=1}^{n} w_{ij} x_j, \; j = 1, 2, ..., m, \qquad (1)$$

Where w_{ij} - totality n observed values m parameters.

Connection Matrix w_{ij} or appropriately selected objects is constructed using data processing methods, such as classification or factor analysis, and also as a relatively independent way of presenting source data. In these cases, we will interpret the values in this matrix as information about the manifestation of the “complex” properties of the elements.

In this case, these matrices record with their elements information about the manifestation of a complex property - the degree of similarity or difference in the existing set of parameters (features).

The use of factor analysis methods to study the feature space also leads to the need to study the structure of the matrix of pairwise correlation coefficients between parameters. This matrix is also interpreted as a complex property resulting from the interaction of common factors.

In terms of the connection matrix, qualitative properties of objects are also represented, such as nominal and rank, which are used to solve problems of classification or ordering of objects [1].

The language of connection matrices is extremely convenient for our purposes, since it allows, firstly, to quantitatively represent many qualitative properties, secondly, to transfer studies of the "internal" structure of these properties to the study of the structure of the corresponding connection matrices, and, thirdly, when developing methods to solve the problem of qualitative factor analysis, use the convenient language of linear algebra.

One of the main points in factor analysis is obtaining an initial matrix of connections between parameters. The initial coupling matrix is often predefined or can be easily obtained. This could be a matrix of correlation coefficients, then

$$w_{ij} = r(x_i, x_j),$$

where $r(x_i, x_j)$ - correlation coefficients.

Analysis and construction of a matrix of residual coefficient connections, as well as further analysis of the matrix structure $\|r_{ii}\|_{i,j=1}^{n}$ the construction of new matrices with their own weights in a single criterion is one of the main points in qualitative factor analysis. This will allow us to further consider these representations as equivalent and formulate an algorithm for solving the problem of constructing qualitative factors based on a unified scheme.

Analysis and Results

Let x_i - i - th parameter, and $\omega_j = r(x_i) \equiv \omega_{ij}$ - j - observation of the i -th parameter, $i = 1,2,...,n; j = 1,2,...,m.$ Let us denote the original observation matrix by $R_1 = \{w_{ij}\},$ and the normalized correlation coefficient of parameters x_k and x_l - through $rw(x_k, x_l) = r_{kl},$ $k,l = 1,2,...,n.$ Then we obtain a normalized symmetric matrix $R_1^H = \{r_{kl}\}$, back then $r_{kl} = r_{lk}$, and $r_{kl} = 1$ at $k = l.$

Main elements of the matrix R_1^H - mine elements of the matrix, and others are parameter covariances.

Main components Z_j determined through parameters x_i according to the formula (1). Each of the observed parameters linearly depends on new components (factors) that are uncorrelated with each other:

This important property of the method determines the maximum possible contribution to the total dispersion of the parameters. However, to accurately approximate the correlation between parameters, all components are necessary in order to monitor the correct operation of the method, since the influence of all parameters on

the process in the sense of total variance should not exceed 100%, otherwise the method is unstable and the results obtained may be incorrect.

Since the method is associated with the total dispersion of parameters, it is necessary that all observations be specified in the form of tables.

Totality n observed values m parameters is a matrix:

$$R = \begin{pmatrix} w_{11} & w_{12} & \dots & w_{1m} \\ w_{21} & w_{22} & \dots & w_{2m} \\ \vdots & \vdots & \vdots\vdots\vdots & \vdots \\ w_{n1} & w_{n2} & \dots & w_{nm} \end{pmatrix}. \quad (2)$$

Let's construct a correlation function between random variables as a discrete distribution. Next, we enter the values of the normalized correlation function into a table, on the basis of which we construct a correlation matrix of the form the main elements, which are the normalizing variances, i.e. the sum of squared deviations from the average values, divided by their variances, and into non-diagonal elements by covariances, i.e. the sum of the cross products of deviations from the mean, divided by their variances. In other words, the resulting pairwise correlation values between two parameters are the corresponding values of the matrix (3).

$$\begin{pmatrix} 1 & r_{x_1x_2} & r_{x_1x_3} & \dots & r_{x_1x_m} \\ r_{x_2x_1} & 1 & r_{x_2x_3} & \dots & r_{x_2x_m} \\ \vdots & \vdots & \vdots & \vdots\vdots\vdots & \vdots \\ r_{x_nx_1} & r_{x_nx_2} & r_{x_nx_3} & \dots & 1 \end{pmatrix}, \quad (3)$$

If we take factors (components) as new independent variables, then, according to the idea of the component analysis method, we can construct a new regression equation that will allow us to identify significant and insignificant factors. Each component is determined through the eigenvectors of the correlation matrix of independent variables, i.e. eigenvectors $\vec{Y}_j$, according to (3) their relationships are determined

$$R_1^H \vec{Y}^{(1)} = \lambda_i \vec{Y}_j,$$

where λ_i - eigenvalues.

Having determined the eigenvectors of the correlation matrix, we can construct the component vectors in the form

$$\left\| \alpha_{ij} \right\| = \left| \eta_i \vec{Y}_i \right|, i = 1, 2, \dots, n, \quad (4)$$

where $\vec{Y}_i$ - eigenvector of the normalized correlation matrix R_1^H, and η_i determined through the eigenvalue of the vector $\vec{Y}_i$ according to the formula

$$\eta_i = \left[\vec{Y}_i^{(1)} \cdot \vec{Y}_i \right]^{-1/2} \cdot \lambda_i^{1/2}.$$

The "prime" corresponds to the transpose operation.

To find the first eigenvalue λ_i eigenvector $\vec{Y}_i$, as an initial approximation we choose [2, 3].

$$\vec{Y}_1^{(1)} = \left\{ \sum_{j=1}^{n} r_{kj} \right\}, \quad k = 1,2,...,n. \tag{5}$$

Subsequent approximations are defined as follows:

$$\vec{Y}_i^{(s+1)} = R_k^H \vec{Y}_i^{(s)}, \quad s = 1,2,...,$$

until the condition is met

$$\max_i \left\{ \left| \vec{Y}_i^{(s+1)} - \vec{Y}_i^{(a)} \right| \right\} \le \varepsilon,$$

where ε - specified error. The λ_i largest element of the vector is taken as $\vec{Y}_i^{(s+1)}$, those.

$$\lambda_i = \max_i \vec{Y}_i^{(s+1)},$$

$\vec{Y}_1$ is calculated as follows:

$$\vec{Y}_i = \frac{1}{\lambda_i} \vec{Y}_i^{(s+1)}.$$

Here

$$R_k^H = \left\{ r_{ij}^{(k-1)} - (\alpha_i^{(k-1)} E \alpha_j^{(k-1)}) \right\},$$

where E - identity matrix.

According to the formula (4) coefficients are calculated α_{i1} with the first factor F_1. It is convenient to denote the residual correlation coefficient r_{ij} after elimination k factors through r_{ij}^k. Then, excluding the first factor, in general form we obtain:

$$R_1 = R - \tilde{R}_1, \tag{6}$$

where

$$\tilde{R}1 = \beta_1 \beta_1' E. \tag{7}$$

Let $\beta_1, \beta_2, ..., \beta_m$ - normalized eigenvectors of the matrix R. Let's check if they are eigenvectors and matrices R_1. Below it is shown that the maximum eigenvalue of the matrix R_1 is the second eigenvalue of the original matrix R.

Theorem 1. Matrix eigenvectors R_1 are identical to the eigenvectors of the matrix R, as well as their eigenvalues, except for the vector β_1, since the corresponding eigenvalue of this vector is R_1 equal to zero, and in R equals λ_1.

Proof. Multiplying the matrix on the right R to vector β_p taking into account (6) and (7) we have

$$R_1 \beta_p = (R - \beta_1 \beta_1' E) \beta_p. \tag{8}$$

Taking advantage $R\beta_p = \lambda_p \beta_p$, we get

$$R_1 \beta_p = R\beta_p - (\beta_1 \beta_1')(E\beta) = \lambda_p \beta_p - (\beta_1 \beta_1')(E\beta_p). \tag{9}$$

If $p = 1$, that $\beta_1' \beta_1 = \lambda_1$ and expression (8) takes on the form $R_1 \beta_1 = 0$.

Therefore, the eigenvector corresponding to the maximum eigenvalue λ_1 matrices R, is also an eigenvector of the matrix R_1, but its corresponding eigenvalue is zero.

If $p \neq 1$, that $\beta_1' E \beta_1 = 0$ and expression (9) takes on the form

$$R_1 \beta_p = \lambda_p \beta_p - \beta_1 \cdot 0 = \lambda_p \beta_p .$$

Therefore, with the exception of λ_1, eigenvalues and eigenvectors R_1 are equal to the corresponding eigenvalues and eigenvectors of the matrix R. Theorem 1 is proven.

The iterative process begins with the selection of *n* numbers, which are found according to the formula (5). As numerous computer calculations have shown, such a choice of initial approximation significantly accelerates the convergence of the iterative process.

The convergence of the process can be accelerated by using a suitable degree coupling matrix of the residual correlation coefficients. To do this, we will use some properties of matrices and the degree of the matrix already determined earlier for the first factor R.

Theorem 2. The degree of the relationship matrix of the residual correlation coefficients is expressed through the degree of the original correlation matrix, i.e.

$$R_1^2 = R^2 - \lambda_1 \tilde{R}_1 . \qquad (10)$$

Proof. Let us algebraically square both sides(6):

$$R_1^2 = R^2 - 2R\tilde{R}_1 + \tilde{R}_1^{\,2} . \qquad (11)$$

From (7) we have

$$\tilde{R}_1^{\,2} = (\beta_1 \beta_1' E)(\beta_1 \beta_1' E)\lambda_1^2 \tilde{R}_1 . \qquad (12)$$

Using the known relation $RY = \Lambda Y$, we get the expression

$$R\beta_1 = \lambda_1 \beta_1,$$

which makes it possible to express $R\tilde{R}_1$ through known quantities. Multiply the previous relation on the right by $\beta_1' E$. Taking into account (7) we have

$$R_1 \tilde{R}_1 = \lambda_1 \tilde{R}_1 . \qquad (13)$$

Substituting (12) and (13) into (11), we get

$$R_1^2 = R^2 - 2\lambda_1 \tilde{R}_1 + \lambda_1 \tilde{R}_1 = R^2 - \lambda_1 \tilde{R}_1 .$$

Thus, Theorem 2 is proven.

Note that the sum of the eigenvalues λ_i must be equal to the trace of the correlation matrix R_i^H, those $\sum_{i=1}^{n} \lambda_1 = n.$

The sum of the squares of the elements of the vector of weights-features α_{ij}, those $\sum_{j=1}^{n} \alpha_{ij}^2, \quad i = \overline{1,n},$ determines variance i - th main component, in other words, its contribution to the total variance $\sum_{j=1}^{n}\sum_{j=1}^{n} \alpha_{ij}^2 = n.$

Conclusions

Using the proposed computational scheme, computational experiments were carried out using information about actually operating oil and gas fields and an analysis of the results was given [4].

The proposed computational scheme of the principal component method allows you to automate calculation processes on a computer and derive convenient simple formulas for analyzing the parameters of oil and gas fields.

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SCIENTIFIC BASES OF PROJECT AND CONSTRUCTION OF BUILDINGS AND STRUCTURES IN SALINE SOILS UNDER THE CONDITIONS OF UZBEKISTAN

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Annotatsiya. Ushbu maqolada O‘zbekiston sharoitlari bo‘yicha sho‘rlangan gruntlarda bino va inshootlarni loyihalash va qurishning ilmiy asoslari haqida ma’lumotlar keltirilgan. Mamlakatimizning turli tumanlaridagi murakkab va sho‘rlangan gruntli sharoitlardagi loyihalash va qurish tajribasi, shuningdek, biz tomonimizdan olib borilgan maxsus tadqiqotlarning ko‘rsatishicha, sho‘rlangan gruntlar tarqalgan hududlardagi qurilishlarni loyihalaganda gruntlarning namlanishi va ishqor yuvilishi jarayonida ularning moddalar tarkibi, strukturasi va fizik-mexanik xossalarining o‘zgaruvchanligini e’tiborga olish zarur.

Kalit so‘zlar: *gruntlar, sho‘rlangan gruntlar, mustahkamlik, deformatsiya, fizik-mexanik xossalar, filtratsiyalar, tuzilmalar, yer osti suvlari, sho‘rlanish, xlorid-sulfatli sho‘rlanish, sulfatli sho‘rlanish, sodali sho‘rlanish, boshlang‘ich gips miqdori, tuzlarning ishqoriyligi, mustahkamlik ko‘rsatkichlari.*

Аннотация. В данной статье представлена информация о научных основах проектирования и строительства зданий и сооружений на засоленных грунтах в условиях Узбекистана. Опыт проектирования и строительства в сложных и засоленных грунтовых условиях в различных районах нашей страны, а также проведенные нами специальные исследования показывают, что при проектировании сооружений в районах распространения засоленных грунтов учитывается их вещественный состав, структура и физико-механические свойства. свойств в процессе намокания и щелочной промывки почвы необходимо учитывать изменчивость ее свойств.

Ключевые слова: *грунты, засоленные грунты, прочность, деформация, физико-механические свойства, фильтрация, структуры, грунтовые воды, засоленность, хлоридно-сульфатная засоленность, сульфатная засоленность, содовая засоленность, начальное содержание гипса, щелочность солей, показатели прочности.*

Abstract. This article provides information on the scientific basis of projecting and constructing buildings and structures in saline soils under the conditions of Uzbekistan. In the last few years, a number of saline soils in Uzbekistan have experienced the rise of groundwater and flooding of the territory. As a result, the

state of Eurasia is noted in many buildings and structures due to a decrease in the consistency characteristics of foundation lattices. The main reason for the decrease in self-sufficiency characteristics is the result of prolonged leaching of light and hard-to-grind salts under the influence of water. This article presents the results of experiments on the study of legislation on changing their consistency during filtration washing of salt gratings on the basis of buildings and structures.

Keywords: *soils, saline soils, strength, deformation, physical-mechanical properties, filtration coefficient, structures, underground water, hard-to-dissolve salts, sulfate-chloride salinity, chloride-sulfate salinity, sulfate salt salting, soda salting, the amount of initial gypsum, salinity, alkalinity of salts, strength indicators.*

Introduction

Construction of buildings and structures in our country is often carried out in complex engineering-geological conditions, especially in areas with saline soils. In Uzbekistan, saline soils, which can be used as a basis for the construction of buildings and structures, consist of saline, saline, saline and bald soils, differing in the composition and amount of slightly soluble salts. They are often formed in the depressions of the relief: mountain slopes, lowlands, saline lake shores, cliffs, desert zones formed as a result of suffocation, mineralized waters close to the surface (1 - 3 m).

The main factor in the formation of saline soils is the mineralized groundwater and saline rocks that lie close to the surface. The main condition for salinization is the impossibility of water flow in places and the fact that the amount of evaporation is greater than the amount of precipitation.

Analysis of the existing literature on saline soils and experience in the design and construction of buildings and structures in different regions of the country, as well as special studies on saline soils show that changes in the composition, structure and physical and mechanical properties of substances during wetting and alkaline leaching. and this phenomenon needs to be taken into account in design work.

As a result of flooding and wetting of areas composed of saline soils, a number of major affects can occur in buildings and structures [1-6].

Literature Review

During the operation of buildings and structures built on saline soils, man-made level of underground water is formed under the structure due to natural and artificial factors [7, 8]. Existing guidelines and normative literature provide recommendations for determining the mechanical properties for saline soils with easy and moderately soluble salts, but the amount of difficult-to-dissolve salts is not taken into account. Studies suggest that in order to ensure the safe operation of buildings and structures built on saline soils, it is necessary to study the process of leaching of insoluble salts, especially when the mechanical properties of the soil are exposed to long-standing water. An experimental study of the laws of change of mechanical properties of water from saline soils over a long period of time. This is because the issues of assessing the change in the mechanical properties of saline soils in the long-term exposure to water to insoluble salts have not been fully studied.

Many scientists have worked on engineering-geological research and their use. Including, Braja M.D., David G.P., Kuhn W., Neal B.G., Harutyunyan A.R., Bartholomey I.L., Bezruk V.M., Babakhanov P.B., Glaz A.A., Grot A.I., Ziangirov R.S., Zatenatskaya N.P., Yerusalimskaya M.F., Karpushko M.O., Kiyalbanev A.K., Kirillov A.A., Klapatovskaya N.A., Kuznetsov Yu.V., Kayumov A.D., Qalandarov T.Kh., Mordovich S.S. and many scientists [9-17].

Research Methodology

The saline loamy and loamy soils in the territory of Uzbekistan, in particular in Pakhtakor district of Jizzakh region, where capital, industrial and civil construction is currently booming, are taken as the object of research and its mechanical characteristics in the article.

The purpose of this dissertation is to develop a methodology for studying the mechanical properties of saline and sedimentary soils when used with water and solutions and long-term leakage, in order to use the parameters of soils in the calculation of the foundation of structures.

The main feature of saline soils is the change in their mechanical properties during the washing of salts, there are two main types of washing of salts:

- filter washing, in which the washing of the salt in the soil is carried out by the filtration flow of the liquid under the pressure gradient and is of practical importance for soils with high permeability;
- diffusion washing, in which the washing of the salt in the soil occurs as a result of the movement of ions due to the difference in the concentration of salts in solution. This is typical for low absorbent soils.

The laws of changing in salinity level and mechanical characteristics when saline soils are exposed to water for a long time under laboratory conditions were studied and expressions were proposed to predict them [7, 8].

Loam and sandy loam samples (Tables 1 and 2) from Pakhtakor district of Jizzakh region were used to study and predict the laws of change in salinity levels and mechanical characteristics of saline soils during prolonged exposure to water.

Based on the task set and the results of previous research, the methodological part of the experiment was based on the following laws:

- In the process of interaction of ground distilled water with water, its structure changes as the amount of soluble salts in the water decreases.
- Changes in soil structure during alkali washing lead to a decrease in strength and an increase in deformation (additional suffocation subsidence).
- Changes in the composition and volume of salts in the soil can affect the water-physical properties of soils, in particular, the composition of the microaggregate, plasticity parameters, viscosity, etc.

Therefore, the experiment is carried out as follows: first, for the first naturally formed primer, the parameters given in Tables 1 and 2 are determined: density (ρ, ρ_d, ρ_c), humidity (w), abrasion and plastic strength (C, φ, ρ_m). The composition was also studied: granulometric, microaggregate, chemical (easily soluble salts, gypsum, calcium content) and mineral composition. In addition, the microstructure of the soils was further investigated.

Table 1. Normative and calculated characteristics of soils.

Names of descriptions	Units of measurement	Normative values		Estimated values, α=	
		Loam	Sandy loam	0,85	0,95
Ground density	t/m^3	1,73	1,76	1,74	1,73
Density of soil in the dry state	t/m^3	1,44	1,43		
Density of soil particle	t/m^3	2,69	2,66		
Porosity	%	46,5	46,3		
Porosity coefficient	dimensionless	0,869	0,863		
Natural humidity	One point	0,175	0,234		
Humidity level	dimensionless	0,54	0,72		
Humidity at the level of fluidity	One point	0,261	0,261		
Humidity at the germination boundary	One point	0,180	0,212		
Quantity of plasticity	One point	0,081	0,049		
Fluidity indicator	dimensionless	<0	0,46		
Comparable adhesion strength	kPa	13	9,0	5,0	3,0
Internal thrust angle	degree	26	27	25	24
Deformation modules: in the natural humidity condition	MPa	5,0	5,0		
In wet condition	MPa	4,0	4,0		
Relative deposition: P=0,1 Mpa P=0,2 MPa P=0,3 MPa	dimensionless	 0,007 0,013 0,017	 0,009 0,015 0,020		
Initial deposition pressure	MPa	0,15	0,12		

Table 2. Chemical analysis of grills using water titers.

Soil name	Dry residue, mg/kg	Ion content mg/kg						pH
		HCO'$_3$	Cl'	SO$_4$''	Ca··	Mg··	Na·+K·	
Loam	13480	210	640	8800	3250	480	60	7,8
Sandy loam	14380	160	910	9090	3150	390	640	7,8

Analysis and Results

Filtration of salts in the soil is carried out according to the lifting current scheme in the FIM device. A pretested sample of the natural structure was placed on the device according to the same scheme. B on the side surfaces of the sample for loss of filtration on wall P. It it was processed in accordance with the methodology proposed by Petrukhin [1, 18-20]. The sample was scraped off with a diameter smaller than the ring of the FIM tool (D = 50 cm^2), plastic glue on its side surfaces is rubbed into the groove, and wax is poured into the gap between the ring and the sample. This treatment allows us to calculate that the liquid moves only through the volume of the soil.

Filtration washing with alkaline was carried out under pressure, often without squeezing the soil, that is, the soil was in conditions of constant volume during the experiment.

Conclusions

From the analysis of deformations in the areas where saline soils are distributed in the territory of Uzbekistan, it is known that the main factor of their occurrence is the change of the physical and mechanical properties of the underlying soils under the influence of water. A study conducted to study their salinity characteristics and the degree of salinity associated with the amount of initial plaster and the degree of salt leaching during prolonged exposure to water based on salt gratings of buildings and structures allows us to draw the following conclusion. Salts of complex soil, in particular, when water enters the mush with which the plaster is salted for a long time, give them a description of the consistency and amount of salt in them, that is, the degree of salinity decreases, which in turn leads to a decrease in the stagnation of the foundation of buildings and structures and additional deposition.

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DETECTION OF SPAM EMAILS USING LOGISTIC REGRESSION METHOD

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Annotatsiya. Hozirgi kunda sun’iy intellekt sohasi jadallik bilan o‘sib bormoqda. Sun’iy intellektdan turli sohalarda unumli foydalanilmoqda. Ushbu maqolada sun’iy intellektdan foydalangan holda elektron pochtadagi xabarlarni haqiqiy yoki haqiqiy emas ya’ni spam ekanligini tekshirish o‘rganildi va natijalar tahlil qilindi.

Kalit so‘zlar: *Spam, Mashinani o‘rganish, regressiya, sigmasimon.*

Аннотация. В настоящее время область искусственного интеллекта стремительно развивается. Искусственный интеллект эффективно используется в различных сферах. В данной статье изучено использование искусственного интеллекта для проверки того, является ли сообщение в электронной почте настоящим или спамом, а также проведён анализ результатов.

Ключевые слова: *Спам, Хам, Машинное обучение, регрессия, сигмоид.*

Abstract. Currently, the field of artificial intelligence is rapidly growing. Artificial intelligence is being effectively used in various sectors. This article examines the use of artificial intelligence to check whether emails are genuine or spam, and the results were analyzed.

Keywords: *Spam, ham, Machine learning, regression, sigmoid.*

Introduction

The main goal of this article is to determine whether email messages are spam or not (ham). As information technology is rapidly advancing, it is important to verify not only the authenticity of emails but also of all messages on social media platforms. Many studies have been conducted in this area, but not all of them have achieved satisfactory results. The accuracy in these studies ranged between 60% and 80%. However, the result in detecting whether an email is spam or not should be at least 90%. Bangladeshi researchers (Islam, Md Khairul; Amin, Md Al; Islam, Md Rakibul; Mahbub, Md Nosin Ibna; Showrov, Md Imran Hossain) achieved good results in identifying spam emails. They mainly used four datasets: the Enron Dataset, Trec-2007 Dataset, LingSpam Dataset, and LingSpam Dataset. In addition, Indian researchers J. Jeyasudha and G. Usha studied the spread of spam on social media and achieved positive results in detecting spam. They focused on identifying spam on Twitter and Facebook. Their research showed that using the Random Forest machine learning method, they achieved 98% accuracy in detecting spam messages on Facebook. For detecting spam on Twitter, they reached 92% accuracy using the same method [1-2]. There are several methods to determine whether a message is spam or ham (not spam). Among these, the most widely used is undoubtedly the machine learning method (hereafter referred to as ML). The ML method is part of artificial intelligence. That is, we use the machine learning method through artificial intelligence. Furthermore, ML has several classifications, which are divided into various parts. Among these, we will focus on the logistic regression method [3].

Literature Review

The concepts of machine learning are derived from Chapman's manual "Machine Learning"; Md Islam's article "Spam-Detection with Comparative and Spamming Words Extraction" and J. Jeyasudha's article "Community Spam Detection Methodologies for Recommending Nodes".

Research Methodology

The regression method is divided into two types: linear regression and logistic regression. The logistic regression method is a part of the ML (machine learning)

method, and it predicts whether an email is spam or ham (not spam). We use the logistic regression method. The question of why we specifically chose the logistic regression method can be answered as follows: this method divides the messages into two categories. The incoming message is compared with 0 or 1. If the incoming data meets the given conditions and equals 0 or 1, we can classify the message as spam or ham (genuine). Now, let's provide more detailed information and examples about this method. This method is based on artificial intelligence and is a component of the machine learning method. The logistic regression method falls under the category of supervised learning algorithms within ML. Writing programs for tasks solved using this method in Python yields efficient results. To predict whether an email is spam or not using the logistic regression method, we use the sigmoid function [5].

The logistic function (sigmoid function) is embedded within logistic regression. It accepts any real-valued number and fits it to a value between 0 and 1 through an S-shaped curve. The sigmoid function is defined as follows:

$$\sigma(z) = \frac{1}{1+e^{-z}} \quad (1)$$

Here, $\sigma(z)$ – is the result (prediction) that falls between 0 and 1, and z – is expressed as the input parameters as follows:

$$z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n.$$

The goal is to find the values of the parameters $\beta_0, \beta_1, \beta_2, \ldots, \beta_n$ that best fit the logistic function to the data.

The logistic regression hypothesis: The logistic regression hypothesis $h(x)$ is defined as the logistic function applied to a linear combination and is calculated as follows:

$$h(x) = \sigma(z) = \frac{1}{1+e^{-z}} \quad (2)$$

In this context, the given x divides the data into two classes, and $h(x)$ calculates the predicted probability for the given data.

Cost function (Log-loss): To find the optimal parameter β that makes our model predictions as accurate as possible, we define the cost function. The point (x_1, y_i) is labeled as the true label (0 or 1), and the predicted probability $h(x)$ is defined as the cost function:

$$J(\beta) = -[y_i \log\big(h(x_i)\big) + (1 - y_i)\log\,(1 - h(x_i))] \quad (3)$$

Taking into account the model's prediction, the likelihood of the observed values is measured. In logistic regression, we consider y_i as the target variable. Here, $h(x)$ follows a Bernoulli distribution. The likelihood for the point (x_1, y_i) is:

$$L(\beta) = h(x_i)^{y_i} \cdot (1 - h\big((x_i)\big)^{(1-y_i)} \quad (4)$$

We find the likelihood using the logarithm. In this case, using the logarithm to calculate the likelihood is one of the common methods of log-loss. This approach simplifies the calculations and transforms the input data into a sum:

$$\log\big(L(\beta)\big) = y_i \cdot \log\big(h(x_i)\big) + (1 - y_i) \cdot \log\,(1 - h(x_i)) \quad (5)$$

When applying the ML method, we typically use the cost function for minimization. Therefore, by adding a negative value to the log-likelihood function, we create the cost function for minimization:

$$J(\beta) = -(y_i \cdot \log\big(h(x_i)\big) + (1 - y_i) \cdot \log\,(1 - h(x_i))) \quad (6)$$

To form the cost function over the entire dataset, we take the average of the negative log function for all data points:

$$J(\beta) = -\frac{1}{m}\sum_{i=1}^{m}(y_i \cdot \log\big(h(x_i)\big) + (1 - y_i) \cdot \log\,(1 - h(x_i))) \quad (7)$$

Gradient descent is used to minimize the cost function by updating the parameters β. For each parameter β_j, the update rule $\beta_j := \beta_j - \alpha\frac{\partial J(\beta)}{\partial \beta_j}$ formula is used. While the partial derivative of Long lass with respect to β_j is $\frac{\partial J(\beta)}{\partial \beta_j} = \frac{1}{m}\sum_{i=1}^{m}(h(x_i) - y_i)x_{ij}$. Where x_{ij} is the value of the x_j symbol for the reference point [4].

Analysis and Results

1. We start by using the cost function with logistic regression. An example of the cost function using logistic regression is expressed as follows:

$$J(\beta) = -(y_i \log\big(h(x_i)\big) + (1 - y_i)\log\,(1 - h(x_i)))$$

2. We take the derivative with respect to β_j. Now, we denote the derivative of $J(\beta)$ with respect to β_j as $\frac{\partial J(\beta)}{\partial \beta_j}$ and calculate it.

$$\frac{\partial J(\beta)}{\partial \beta_j} = -(\frac{y_i}{h(x_i)} - \frac{1 - y_i}{1 - h(x_i)}) \cdot \frac{\partial}{\partial \beta_j}(h(x_i))$$

Application of the Chain Rule. To calculate $\frac{\partial}{\partial \beta_j}(h(x_i))$, we need to apply the chain rule for differentiating composite functions.

$$\frac{\partial}{\partial \beta_j}\big(h(x_i)\big) = h(x_i)(1 - h(x_i)) \cdot \frac{\partial}{\partial \beta_j}(\beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_n x_{ij} + \cdots)$$

We simplify the derivative.

$$\frac{\partial}{\partial \beta_j}\big(\beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_j x_{ij} + \cdots + \beta_n x_{in}\big);$$

$$\frac{\partial}{\partial \beta_j}\big(h(x_i)\big) = h(x_i)\big(1 - h(x_i)\big) \cdot x_{ij};\ \ \frac{\partial J(\beta)}{\partial \beta_j} = \frac{1}{m}\sum_{i=1}^{m}(h(x_i) - y_i)x_{ij}.$$

After the calculations, a new value for β_j is obtained.

Accuracy score — is a metric that measures the correctness of a classification model. It is calculated as the ratio of correctly predicted outcomes (true positives and true negatives) to the total outcomes. The formula is as follows:

$$\text{Accuracy} = \frac{True\ Positives + True\ Negatives}{Total\ Samples} \quad (10)$$

its value ranges from 0 to 1 [6-7].

Using the Python programming language, we will create a program, and the following result will be obtained:

Correlation Matrix:

	Client ID	Income	Age	Loan	Default
Client ID	1.000000	0.039133	-0.014704	0.018358	-0.021217
Income	0.039133	1.000000	-0.033687	0.441539	0.002222

Age	-0.014704	-0.033687	1.000000	0.002309	-0.429759
Loan	0.018358	0.441539	0.002309	1.000000	0.377169
Default	-0.021217	0.002222	-0.429759	0.377169	1.000000

Confusion Matrix:

$$\begin{bmatrix} 512 & 8 \\ 35 & 45 \end{bmatrix}$$

Accuracy Score: 0.9283

Conclusions

In this article, the use of logistic regression to determine whether incoming emails are legitimate or spam is discussed. The logistic regression method is based on ML and checks the data by classifying it into two categories, meaning it makes predictions. If the result is close to 1, meaning the prediction result is above 0.5, the data is classified as legitimate. If the predicted value is below 0.5, the data is classified as not legitimate, that is, spam. In the case we examined, the result was 0.9283, indicating that the data is legitimate, meaning it is not spam.

A convenient method for checking whether messages are spam or not is, of course, the Machine Learning approach, as discussed in this article.

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STAGES OF IMPROVEMENT FOR THE PROCESSES OF ISSUING ALERTS TO TRAINS

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Annotatsiya. Hozirgi kunda “O‘zbekiston temir yo‘llari” AJda boshqaruvni to‘liq raqamli texnologiyalar asosida tashkil etishga katta e’tibor qaratilmoqda. Shularni inobatga olgan holda, poyezdlar harakatini xavfsiz va samarali tashkil etish, harakat tezliklarni oshirish va samarasiz yo‘qotishlarni kamaytirish, yuk va yo‘lovchilarni o‘z manziliga yetkazish vaqtlarini kamaytirishga erishiladi. Shu o‘rinda poyezdlarga beriladigan ogohlantirishlarni berish va bekor qilishni avtomatlashtirilgan tizimlar orqali tashkil etish ishlari jadal suratlarda olib borilmoqda. Natijada poyezdlarning ogohlantirish blankalarini kutib turib qolish vaqtini kamaytirish va harakatni samarali usullar orqali tashkil etishga imkonini beradi.

Kalit so‘zlar: *ma’lumotlar bazasi, elektron hujjat aylanishi, funksional madel, ogohlantirish blankasi, avtomatlashtirilgan tizim, telefon aloqasi.*

Аннотация. В настоящее время в АО “Узбекистон темир йуллари” уделяется большое внимание организации управления на основе цифровых технологий. Учитывая это, достигаются такие цели, как безопасная и эффективная организация движения поездов, увеличение скорости движения, сокращение неэффективных потерь, а также уменьшение времени доставки грузов и пассажиров к месту назначения. В данном контексте активно ведутся работы по автоматизации систем оповещения и отмены сигналов для поездов. Это позволяет сократить время ожидания поездов на получение предупредительных бланков и организовать движение более эффективными методами.

Ключевые слова: *база данных, электронный документооборот, функциональная модель, бланк предупреждения, автоматизированная система, телефонная связь.*

Abstract. Currently, great attention is being paid to organizing management at JSC “Uzbekistan Railways” based on digital technologies. Considering this, the aim is to ensure the safe and efficient management of train movements, increase speeds, reduce inefficiencies and losses, and minimize the time needed to deliver cargo and passengers to their destinations. In this regard, work is being actively carried out to organize the automation of alert and cancellation systems for trains. As a result, it reduces the waiting time for trains to receive alert forms and enables more efficient train movement organization.

Keywords: *database, electronic document circulation, functional model, alert form, automated system, telephone communication.*

Introduction

Currently, great attention is being paid to organizing management at JSC “Uzbekistan Railways” based on digital technologies. Considering this, the aim is to ensure the safe and efficient management of train movements, increase speeds, reduce inefficiencies and losses, and minimize the time needed to deliver cargo and passengers to their destinations. In this regard, work is being actively carried out to organize the automation of alert and cancellation systems for trains. As a result, it reduces the waiting time for trains to receive alert forms and enables more efficient train movement organization.

During all periods of railway development, a number of scientists have conducted their own research work to provide scientific justification for reducing losses and determining their influencing factors in issuing and canceling alerts to trains [1 – 8]. However, the problems associated with data storage processing in an automated system when transmitting alerts on rail transport, delivery of alert blanks to a train machinist, i.e. control of pre-shipment processes of alert applications to the destination, development of a model of a quality and timely delivery system, taking into account the data transmission system of observed failures at rail transport facilities, have not been sufficiently studied.

Literature Review

Various methods are available to solve this problem, with one of the most important being the use of digital technologies to organize the delivery of alerts to train drivers, station operators, and train dispatchers. This reduces the time spent on processes. A functional model has been developed using the IDEF0 program to improve the quality of data.

Research Methodology

Automated train alarm and cancellation system technology. The process of organizing management and automation in issuing and canceling alerts each process occupies a special place in the effective organization of these transportation processes. This process is represented by many stages. Timely communication of information with accuracy and speed at each stage is a process that depends on the cognitive skills of employees of the industry and approach to their profession with responsibility. Also

characterized by different stages in the organization of the process, many users provide continuity of data sharing.

The information is conveyed by the personnel who check the technical condition of the plot and paragons. All databases need to be entered in real-time order and continuously.

An object of alerts is an object that can be identified by something that has been isolated into paragons and picket kilometers to distinguish it from other objects.

The person overseeing all processes is the train dispatcher. Information technology determines the implementation (methods, techniques) of the information process. In defining the concept of information technology, elementary operations of the information process are listed:

- Assembly, modification and insertion into a computer;
- upload to database;
- storage;
-automatic recording of applications to DU-60 magazine.

The database can be classified according to a number of signs: purpose, structure, order of Work, type of activity, etc.

It is designed to collect alerts on the plot and railway blocks, and the analysis of the information necessary for making decisions in the transportation process serves to increase the safety of movement.

This system allows train machinists to receive all alerts remotely.

Stages of improving the processes of issuing alerts to trains informational technology determines the methods (methods, techniques) for the implementation of the information process. Each operation on the automation of the alarm system can be carried out using different methods. Therefore, we can talk about Assembly, conversion and various technologies, allowing you to perform operations to enter, transmit, store, process and present data on the base (Figure 1).

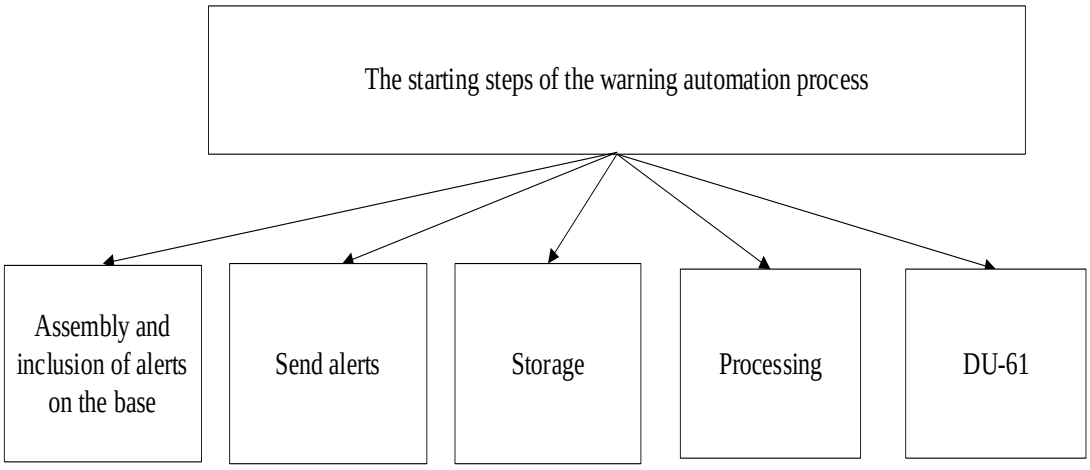

Figure 1. The structure of the alert formation process.

The above functions are called elementary, more complex functions, and are formed from a combination of elementary functions. Thus, the exchange of messages between users is based on the principle of electronic document exchange. In the process of exchanging an electronic document, it is carried out as a result of a complex of ordered operations on the input, transmission, storage and processing of messages.

The implementation of transportation processes in rail transport is carried out through modern information technologies. In rail transport, it is the main source of sending and receiving information on the volume of information transmitted through database devices. The number and speed of functions in the database are increasing, more improved multi-channel function systems are being introduced, connection installation processes are being automated, modern switching equipment is being deployed.

Increasing the efficiency of rail transport work requires the introduction of modern information and management technologies based on high-speed digital transmission systems to create modern management in the organization of transportation. Modern technologies ensure a decrease in time and paper consumption when issuing and canceling train traffic alerts, an increase in transportation indicators, a decrease in fuel and electricity consumption that goes to slow acceleration, and, in addition, an increase in the number of users of rail transport services, as well as competitiveness with other types of transport [9 - 11].

In rail transport, an automated system of train alerts when performing these tasks is a technological software system designed to quickly enter data into the base and transmit it to the train machinist. This system allows real-time updates of alerts on the entire rail network and the ability to transmit and store canceled alerts through a single system.

An automated system for issuing and canceling alerts provides:

- integration of the train traffic and transportation process into a single system of dispatch control and rail transport infrastructure (Road farm, power supply farm, rolling stock, communications and signaling farm, etc.;
- operation of information and Information Management in the transportation process on the basis of modern technologies, automation of Railways and Traffic Safety;
- organization of work productivity of employees participating in the organization of transportation in the implementation of technological processes of operational work on the basis of digital and analog telecommunication networks.

Rail transport has a broadband electrical network, through which operational management of the transportation process and management of large and complex road infrastructure is carried out.

In improving the processes of issuing alerts to trains, we carry out it through the IDEF0 modeling language.

The IDEF0 functional model is a set of blocks, each of which is a “black box” with inputs and outputs, controls and mechanisms detailed (fragmented) at the required level. The most important function is in the upper left corner. Functions are linked together using arrows and descriptions of functional blocks. In addition, each axis or type of activity has its own specific meaning.

IDEF0-key features. Like many modeling techniques, a key element of writing is graphic language designed to convey specific information. Marking helps to understand and analyze processes, defines the logic of changes, allows you to clarify project requirements, and also supports design at the level of systems and integration tasks.

Process model on the IDF0 diagram. The main goal is to model complex systems that include people, machines, resources, information systems, and data flow. Models help determine the requirements and functions of the future system.

IDEF0 notation specifies that modeling should have as few connections as possible between functions included in different subsystems. IDEF0 diagrams are read from top to bottom and from left to right. All major elements are based on simple characters:

- represents rectangular functions or processes;
- arrows show how functions are connected through physical and information flows.

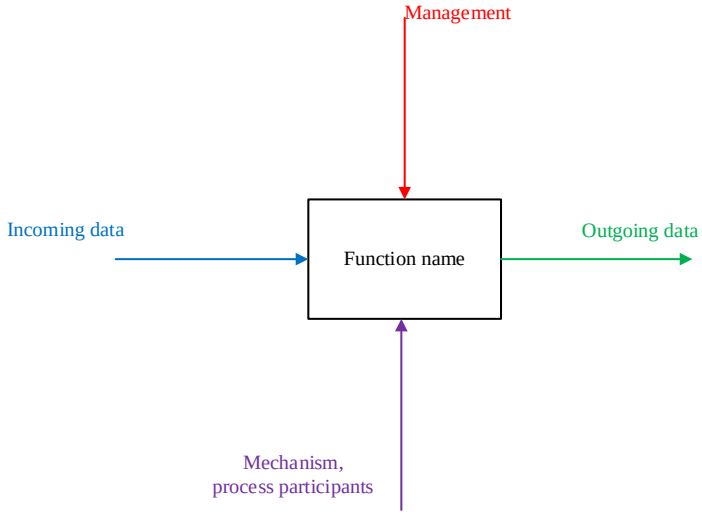

Figure 2. IDF0 syntax model.

The semantics of the language accurately describe the functions of the system - what needs to be done to convert the incoming stream, so the names in the rectangles must be indicated by a verb or verbal noun. Each side of the rectangle has its own meaning and is uniquely connected to one of the 4 types of arrows (Table 1).

Table 1. Components of the IDEF0 functional model.

Round side	Arrow	Meaning
top ↑	control arrow	rules, procedures, standards, control methods
left ←	input arrow	material or data
right →	output arrow	data and material objects modified by the function
down ↓	mechanism arrow	resources (personnel, equipment, production facilities, etc.)

There is also a call arrow pointing to a function executed outside the specified block.

Main descriptions of IDEF0:

- high level details for any type of process;
- consistency and relative simplicity of linguistic means that ensure completeness of use and correctness of interpretation;
- emphasis on hierarchical view of elements;

- can be recreated at the software level.

Analysis and Results

Like any modeling language, notation functions as a means of communication between analysts, architects, developers, managers, and users. The modeling of the automated system for issuing and canceling alerts to train machinists in the IDEF0 program is shown in Figure 3.

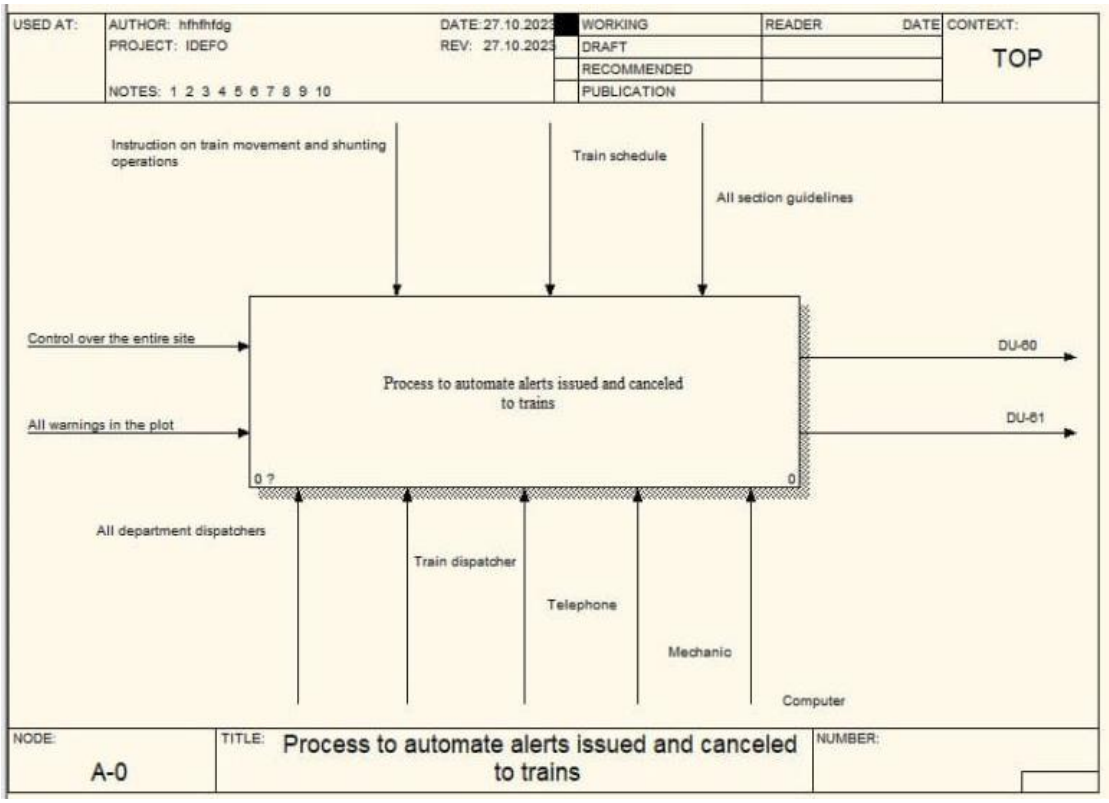

Figure 3. IDEF0 functional model when sending data.

Input arrows - “control over the entire plot”, “all alerts on the plot” these are the input notes that we need to start the processes. In the management of an automated system for issuing and canceling alerts, the instructions are “Instruction movement of trains and shunting work on the railways of Uzbekistan Railways,” “Train traffic graph,” “Road farm, communications and signaling farm, power grid farms.”

The role of “mechanisms” is played by a train dispatcher, all department dispatchers, telephone, mechanical and computer. In this case, the train dispatcher organizes the movement of trains, controlling all processes on its plot. All departmental dispatchers ensure that the alerts received by the waymasters, supervisors, who belong to them are included in the database of instructions. Information on the base is updated on the basis of telephone messages. Mechanics deliver information at speed to Department dispatchers as to whether the failure to issue alerts has been eliminated. All data functions to be downloaded to a single database via a computer [12].

In our case, the work is divided into 4 main stages:

1. Fault information;
2. Data processing;
3. Issuing alerts;
4. Cancel alerts.

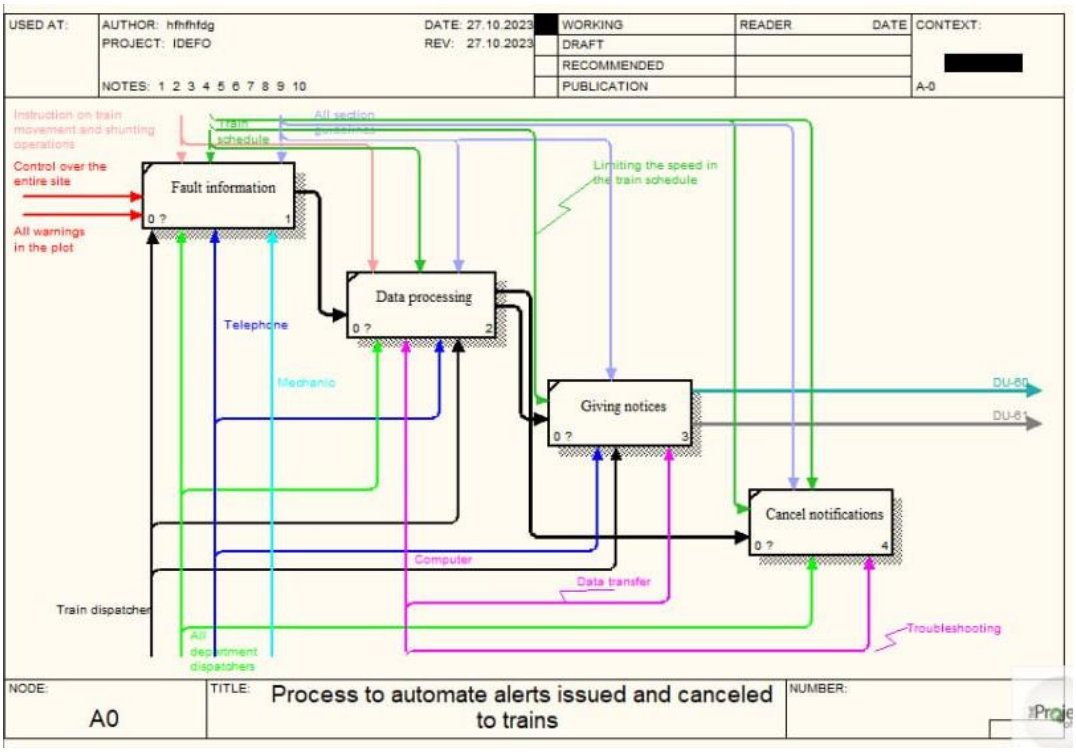

Figure 4. Functional model of train-Fed and cancellable alerts.

The main purpose of creating a functional model is to reduce electricity, fuel losses, time consumption during train movement and increase the capacity of trains on the site.

Therefore, the first thing that needs to be determined when creating a process model is to communicate the data to the participants of the process in a timely, reliable and complete way. Such modeling is considered very convenient for making not only visual, but also effective management decisions.

The IDEF0 standard was developed by the Department of the Air Force in the United States in 1981 to automate industrial enterprises. In the process of software development, developers appeared with the need to develop new ways of analyzing business processes. As a result, they began to use the IDEF0 functional modeling methodology, which uses special IDEF0 characters for analysis.

Conclusions

As a conclusion, it can be said that the description and quantification of functional model changes requires the creation of mathematical models that must reflect (emulate) physical, economic, organizational, financial, logical, etc.

Relationships between objects included in the IDEF0 model develop over time.

Based on general considerations related to possible areas of application of functional modeling and structural analysis of enterprises and organizations, it is possible to show several classes of mathematical models that find use as a tool for describing processes.

Events occurring in IDEF0 blocks. These include, first of all, the following:

- distribution models of operations learning theory (optimal resource allocation);
- queueing theory models (deterministic and statistical);
- transport models.

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UDC: 62, 62-2, 677.1/.2, 62-96

IMPROVING THE DESIGN OF THE 1XK BRAND CLEANING MACHINE TO PRESERVE THE NATURAL CHARACTERISTICS OF COTTON

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Annotatsiya. Ushbu maqolada paxta tozalash korxonalaridagi tozalash mashinalarining konstruksiyasini takomillashtirish bo‘yicha izlanishlar olib borilgan bo‘lib, bunda paxtani mayda iflosliklardan tozalovchi 1XK rusumli qurilmaning takomillashgan konstruksiyasini taklif qilingan. Taklif qilingan yangi konstruksiyadagi 1 XK qurulmasi paxtani iflosliklardan tozalash jarayonida tola va chigitlarning shikastlanishini oldini olingan.

Kalit so‘zlar: paxta tozalash, tola, to‘rli yuza, qoziqli baraban, zaslonkalar, qoziqchalar, ishchi kamera, samaradorlik, ifloslik bunkeri, chigit, shikastlanish.

Аннотация. В данной статье проведены исследования по совершенствованию конструкции очистительных машин на хлопкоочистительных предприятиях и предложена усовершенствованная конструкция устройства 1ХК для очистки хлопка от мелких примесей. Структура 1ХК предлагаемой новой конструкции предотвращает повреждение волокон и семян при очистке хлопка от примесей.

Ключевые слова:. хлопкоочистка, волокно, сетчатая поверхность, колковый барабан, заслонки, колки, рабочая камера, производительность, бункер для ссор, семена, повреждение.

Abstract. In this article, research was conducted to improve the design of cleaning machines at cotton ginning enterprises and an improved design of the 1XK device for cleaning cotton from small impurities was proposed. Structure 1 HC of the proposed new design prevents damage to fibers and seeds when cleaning cotton from impurities.

Keywords: *cotton cleaning, fiber, mesh surface, pegging drum, dampers, pegs, working chamber, productivity, quarrel bin, seeds, damage.*

Introduction

Solving problems in the cultivation of raw cotton consists of accelerating scientific and technical progress, creating new complexes related to increasing the speed and efficiency of economic development, the capacity of cotton cultivation, improving the working bodies of processing machines, ensuring productivity and high quality of manufactured products. "The most important strategic task is deep technical re-equipment of processing industries, equipping them with modern techniques and technologies, creating a completely improved technology for the production of high-quality competitive consumer goods." Today, it is necessary to pay great attention to the cultivation and processing of raw cotton, which is a valuable product of the textile industry. It is necessary to improve the quality of cotton fiber and the productivity of production by using high-efficiency machines and modernizing the cleaning machines that are currently working [1].

Literature Review

The main drawback of cotton ginning plants is the mechanical impact of the working bodies of the machines on the processed material and the deterioration of the quality of raw cotton. The main working body of the cotton ginning machine is the pile drum and mesh surface for cleaning small impurities [2].

It is necessary to organize the processing of raw cotton in a soft mode while preserving its natural qualities. Such a method has little effect on the cleaning efficiency of the machine and damage to the seed. It is clear from the analysis of the research conducted on cotton raw material cleaners that the main part of the research is focused on the development and improvement of working elements of cleaning machines based on technology. The main direction of the development of cotton cleaning technology is the intensification of the technological process by activating the working bodies. Therefore, the modernization of the pile drum meets modern requirements. The reserve of improvement of small raw cotton cleaning equipment is the selection and justification of working parameters and modes of operation of working bodies, taking into account all the main features and peculiarities of the work based on the dynamic study of the machines [3].

In the following years, a number of scientific and research works aimed at reducing the damage of fibers and seeds during technological processing were carried out. They mainly consider the working organs of cleaning machines, which are more affected by seed damage. The results show that by reducing the amount of processing, the damage to the seed and fibers is reduced, because the previous operating modes are preserved: the speed of the process, the direction of movement of the working bodies, and the effect of shock vibration on the fibers. the fibers remain the same. The main drawback for existing cleaning processes is the structural damage of the cotton fiber and the seed due to the interaction of the working bodies. A lot of processing and the monotonous effect of the working body on the processed material worsens the cleaning process. Based on these considerations, the cotton ginning industry needs new working bodies, pile drums, which should eliminate the above shortcomings as much as possible. Eliminating such shortcomings is one of the main tasks in creating new working bodies of modern machines and aggregates of light industry. The analysis of the constructions of domestic and foreign produced cotton cleaners showed that an important factor of

cleaning efficiency is the method of installing the working bodies of the cleaner on the cotton: the effect of shaking on a net or grid, blowing with air, dynamic piles, etc. A review of cotton weeders shows that an increase in the cleaning effect is achieved by increasing the number of impactors or by increasing the number of drums. However, cotton fiber still exceeds existing standards. Therefore, cotton gins are forced to clean cotton raw material from small weeds many times in the drying-cleaning workshops. However, reducing fiber entanglement, as if the norm, machines seriously damage fibers and seeds [4].

Thus, the existing working bodies of cotton processing machines do not have an effective effect on the processed material, which requires an increase in processing efficiency. To increase the efficiency of cotton cleaning, a new working body has been developed that actively affects the fiber material. It is known that one of the main working organs in the cleaners is piled drums, which drag the cotton through a mesh or grid and separate small impurities from it [5].

Research Methodology

To increase the efficiency of cotton cleaning, a new working body has been developed that actively affects the fiber material.

Analysis and Results

The goal of improvement-1XK cleaning machine is used to clean cotton from small impurities in cotton ginning factories. Depending on the industrial type of cotton, the level of impurities in its composition is different. When the cotton gin is working, it is necessary to take into account the level of dirtiness of the cotton when passing it through pile drums. Cottons of the first and second grade will not be very dirty, it will not be necessary to pass them through the 8-pile drums of the 1XK cleaning machine. Therefore, the design of the 1XK cotton cleaning machine from small impurities was improved (scheme 1).

When high-quality cotton is cleaned in the improved cotton cleaning machine, 1, 2 - sieves are open. In this case, the 3rd screen is closed and the cotton passes through four-pile drums to be cleaned of small impurities [6].

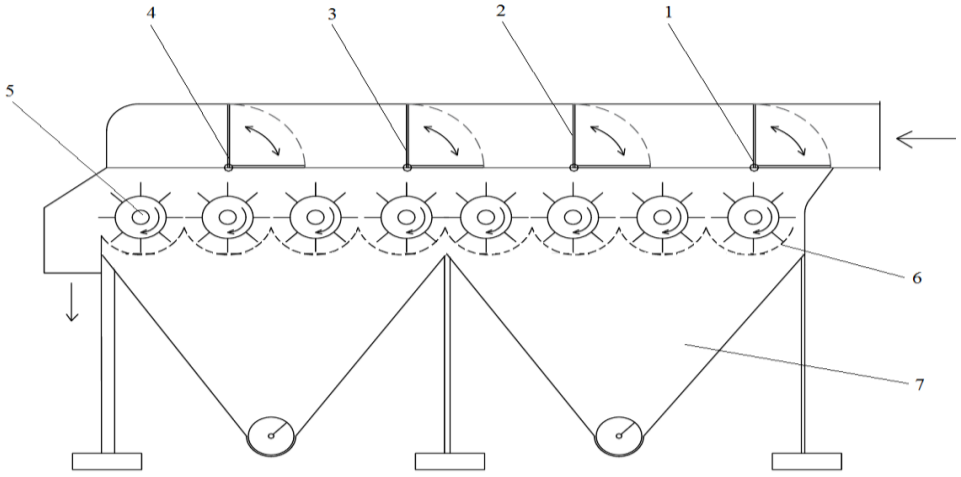

Figure 1. Improved cotton cleaning machine.
1,2,3,4 – sieves, 5 - pile drum, 6 - mesh surface, 7 - dirt hopper.

Theoretical foundations-the 1st screen is closed when cleaning cotton with a high level of low-grade impurities from small impurities. As a result, the cotton is cleaned by passing through 8 pile drums. In addition, depending on the dirtiness of the cotton, it is also possible to pass through 2 and 6 pile drums [7].

The improved construction of cleaning cotton from small impurities proposed by these authors reduces seed damage and prevents the formation of various defects in cotton [8].

The rest of the values were taken as in the cases [9, 10]. The radius of the base of the cone is selected depending on the useful surface of the equipment for picking up fine cotton 1XK [11,12].

Table 1

№	The length of the mesh surface $M_э$ (mm)	The angle of coverage of the mesh surface is a (degree)	Mesh surface width $К_э$ (mm)	The mesh surface is a useful surface (cm^2)
1	1800	60	230	0.41
2	1800	65	251	0.45
3	1800	70	269	0.48
4	1800	75	288	0.51
5	1800	80	307	0.55
6	1800	85	325	0.58
7	1800	90	345	0.62

As can be seen from Table 1, the actual distance occupied occupies its useful surface.

Conclusions

In the article, the scientific and research works devoted to the improvement of the construction of the drum with a pile in order to preserve the natural properties of cotton were analyzed. In studies conducted by scientists, the efficiency of ginning machines was achieved by increasing the number of pile drums affecting the cotton. As a result, the seed was damaged and caused the formation of various defects in the composition of the fibers.

The improved cleaning machine proposed by the authors is passed through drums with piles depending on the amount of small impurities in the cotton. Organizing the process of cleaning such cotton from small impurities will significantly reduce seed damage.

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UDC: 340.5, 342, 342.4

DEVELOPMENT OF CONSTITUTIONALISM AND PHILOSOPHICAL-CRATOLOGICAL VIEWS IN ENGLAND

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Annotatsiya. Demokratik davlatlarda konstitutsiya va konstitutsionalizm prinsipiga tayanish odatiy voqelikdir. Ammo ularning genezisi, evolyutsiyasi va shakllanish bosqichlari bo'yicha amalga oshirilgan tadqiqotlar kamchilikni tashkil qiladi. Shuning uchun mazkur maqolada biz, ijtimoiy davlat qurishning strategik maqsadlaridan kelib chiqqan holda, ana shu muammolar va tajribalarni Angliya misolida ochib berishga intilamiz.

Kalit so'zlar: *konstitutsionalizm, demokratizm, kanonik huquq, konstitutsion monarxiya*

Аннотация. Опора на конституцию и принцип конституционализма является обычной реальностью в демократических странах. Однако исследования их генезиса, эволюции и этапов формирования отсутствуют. Поэтому в этой статье, исходя из стратегических целей построения государства всеобщего благосостояния, мы пытаемся раскрыть эти проблемы и опыт на примере Англии.

Ключевые слова: *конституционализм, демократия, каноническое право, конституционная монархия.*

Abstract. Relying on the constitution and the principle of constitutionalism is a common reality in democratic countries. However, there is a lack of research on their genesis, evolution, and stages of formation. Therefore, in this article, based on the strategic goals of building a welfare state, we try to reveal these problems and experiences in the case of England.

Keywords: *constitutionalism, democracy, canonical law, constitutional monarchy*

Introduction

The word "constitution" is derived from the Latin word "constitutito" meaning "structure", "established order". At first, it was used in a biological sense, referring to the morphological structure of human and animal organisms. In medicine, it is still used in this sense. In foreign literature, in the interpretation of constitutional scholars, there is an opinion that more than two hundred years have passed since the formation of the theory of the constitution. In this period, the theory of the constitution, after affecting the function of state management with political processes, was perceived and understood as a transcendent reality, symbol, even myth in the form of "constitutional absolute" in relation to law. This transcendence, formed before legal norms, was later transmitted to all legal norms and laws [1].

Literature Review

The constitution was created in the place of a document defining the basis of the state in time and specific socio-political space, expressing its internal structure and management procedures in written form. From a retrospective point of view, the constitution is “a transition from a dictate legitimized by religion to a government integrated into the state aimed at the rational organization of the people's life” [1]. In the Middle Ages, built on the tradition of sacralization of power, “religious laws”, “canonical law” were not based on a rational basis, but in the form of faith, unconditional belief in religious dogma. Even the distribution of power and “social agreement” proposed by Montesquieu S. and Rousseau J.J. did not have a constitutional character. During the Enlightenment period, when the belief in human intelligence, rational management by power, freedom of criticism and thought became the object of social thought, the human and his right, especially his relationship with power and management, the need and requirements for legal norms increased to the “meta-juridical and transcendent basis” of the constitution [2]. If the enlighteners Montesquieu S., Diderot D., Bonneau E., de Lametri J.S., Gelvetsiy K., Holbach P.A.D., Voltaire, Rousseau J.J. tried to free the intellect from the rational basis of state and society management, the method of deifying the relations between the individual and the society, the citizen and the state, the person and the nature, the existence, it can be said that their ideas about applying the principles of power, management, coercion and voluntariness, freedom, equality and inequality to social and political life became a philosophical methodological basis for the theory of constitution. However, they said almost nothing about the constitution itself. Nevertheless, it should be recognized that the philosophical-political and cratological views of the Enlightenment were an important stage for the theory and practice of the constitution.

The formation of the constitution and the principle of constitutionalism is actually the result of the English and French revolutions that took place in Europe, especially in the XVII-XVIII centuries. If the New Era begins with the XV-XVI centuries, that is, with the Renaissance and Reformation, then the formation of democracy, constitution and constitutionalism as a separate socio-legal phenomenon begins with the English and French revolutions. And it urges us to observe the system of government and law in England (Great Britain) and France in order to determine the evolution and stages of the principle of constitution and constitutionalism. It was in these periods and states that the constitutional changes, the distribution of power, the participation of the wider population in democratic elections and governance, in short, the legal-cratological updates that fundamentally changed the social and political existence, brought the development of humanity to a new level. This, in turn, formed the modern constitution and constitutional principles, created the norms and conditions for the constitutional legalization of democratic changes in state and community management and their strict adherence to them by the authorities.

Research Methodology.

In this article, historical comparison, analysis, synthethis methods were used.

Analysis and Results

Some experts associate the formation of the principle of constitutionalism in England with the Great Charter of Liberty adopted in 1215 [3]. However, the functioning of this document was not related to its adoption, but to the real participation of the general public in the management of state affairs, the activity of the representative body. By the 17th century, the state administration based on the feudal monarchy began to become an obstacle to the interests and needs of the newly emerging entrepreneurs and businessmen, who were looking for the essence of capital accumulation. The rapid development of industry brought the industrial bourgeoisie and entrepreneurs, aristocracy to the stage of socio-political life, absolutism in society did not suit the interests of this stratum. Under their influence, the constitutional monarch (royal power), the House of Lords, the Privy Council and the feudal representative body emerged in the power system. The basis of feudal absolutism was formed by the feudal nobles and the English Church, while the new layer, the supporters of capitalist relations, relied on the supporters of reformation and liberal democratic ideas. The new layer was named “puritans” [4].

Conflicts between the House of Lords and the king became the basis for moving towards constitutionalism. The actions of the monarch that are not in accordance with the general procedures and development of society, social opinion, the allocation of large funds for its maintenance, the implementation of state management at its own discretion, aroused various objections in the House of Lords. In 1628, the House of Lords prepared a Petition on Right to Limit the King’s Government Actions. It included the following:

1) no one shall henceforth pay irregular taxes and dues to the royal treasury, generally agreed upon and approved by Parliament;

2) no person who refuses to pay illegal taxes may be arrested;

3) the army cannot be stationed in inhabited houses;

4) no person or citizen who opposes the laws and regulations of the country should be deprived of his life. “In this way, the main issue regarding the life and property of the king and the citizen is legally resolved in the document” [4].

Royal rights are limited, private property is protected. Later, the parliament introduces the impeachment of high-ranking officials. It so happened that during the Great Restoration (1641-1649), the king would be able to appoint people whom Parliament trusted to positions of power. State management, the issue of power is carried out with the approval of the parliament, violation of this principle will be condemned by the parliament. It was actually a path towards a constitutional monarchy.

In the 18th and 19th centuries, constitutionalism in the government and state administration of England went towards strengthening the constitutional monarchy and expanding the parliamentary government and its management capabilities. Parliamentarianism has gone down in history as a policy of limiting royal power and expanding parliamentary rule. The fact is that the relations between the king and the parliament, the constitutional monarch and the “responsible government” approved by the parliament are not formalized by any act, document, or constitutional norm. But there was a consensus, an unwritten agreement, agreements called “conventional norms” between them, so that this experience was equally understandable to the legislative body and the executive power. “The king reigns but does not rule”. This

principle recognized the monarch as the body of state power, but the government and all governing affairs were in the hands of Parliament (the House of Commons and the House of Lords) or "party rule". The reforms carried out in the judicial system were focused on ensuring their independence. In this way, in England "unwritten constitutionalism", but a government appointed by the parliament, a governing body governs the country, a system called "Westminster model" was formed in the legal literature [4]. The expansionist policy of the Great Britain mixed with the traditions and management systems and organs of the colonies created the "British Indian" and "British Muslim" legal systems, state power and administrative bodies corresponding to them [4].

Conclusions

In the world of constitutions, the experience of Great Britain (England) comes, on the one hand, as a reflection of historical-political processes, and on the other hand, it takes place as a unique, unwritten norm based on consensus and compromise between the monarch and the parliament. Such unwritten constitutional norms and constitutional governance are hardly found in other countries. It is necessary to look for the emergence and characteristics of this English management system first of all from the English philosophy and political legal and cratological teachings of that time. In this regard, it is appropriate to remember Francis Bacon (1561 1626), Thomas Hobbes ((1588 1679), John Locke (1632 1704), Baruch Spinoza (1632 1677), Chefstebury Anthony Ashley Cooper (1671 1713), David Hume (1711 1776), because they not only formed the philosophical-cratological and political-legal views of their time, these views, in turn, influenced the European continental scientific heritage of the XIX-XX centuries, and determined its main direction when it comes to their political and legal experiences, which implies the harmony of this heritage with modern scientific doctrines.

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ANALYSIS OF QUALITY OF LIFE INDICATORS FOR PERSONS WITH DISABILITIES

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Annotatsiya. Bugungi kunda xalqaro hamjamiyat nogironlarning hayot sifatini yaxshilashga katta e'tibor qaratmoqda. Shu munosabat bilan dunyoning turli ilmiy markazlari nogironlarning hayot sifatini baholash uchun turli ko'rsatkichlarni taklif qilishdi. Bu ko'rsatkichlar tahlili Yangi O'zbekistonda milliy ko'rsatkichlarni rivojlantirishga zamin yaratadi. Muallif ushbu maqolada yetakchi xalqaro tadqiqot markazlari tomonidan nogironlarning hayot sifatini baholashga qaratilgan ko'rsatkichlarning asosiy jihatlariga e'tibor qaratadi. Bundan tashqari, maqolada ekspert so'rovi usuli yordamida o'tkazilgan tadqiqotning asosiy xususiyatlari yoritilgan. Muallif O'zbekistonda nogironligi bo'lgan shaxslarga qaratilgan ijtimoiy siyosat samaradorligini oshirish maqsadida nogironlarning hayot sifatini baholash bo'yicha milliy ko'rsatkichlarni ishlab chiqish va amalga oshirish zarurligi haqida xulosa qiladi.

Kalit so'zlar: *Hayot sifati, nogironligi bo'lgan shaxslar, xalqaro ko'rsatkichlar, ekspert so'rovi usuli, O'zbekistonda ijtimoiy siyosat*

Аннотация. Сегодня международное сообщество уделяет большое внимание улучшению качества жизни лиц с ограниченными возможностями. В связи с этим различными научными центрами мира предложены разнообразные индикаторы для оценки качества жизни лиц с ограниченными возможностями. Анализ этих индикаторов открывает путь для разработки национальных индикаторов в Новом Узбекистане. В данной статье автор акцентирует внимание на ключевых аспектах индикаторов, разработанных ведущими международными исследовательскими центрами, направленных на оценку качества жизни лиц с ограниченными возможностями. Кроме того, в статье освещаются основные особенности исследования, проведенного методом экспертного опроса. Автор приходит к выводу, что для повышения эффективности социальной политики в отношении лиц с ограниченными возможностями в Узбекистане необходимо разработать и внедрить национальные индикаторы для оценки качества жизни лиц с ограниченными возможностями.

Ключевые слова: *Качество жизни, лица с ограниченными возможностями, международные показатели, метод экспертного опроса, социальная политика в Узбекистане*

Abstract. Today, the international community places significant emphasis on improving the quality of life for persons with disabilities. In line with this, various scientific centers around the world have proposed diverse indicators to assess the quality of life of individuals with disabilities. The analysis of these indicators

paves the way for developing national indicators in the New Uzbekistan. In this article, the author focuses on the key aspects of the indicators developed by leading international research centers aimed at assessing the quality of life for people with disabilities. Additionally, the article highlights the main features of a study conducted using the expert survey method. The author concludes that, in order to enhance the effectiveness of social policies targeting persons with disabilities in Uzbekistan, there is a need to develop and implement national indicators for assessing the quality of life of people with disabilities.

Keywords: *Quality of Life, Persons with Disabilities, International Indicators, Expert Survey Method, Social Policy in Uzbekistan*

Introduction

The development of any society and state is measured by the quality of life of its citizens. Along with universal indicators aimed at determining human well-being and quality of life, scholars in the field of social sciences are increasingly developing specific indicators. One such example is the set of indicators designed to assess the quality of life for persons with disabilities.

In recent years, Uzbekistan has witnessed a new phase of social policy aimed at improving the social protection of individuals with disabilities. To enhance the effectiveness of this social policy, it is advisable to develop and implement indicators that can measure the dynamics of the quality of life of persons with disabilities.

Literature Review

In recent years, various studies aimed at improving the quality of life for persons with disabilities have been conducted by Uzbek scholars, including M. Ganiyeva [1], N. Latipova [2], L. Mominova [3], D. Nurkeldiyeva [4], V. Alimova [5], V. Alekseeva[6], M. Abduvalieva [7], F. Komilov [8], Z. Uzakova [9], D. Yusupov [10], Ya. Checherina [11], and A. Abduxalilov [12]. While these scholars have addressed various issues related to the rights and interests of persons with disabilities, there has been little attention given to indicators for assessing their quality of life. This article, therefore, reviews studies conducted by various international research centers on this topic.

Research Methodology

Following the adoption of the international classification of disability, the United Nations Statistical Commission established the “Washington Group on Disability Statistics.” This group consists of national statistical committees from various countries focused on disability statistics. The primary goal of this group is to develop quantitative indicators to identify the needs of persons with disabilities through enhanced international cooperation and to compare the achievements of different countries. The methodology developed by the Washington Group can be applied in population censuses, and the tools created by the group aim to compare the living conditions of persons with disabilities. It is important to note that the instruments developed by the Washington Group reflect the multifaceted and complex nature of the disability phenomenon. The most well-known tool is the questionnaire designed to assess the functional characteristics of persons with disabilities [13].

This questionnaire, developed as a short module for population censuses, identifies the functional characteristics of persons with disabilities. Furthermore, one of the main objectives of the short questionnaire is to identify the link between environmental factors and the challenges persons with disabilities face in their daily activities. The questionnaire addresses issues such as poor vision, hearing impairments, mobility limitations, memory and concentration difficulties. The tool is designed to identify the challenges faced by people with different types of disabilities. Today, the short questionnaire developed by the Washington Group is recognized by the international community as one of the best practices for gathering information on the living conditions of persons with disabilities. The short questionnaire by the Washington Group includes the following questions:

1. Do you have difficulty seeing, even if wearing glasses?
2. Do you have difficulty hearing, even if using a hearing aid?
3. Do you have difficulty walking or climbing stairs?
4. Do you have difficulty remembering or concentrating?
5. Do you have difficulty with self-care tasks such as washing or dressing?
6. Do you have difficulty communicating with others?

Each question has four possible responses:

a) No, no difficulty;
b) Yes, a lot of difficulty;
c) Yes, some difficulty;
d) Cannot do at all.

According to the experts involved, the state of disability is determined based on the above-mentioned barriers. After the development of the short questionnaire, an extended questionnaire was also created to assess the quality of life of persons with disabilities. The extended questionnaire allows for the collection of additional information not covered by the short form, such as anxiety, depression, upper body functions, pain, and fatigue. It also includes questions on the relationship between functional characteristics and the environment, personal assistants, and assistive devices. The extended questionnaire consists of 35 questions and covers demographic status, household information, and health conditions. It is intended for individuals with disabilities aged 18 and older. If a respondent is unable to participate in the study for any reason, a caregiver can answer on their behalf [14].

The extended questionnaire also addresses the needs and quality of life of children with disabilities. In collaboration with UNICEF, the Washington Group developed a questionnaire specifically for children. Similar to the adult questionnaire, this tool aims to assess the quality of life of children with disabilities. The questionnaire is divided into two sections: one for children aged 2-4 years and another for children aged 5-17 years. The questionnaire for younger children includes questions related to motor skills, communication, play, and behavior. The section for older children addresses issues related to vision, hearing, mobility, self-care, communication, memory, and concentration. If the child cannot respond, the main caregiver is interviewed. Additionally, the Washington Group is developing questionnaires to assess participation in inclusive education, barriers, employment challenges, and other difficulties faced by persons with disabilities [15].

In our view, the development of these questionnaires by the Washington Group will lead to more comprehensive research on disability issues and the emergence of new concepts aimed at understanding the disability phenomenon. Another widely used questionnaire, developed by the World Health Organization (WHO) and the World Bank, aims to collect comprehensive information on the quality of life of persons with disabilities. This tool focuses on identifying the challenges faced by both disabled and non-disabled individuals and aims to monitor the implementation of the Sustainable Development Goals (SDGs) in different countries. The questionnaire covers the following modules:

I) Environmental Factors:

1. Are the public places you usually visit accessible to you?
2. Do these public places enable your full participation in community life?
3. Are the stores, post offices, and banks near your residence accessible to you?
4. Are the transportation options you use or wish to use accessible?
5. Is your residence accessible to you, or do you face difficulties there?
6. How difficult is it to receive help from your partner or family members when needed?
7. How difficult is it to ask for help from friends or colleagues?
8. Do you find it difficult to get help from your neighbors?
9. Do you have choices in your daily life, such as what to eat, where to go, and what to do?
10. Do you feel that others respect you and listen to you?

II) Functional Tasks:

1. Do you have difficulty walking a kilometer?
2. Do you have difficulty with personal care tasks like washing and dressing?
3. Do you have difficulty using the toilet?
4. Do you find it difficult to take care of your health, such as doing exercises, eating well, taking medications, or having enough energy to complete tasks?
5. Do you have difficulty remembering tasks or completing daily responsibilities?
6. Do you find household tasks difficult?
7. Do you find it difficult to participate in social life (e.g., religious or other ceremonies)?
8. Do you have difficulty using public or private transportation?
9. Do you find it difficult to fulfill your responsibilities at work?

III) Opportunities and Health Conditions:

1. Do you have difficulty seeing objects at a distance without glasses?
2. Do you have difficulty communicating without a hearing aid?
3. Do you have difficulty walking or climbing stairs?
4. Do you have trouble concentrating or remembering things?
5. Do you have difficulty falling asleep or staying asleep due to health problems?
6. Do health problems make it difficult for you to complete household tasks?
7. Do health issues make it difficult for you to participate in social life?
8. Do you often feel sad or frustrated?
9. Do you have conditions such as blindness, hearing loss, hypertension, heart disease, diabetes, arthritis, or chronic respiratory diseases?

IV) Personal Help and Assistive Devices:

1. Do you have people who help you at home or outside your home?
2. Do you think you need additional help?
3. Do you think someone should assist you?
4. Are you currently using assistive devices?

We believe that the questions in the WHO and World Bank questionnaire provide valuable information about the living conditions of persons with disabilities in specific countries. These tools not only provide insights into the status of persons with disabilities but also allow for a comparative analysis of national policies regarding disability.

In addition to international organizations, there are also national studies aimed at developing indicators to assess the quality of life for persons with disabilities. A notable example is the research conducted by Queen's University in Belfast, Northern Ireland. The research objectives included:

1. A review of literature assessing the quality of life of families with disabled members.
2. Identifying key aspects for measuring the quality of life for persons with disabilities and developing appropriate recommendations.
3. Analyzing existing data and identifying new information.
4. Developing recommendations to improve the quality of life for persons with disabilities.
5. Verifying the proposed measures.

This study defines disability according to the United Nations "Convention on the Rights of Persons with Disabilities," and the concept of quality of life is defined as "an individual's assessment of their situation based on the social, cultural, and economic characteristics of a given society." The report emphasizes that research on the quality of life for persons with disabilities is relatively new, and there is still no comprehensive framework for measuring the quality of life for persons with disabilities. The report's authors raise several complex questions related to measuring quality of life: What is a good life? Are people's perceptions of a good life similar? Which aspects of life are more important? Are there universal indicators for measuring quality of life? Should objective or subjective factors be prioritized when assessing quality of life? How do social and cultural factors influence the understanding of the quality of life category?

The report highlights the complexity of measuring the quality of life for persons with disabilities, noting that various paradoxes can arise during the process. Despite the complexity, it is critical to develop valid, reliable indicators that can accurately assess the well-being of individuals with disabilities in different social and cultural contexts.

Analysis and Results

In recent years, Uzbekistan has made significant strides in improving the quality of life for persons with disabilities, making it a key area of focus within the country's social policies. Ensuring the effectiveness of these policies requires scientific methods and tools to assess and measure the quality of life of individuals with disabilities. Evidence-based proposals rooted in scientific research are essential for systematically reforming social policies aimed at improving the well-being of persons with

disabilities. This study utilized the expert assessment method to focus on developing national indicators for measuring the quality of life for persons with disabilities. A total of 10 experts participated in the study, including five from academic circles, five leaders of non-governmental organizations, and four individuals with disabilities themselves.

The results of the study indicate that developing national indicators for measuring the quality of life for persons with disabilities is indeed feasible and necessary. The proposed indicators include the following aspects:

1. The degree of integration of persons with disabilities into society.
2. The availability of a barrier-free environment.
3. Opportunities for personal development and growth.
4. Emotional well-being.
5. Physical well-being.
6. Financial security and material well-being.

It is worth noting that experts believe that implementing these national indicators for measuring the quality of life for persons with disabilities will contribute to the overall improvement of their living conditions and enhance their well-being.

Conclusions

As mentioned above, the research on these indicators is still in its early stages, and the studies conducted so far have not undergone full-scale validation. To ensure the successful implementation of these indicators, it is necessary for researchers to conduct both quantitative and qualitative studies on this subject. Based on the analysis of the indicators and the findings of this study, the following conclusions can be drawn:

1. While various indicators for measuring the quality of life of persons with disabilities have been developed, it remains unclear which indicators are the most appropriate for specific countries. Global research on the application and use of these indicators is still lacking.

2. Integrating both objective and subjective indicators is crucial for accurately assessing the quality of life of persons with disabilities. The quality of life is influenced not only by measurable factors but also by individuals' perceptions and experiences.

3. The research revealed several key areas that need to be prioritized in ensuring the quality of life for persons with disabilities:

- Integration into society.
- The creation and maintenance of a barrier-free environment.
- Opportunities for personal development and growth.
- Ensuring emotional well-being.
- Ensuring physical well-being.
- Ensuring financial and material security.

These priorities demonstrate that if programs aimed at creating a barrier-free environment are effectively developed and implemented, persons with disabilities could experience improvements in emotional, physical, and material well-being. Additionally, targeted efforts to integrate persons with disabilities into society and provide them with opportunities for personal and professional growth will contribute to their overall quality of life.

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PHILOSOPHICAL ANALYSIS OF MAHMUD AL-ZAMAKHSHARI IN THE WATER ISSUE

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Annotatsiya. Mazkur maqolada hozirgi vaqtda insoniyat yashashi uchun zarur va muhim bo‘lgan ichimlik suvi masalasi va ichimlik suvi va tabiat haqidagi qarashlar, Mahmud az-Zamaxshariy qarashlari atroflicha tahlil etilgan.

Kalit so‘zlar: *tabiat, suv, fan, ekologiya, atrof-muhit, atrof-muhit, odam, tirik organizm.*

Аннотация. В данной статье в настоящее время подробно анализируется вопрос питьевой воды, которая необходима и важна для существования человека, а также взгляды на питьевую воду и природу, и взгляды Махмуда аз-Замахшари.

Ключевые слова: *природа, вода, наука, экология, окружающая среда, окружающая среда, человек, живой организм.*

Abstract. This article is currently analyzed in detail the issue of drinking water, which is necessary and important for human existence, and the views of drinking water and nature, and the views of Mahmud al-Zamakhshari.

Keywords: *nature, water, science, ecology, environment, environmental, man, live organism.*

Introduction

Recently, we see today’s global events in the world that the increase in anthropogenic effects over the environment is the cause of the environment today and is causing the emergence of many environmental problems. The atmosphere has the problems of air disorders, hot air, decrease in soil degradation, the decline of the ozone degradation, the mirting of the ozone layer separately to nature requires a minor supply. It is noteworthy that in the history of the human society, water is value as the source of the most necessary need. The water is the most important vital erodes for all living organisms, creatures and people, including the simplest and initial liquid on Earth. Indeed, water is a blessing, the invaluable blessing that determines nature and human existence and life. Therefore, the President of the Republic of Uzbekistan Shavkat Mirziyoyev said, “The wisdom of environmental safety, water and natural resources must be in the center of our attention” [1]. Today, water is the unique element of the most important vital nature for all areas of socio-economic activity, from daily needs of the people, is a living resource for all sectors of the economy, in particular agricultural and industrial machinery.

Today, for social and economic development, it is very important to preserve the natural ecological environment by increasing the influence of the environment and

people's relationship with each other. In Mahmud al-Zamakhshari's spiritual heritage, important constructive ecological philosophical ideas about man and nature have a special place. To raise environmental consciousness and culture, and use environmental benefits and use nature, to raise environmental benefits and its presence, normal environment, an important factor in changing the environmental thinking of the population for a positive direction. Therefore, the ecological consciousness of the younger generation and ecological ideas through the works of the works of scholars are valuable today in the works of scholars. He serves to develop culture.

Research Methodology

During the recording process, history, statistical analysis, philosophical analysis, logical comparison, and part-topological analysis were used in turn. The fact that water is a global issue in the world is a global problem. In the IV Repair of Intergovernmental Changes, 3.9 billion people in the Earth have been returned to the water [2]. According to the UN, in 2050, 80 percent of the world's population lives in areas where water is scarce. At the same time, the activities of the population of the population will be closely related to the levels of water [3].

When maintaining human health, the importance of water and air purity is rapidly said. However, according to the World Health Organization, 85 % of all diseases are watered. Every year, 25 million people die of frosts. According to a joint UN section of 36 sections of the World Section of 2009, UN World Sections (2005-2015) reported that many countries around the world are very close to the limits of water use came to come. Some countries, cities, villages have already begun, the risks have already begun, and the risk of becoming this problem is increasing. According to speakers, the needs of water consumption, where water consumption is not yet, will be currently unique, in 2030, water consuming 5 billion people (67 % of the population. Currently, 340 million people have suffered pure, fresh water shortages in the southern site of Africa. This is one of the most important environmental problems today. In the seventh section of the scientist's "Rabiul-Abror," in the seventh chapter of swimming in the water, seas and rivers, springs and waters, all things in the universe are created for people, adopt the blessings of human children. Cognize, responsible for not waste. Of course, it violated the order of nature, - acting the leading to environmental crisis, to people far from environmental culture:

Scholar, ali r.a. Allah Almighty is then asked the commentary on the verse of the verse. They also have also stated that as well as well as the expelling of nature breeds, it is also possible to ask them about harms of them. He describes what kind of blessings he and said, "These blessings are wet, water, and coolness." Of course, it is very important for human life that clean drinking water and purification. For a person, 2-2.5 liters of clean drinking water is required in one day to meet the biological needs. If the air temperature is moderately, of course. After all, if the air is hot, this indicator changes.

It is known that 80-90 percent of the feed that all living organism consumes all living organisms is water, drinking about 35 tons of water during human life. In turn, 70-75 % of the human body consists of water, with water, consisting of 95 % of the brain that manage life, and 95 % of blood consists of water [5].

Analysis and Results

In particular, the pollination of the water with all waste and filthy, the water basins with all sorts of waste is strongly condemned in the teachings of Islam. It is said in the hadith narrated by Al-Tabarani narrated that, “Those who brought hard to put the flowing water” (Reported by Imam Tabarieenani).

According to the UN, 97.5 % of the planet is saline, which is unable to use both irrigation and drinkers. 2.5% is clean drinking water and contains clean drinking water, so two-thirds are water forms available in iceberg and mountain glaciers. Only 1 % of the Earth's water stock accounts for water consumption. Water that are suitable for consumption is called drinking water. The human body contains a maximum of 0.1% salt, which is not harmful and meets current standards. Bacteriological evaluations of water do not rely solely on the climak titr or the coli index. The minimum amount of water required for a single bowel movement is indicated by the Kokoli index, which defines 1 liter of intestinal rods in water. Studies show that after water is treated (specifically when more than 300 ml is used), TIF, pathogenic microbes, and diseases such as paratuberculosis and tuberculosis are effectively eliminated. Therefore, this implies that the water quality meets the necessary standards for safe drinking.

Over the past five thousand years, although the size of the water is not changed as a key environmental component, while the residents of the earth increased several hundred times, technology news was used in practice. Today, the idea that drinking water, the unique and precious natural resource is being confirmed.

In chapter 7 of the scholar “Rabiul-Abror,” it covers these sentences in such a way that the value of water that is precious to man is:

Ali R.A. They asked, “What is your love for the Messenger of Allah?”. He said, “By God, He is better than all our wealth and the cool water.”

Some of the Arabs said:

The words are so attracted, O beautiful, and the Lord is like the cool water is like my souls enjoy.

One day, Ash Sha’bi asked Kutayba Ibn Muslim for a drink. Kelayba inquired, “O Abu Emir, what drink is most similar?” He replied, “If there is nothing else, then it’s like a drink.” Kelayba said, “Give him water.”

Ali R.A. Narrated by: Rasululloh s.a.v. Those say: “The Prayer of the World and Hereafter is meat, and the master of the world and the Hereaway wine is water. And I am the Prayer of Adam’s children. Recharge as” [4].

Recently, by the United Nations Environment Program (United Nations Entirement Program-UNEP), recently, by 2050, it was noted that 30 % of the population of Earth faces the problem of 30 % of the population. The process is in fact accelerated. Water shortages and water quality problems have become transverse to the world’s population. All the waters in Earth are unique, and they are in constant movement, change and renewal. The liquid state between the zero degrees from 100 degrees is the main condition of existence of life in the ground for living.

If in 1960, 1 person in the Middle East and North Africa 1 person 3300 liters. If water is accurate, now this number is 1250 liters, which is the lowest dangerous line of the sanitary norm of 1000 liters of water in 1 year (indicates that it is). Syria and Lebanese countries are coming to this dangerous line. Kazakhstan often experiencing

water shortages between the Commonwealth. The latest in the wealth of the Water Security Trades accounts for: here is 37,000 meters of water per 1 sq./km. It is 6,000 meters of cubic water a year. The territory of Kazakhstan satisfies the supply of 56% water through its territory, while the remaining 44% of the remaining 44% shall cover water from other neighboring countries. This is the largest economic and environmentally disaster treachery [6].

Fresh water from Karakalpakstan was 400 km, 400 km from Nukus, was found fresh water on the island of "€" ("Rewash"). Fruit water is exporting 7 liters per second from deposits in the COLD of the Arleta of the Artesian Ban. The mineralization of this water is 3 grams and hardness are equivalent to 6 milligron equivalent. This means that the scale of pure fresh water is 420 liters. In an hour, 25,000 liters of fresh water are coming out. This also serves to improve the environmental quality of the Aral Sea region [7].

The role of the hydrosphere in maintaining a relatively constant temperature on our planet is incomparable, it is a heat accumulator, on the one hand, it provides the average constant temperature on the planet, and on the other hand, it provides half of the oxygen in the atmosphere at the expense of phytoplankton. Of course, touching on the value of water in human life and activities, in the following conversation, when Abul Atohiya was sitting with a group of poets in the presence of the king, a man drank water and said, "What a cool and pleasant water!" said. Abul Atohiya said: "Everyone confirms what you said." The people in the circle fell into silence. Abul Atohiya said: "Subhan Allah, what a beautiful silence" he recited this verse:

The water is cool and clean,
Excellent drinks.

When the great thinker emphasizes how important clean water is for a person, he raises the importance of cool water to such high levels [4]. Today, the demand for water is increasing day by day. and wants to drink clean drinking water.

It is important to note that experts predict that in 2025, the water crisis will spread to 17 more countries, and India will not be spared from this crisis. In fact, at present, every Indian family needs 250 liters of water per day. 7 of the largest cities in India (35% of the country's population lives in these 7 cities) use 100 liters of water per day [6].

It is difficult to imagine the consequences if this water hazard threatens China as well. After a quarter of a century, water risk may threaten 8 billion people, so it is necessary to start practical activities about saving water now. Jalaluddin Rumi showed the value of water in his wisdom:

Obi animal qiblai soul, my friend,
Boston is alive with water, my friend.

he writes. Fahriddin Gurgoni, an artist who lived in the 11th century, was a great teacher about not polluting water in his time:

"If you make a fountain today,
You can't drink anything else from this water."

Maulana Jalaluddin Rumi paid special attention to the great importance of water for all living organisms, plants and people:

The sound of water is wasted,
Tirgizur even kills dead souls [8],

He wrote about the place of water in nature. Through these verses, people are told, “Now, think of yourself as water and feel yourself as water. Imagine that you are as special as water, as life-giving as water, as pure as water, as necessary as water, as a pledge of life as water, and as inexhaustible as water... But again, you can fit yourself into a small container like water, so that get into people's veins. Give life, be unyielding!” [8]. These verses show the high place of water in existence. It is said to be useful to all mankind like water.

Ma’mun said: “There are three things in cool water: it gives pleasure, it is digestible, and it gives praise (Alhamdulillah)” [4].

Alloma refers to what an enlightened person can be by describing water as a tool that creates life, movement and gratitude for all blessings.

“Make all things beautiful” (Allah called people to treat people and nature with beautiful behavior and good manners), (Surah Al-Baqara, verse 143). God loves those who do good and those who are patient. In other words, in addition to the good deeds done to people and nature, people's behavior with beautiful patience increases their respect.

Alloma gives the following information about the world’s seas. Wahb ibn Munabbaah said: “There are seven famous seas. These are the Indian Sea, the Sind Sea, the Levant Sea, the African Sea, the Andalusian Sea, the Sea of Rum, and the Sea of Sin (China).”

Abu Nuwwas describes the ship as follows:

The water caresses his chest,
Sailors have oars in their hands.
Like a black eagle in the dark,
Screaming and flapping its wings [4].

The aquatic environment is for fishing, gathering plants, underwater resources - getting ores (manganese, nickel, cobalt and oil), another benefit is the environment for carrying goods and delivering passengers to their destination.

In Surah Fatir verse 12, we read the following: “Two seas are not equal - one is sweet and drinkable, and the other is salty and sour. You will eat fresh meat (fish) from each (of them) and bring out ornaments to wear.”

A few centuries ago, a great scholar discovered the separation of two seas in his work, and praise be to God, who drew a curtain between the two seas, which the people are unable to perceive [4]. It gives the idea that. In the 20th century, Cousteau boasted to the world that he had made this discovery, while al-Zamakhshari mentioned it in the work “Rabiul-abror” before the 9th century. It is because we are not aware of the spiritual heritage of the younger generation and our scholars.

In many surahs of the Holy Qur'an, Allah mentions the blessings that Allah has given to mankind, and among them he mentions water in particular: "He sent down water (rain) from the sky for you to drink." He is the one who digged. The grass that feeds (your animals) is also (watered) from that water. He collects for you that (water) and (various) crops, olives, dates, grapes and all fruits. Indeed, there is a sign in this for those who reflect (Surah Nahl, verses 10-11). According to experts, a person can live without food for a week or two, but he cannot survive even three days without water. If the water in a person's body decreases by fifteen percent, he will die. Most of the human body consists of water.

Abu Abdullah ibn Umar said: "I know when the people of Egypt will leave their land." They asked him: "Will the enemy drive us out?" He said: "No, your source of life, the river Nile, will dry up." Not even a single layer remains. Sand flows instead of water. Wild animals eat his fish [4].

Allah, the Exalted, created all things in an integral relationship with each other, with his own measure and calculation, and there are many proofs about this in the "Holy Qur'an." For example: that is: "Allah the Most High sends down rainwater from the sky, and the waters flow in the valleys according to their measure and calculation..." [8] (Surah Ra'd, verse 17). Another verse in the Karim says: "We sent down rainwater from the sky and settled it on the Earth (according to the needs of all things on Earth). We are capable of taking away these waters and depriving you of them" [9] (Surah Mominun, verse 17).

Through this verse, Almighty God informs us that all things on Earth, including water, were created with a specific calculation and measure. That is, if it rains more than usual, floods will occur and everything from crops to homes will be destroyed, if it does not rain at all, drought and water shortage will occur. could. It is a pity that there are people today who carelessly treat this priceless gift. The waste of water, which is the most necessary blessing for our life, is exceeding everything. We should never forget that it is our duty and mission not to waste water. Now, the problem of drinking water has risen to the first level in the world, and in Africa, Central Asia, the Middle East and South America, serious discussions are being held on river reserves and internal drinking water lakes.

Conclusions

In short, drinking water remains the most unique and valuable natural resource in the world today. According to the State Geological Committee, there are 97 underground deposits in Uzbekistan, with total water reserves of 64 million cubic meters. These water reserves are mainly distributed in Tashkent, Samarkand, Surhandaryo, Namangan, Andijan and Fergana regions. But there is almost no fresh water in the Khorezm region and the Republic of Karakalpakstan. Bukhara and Navoi regions have average water reserves. Due to the uneven distribution of water resources in the country, the issue of effective use of water and not wasting it is urgent today.

According to the World Health Organization, more than 2 billion people may face a shortage of clean drinking water, which we can see in the following:

- as water shortages occur in most countries of the world, the importance of the water factor increases to that extent. In this regard, the activities of large companies dealing

with international water infrastructure, such as Suez Lyonnais des Eaux and Vivendi, have increased;

- the shortage of drinking water supply, agriculture and industry is not a problem of one or ten countries, it is interesting that the economically developed countries of the world: China, India and even the USA are suffering from it. In order to solve this problem in China, they are trying to divert the rivers of the Northern region to the south, and for the implementation of this project, 12 bln. dollars and 10 years later;

- the countries of the Persian Gulf, which have large oil reserves, want to solve drinking water problems through their underground water, but they admit that the amount of water collected for several thousand years is rapidly decreasing and decreasing;

Another solution for providing drinking water is to use icebergs. With the number of icebergs collected in Antarctica alone, it is possible to provide water for the entire population of the earth for 1 year. Scientists admit that iceberg waters are extremely clean.

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AN ANCIENT UZBEK WOOD - WIND INSTRUMENT SURNAY AND LAZGI

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Annotatsiya. Mazkur maqolada o‘zbek puflama cholg‘ularidan biri bo‘lgan surnay cholg‘usi, u bilan bog‘liq tarixiy ma’lumotlar, mehtar va mehtarlik san’ati, surnay lazgisining tarixiy-nazariy asoslari yoritilgan.

Kalit so‘zlar: *puflama cholg‘ular, surnay, mehtar, surnay lazgisi, surnay yo‘llari.*

Аннотация. В этой статье рассказывается об одном из узбекских духовых инструментов - сурнай, исторической информации, связанной с ним, искусстве мехтара и мехтарлика, исторических и практических основах сурнай лазги.

Ключевые слова: *духовой инструмент, сурнай, мехтар, сурнай лазги, музыка сурная.*

Abstract. This article highlights one of the Uzbek wind instruments - the surnay instrument, the historical information related to it, the art of mehtar and mehtarlik, the historical and practical foundations of surnay lazgi.

Keywords: *wind instrument, surnay, mehtar, surnay lazgi, music of surnay.*

Introduction

Wind instruments have long been used in hunting, military campaigns, weddings, festivities, holidays and various other gatherings. This is due to the fact that this type of instrument produced a sound stronger than the human voice, so it was considered an instrument for playing outdoors. Over the years, wind instruments have improved and developed and serve our people even in our time.

Figurines and archaeological finds from Ancient Egypt, Babylon and other eastern countries contain works of art telling about wind instruments. Wind instruments were also described in the III-I centuries BC as flute, reed and tubular [1-3].

Literature Review

On the territory of Uzbekistan, in particular in the fortifications of the Khorezm oasis “Qo‘y qirqiilgan qal’a” (IV-III centuries BC), “Tuproq qal’a” (I-III centuries AD), “Qirq qiz qal’a” (V-VI centuries AD), coins, statuettes depicting women were found and men of mutriba in Ayritome contain works of art depicting instruments similar to the flute, mizmar, surnay, tambourine and drum, whose original names have not been preserved [4]. Since there is almost no information about these tools, it is difficult to say anything specific about their names or other aspects.

Research Methodology

The development of cities by the Middle Ages with the advent of shop (Store - Persian - address, settlement, association) works of various artisans, squads, groups of mehtars (mehtar - Persian - chief, officer, leader) appeared. Their line-up included from three (surnay, karnay, doira) to fifteen soloists. Mehtars consist of musicians playing outdoors. Their task was to scare the enemy with a powerful musical sound - "asaasa", give the troops peace of mind, play a melody and warn the people about the beginning of the battle, the return of the army, the victory celebration, the khan's speech and other events, as well as about the holiday, sayil and wedding event. The mehtars played in different ways according to the capabilities of their instrument, and they were also called murattab (navba - Arabic -a series of melodies, ordered pieces played in turn). It began to change in the seventeenth and subsequent centuries, when mehtar's activities in musical culture expanded and to some extent democratized. In the XIX-early XX century, Mehtar the drummer remained the head of the ensemble of court musicians, the military orchestra of emirs and beks, as well as similar ensembles performing a mixed repertoire (classical music - mughams and folk melodies) outside the palace, at public performances. At that time, the leaders of all these orchestras and ensembles already referred to surnayer performers. This is evidenced by information about many of the famous mehtar of the XIX-early XX centuries [1].

The Uzbek people have a rich history, culture, art and musical heritage. The work of studying the rich musical heritage of the Uzbek people and promoting it among the masses should be entrusted to passionate initiators, talented performers and mentors of our art. Because the merit of the gifts of our art in the direct transfer from teacher to student of the vast musical heritage that has come down to our time is invaluable. Among the unique types of our musical heritage is surnay playing, which has been preserved in the memory of our people for a long time and is among the spiritual values. The surnay has always been considered the most popular instrument of the Uzbek people. Since ancient times, it is impossible to imagine that folk festivals, Navruz processions, and wedding spectacles could do without surnay performance. The merits of the mehtar masters deserve admiration, who ensured the continuity of the transmission from generation to generation of the musical heritage that has come down from our ancestors to the present day, in particular, the surnay instrument, which is widely popular among our people.

Among the national wind instruments in Uzbekistan, such musical instruments as surnay, balaman, qo'ṣhnay, nay are common. For historical and other reasons, the styles of performance of musical instruments in our region are also unique, that is, in some regions, in particular in the performance of the surnay, the Khorezm and Ferghana-Tashkent styles of performance differ from each other.

Analysis and Results

In the Khorezm school of surnay playing, several "uztoz" performers had their own school and style of performance. The clown's art and the classical surnay playing style are markedly different from each other. That is, there are both large-scale works in the classical style of performance, and small-scale social and household melodies during the performance of clowns the first types include melodies corresponding to the surnay in the instrumental tracks of statuses, as well as melodies of orazibon, norim-norim,

bartavil and others. The works of the second type included az-az, gazarman, ot eroni, surnay o‘yini, sargardon and other similar works [2]. Almost every one of the above melodies was performed at a certain time and under certain circumstances. For example, the melody of the “surnay o‘yini” was played when acrobat climbing to the rope.

Today, “the Lazgi dance”, which is one of the world's intangible cultural heritage, has been performed only on the surnay since ancient times. It was only in the next century that the word was written and performed to the melody of the lazgi.

Songwriting on the “Lazgi” tracks has been finding expression in the work of singers and master performers for many years. For the first time, the People’s Artist of Uzbekistan, Karakalpakstan, Turkmenistan, the owner of a unique voice Komiljon Otaniyazov (“kimni sevar yorisan” K. Khorezmiy), and later the People’s Artist of Uzbekistan Matyakub Rakhimov (“Loyiq” N. Abdullah’s poem, music by A.M. Otajonov), Almakhan Khaitova (“O‘ynali”, O. Matjon), Matkarim Hafiz Bobozhonov (“Dedi” Ogakhi), People's Artist of Uzbekistan, Karakalpakstan, Tatarstan and Turkmenistan Otajon Khudoyshukurov (“Farang ro‘mol boshinda”), Uzbekistan, People's Artist of Turkmenistan babomurod Hamdamov (“Gal-Gal” Kamina), Bekchon Djumaniyazov (“O‘rtanaymu?”), Rakhimboy Rozmetov (“Ajoyib”), Azamat Otajonov (“O‘zingdan ko‘r”), Rahmatjon Qurbonov (“Xivaki” R. Qurbonov) and Og‘abek Sobirov (“Lazgi bu”).

At this stage, it should be noted that the tempo of the surnay lazgi is currently being performed at a fast pace. In the last 20-30 years ago, the average rate of surnay lazgi was about 120-135 beats per minute. At this pace, you can perform both percussion and dance movements in full. But now, in many cases, this pace is becoming too fast. As a result, only professional dancers can perform dance moves at a very fast pace. In our recent 100-year-old past, only male dancers could perform in front of an audience. Of the later artists, anash Khalfa Sobirova (Anash cho‘laq) began performing in evening with accordion.

The surnay lazgi is based on the minor mode. The minor piece denotes a horn melody, fun in terms of sound. The surnay lazgi begins with a doira, which is one of our national percussion instruments. In this, the dancer raises his hand up, as if this is praise to Allah Almighty, a blessing practice. There is a myth that this state of the master is associated with the phenomenon of penetration of the soul (spirit) into the human body. In the tube, the head of the lasga melody starts with open hole and sometimes with a “glissando.”

At the beginning of the melody seems to represent the movements of a warrior-dancer, in which jumping movements up and down seem to move back and forth. Throughout the melody of the 3, 4 themes, the basis of the melody is repeated. Each melody theme of the surnay lasgi is thematically separated from each other, and they are connected by the same melodic theme.

Honored Worker of Culture of Uzbekistan, knight of the Order of Friendship Matrasul Matyakubov is considered one of those who made a radical turn in the performance of the Khorezm surnay performance. In particular, it would not be an exaggeration to say that, one of the melody themes of the surnay lazgi in the interpretation of the master Matrasul Matyakubov were borrowed from the melody of

"Turgay chirlomo", performed earlier, which gave the ancient melody even more charm.

Conclusions

The surnay lazgi, the pride of Khorezm, has been a symbol of cheerfulness and joy for many centuries. Therefore, we must cherish it as a part of our spirituality, pass it on to future generations, and support the sound of the Khorezm surnay on world stages.

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THE USE OF VARIOUS HEURISTICS AND DESIGN METHODS WHEN CREATING A COSTUME AND ITS FUNCTIONS

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Annotatsiya. Ushbu maqolada kostyumni yaratishni loyihalash va turli usullardan foydalanishda uning funktsiyalari bo'yicha maxsus bilim va ko'nikmalar mavjud.

Kalit so'zlar: *moda, san'at, kostyum, shakllar, dizayn, kiyim-kechak, ijodiy, kiyim-kechak dizayni, san'at, to'plamlar.*

Аннотация. Эта статья содержит специальные знания и навыки в проектировании создании костюма и эго функции в использовании различных методов

Ключевые слова: *мода, искусства, костюм, формы, дизайн, одежды, творческий, проектирование одежды, художество, коллекции.*

Abstract. This article contains specialized knowledge and skills in designing, creating a suit and its functions using various methods

Keywords: *Fashion, art, costume, shapes, design, clothing, creative, clothing design, art, collections.*

Introduction

Modern fashion is one of the types of conceptual art. In the costume collection, due to the combination of various elements (assortment of clothes, accessories, colors,

shapes), a whole, individual image is created. Fashion is determined by the rhythm of life, the material and spiritual needs of people, and the capabilities of industry. The main type of professional activity of a designer is the design and creation of new original design forms corresponding to the modern level of science, production, technology on the one hand, and the content of aesthetic demands of society, fashion trends in the field of modern clothing on the other hand. The vocation of a modern designer is to work on bringing new ideas to life [1].

Literature Review

One of the main tasks of fashion is considered to be the transformation and transformation of the surrounding world according to the laws of beauty. Historical examples demonstrate how styles, aesthetic ideals of beauty, and trendsetters changed in time space. Nowadays, we have the opportunity to observe many trends and styles in art left to us by history. All of them are beautiful and unique in their own way and testify to the rich experience of previous generations in creating an absolutely new aesthetic product [2].

Designing and creating a costume is a creative process that requires, along with special knowledge and skills, the ability to anticipate changes in its plastic (aesthetic, stylistic, etc.) characteristics. Therefore, the professional interest of the designer finds sources of inspiration in the cultural aspects of different countries and peoples who supply rich material for modern fashion, while taking into account the interests and needs of the modern consumer [3].

Research Methodology

Today, a whole range of different approaches can be distinguished. The main directions of the study of the costume phenomenon can be summarized, given that various aspects can be considered by one author. Such directions can be considered:

- a philosophical and cultural approach focused on understanding the social nature and values, primarily fashion and, already within its framework, costume (it began in the classical works of Barth R., Hegel G., Simmel G., Kant I., Smith A., Spencer G., Taylor E., 8 and in the research of such modern scientists, as Grigorieva I., Demshina A.Y., Kantor K.M., Koskov M.A., Cooper E., Lola G.N., Lotman Y.M., Mankevich I.A., Svendsen L., Tolstykh V.I., Fishman R.B., Schultz G., Elkina Z.B., Yakovleva M.V., etc.) [4];
- a historical and art criticism approach linking the history of costume and fashion with the development of artistic culture and certain events of a particular historical period (Bell K., Bogatyrev P.G., Weinstein O.B., Vasiliev A.A., Gnedich P.L., Gorbacheva L.M., Ermilova B.V., Ermilova D.Y., Zeling Sh., Kaminskaya N.M., Kireeva E.V., Kirsanova P.M., Kommisarzhevsky F.F., Kosareva E.A., Levi-Strauss Y.K., Mertsalova M.N., Taylor E., Fraser D.) [5];
- a socio-psychological approach, including consideration of the dependence of fashion and costume on forms of communication in society, the relationship between its creators and consumers (Andreeva A.N., Andreeva I.A., Bloch I., Bogardus I., Borev Yu.B., Hoffman A.B., Sombart V., Kiloshenko M.I., Nystrom P., Parygin B.D., Petrov L.V., Porshnev B.F., Tard J., Topalov M.N., Flugel D., Fuchs E.) [6];

- a theoretical and methodological approach to the study of costume, covering the problems of designing and forming an imaginative costume system in the context of fashion (Belyaeva-Instantirskaya S.N., Black S., Bolton E., Huseynov G.M., Jones D., Dixon D., Ermilova V.V., Ermilova D.Y., Kozlova T.V., Parmon F.M., Petushkova G.I., Stepuchev P.A., Cheremnykh A.I.) [6].

The fact that the costume in the cultural system acts as a certain kind of sign system was noted by such researchers as Bogatyrev P.G., Kozlova T.V., Parmon F.M., and P.A. Stepuchev [7].

Analysis and Results

However, attention was not focused on the fact that any sign - and the costume is no exception here - is two-part, i.e. it consists of the signified and the signifier. In this regard, it seems advisable to define more precisely the very content of these components. Understanding the costume as a sign system, it is necessary to consider clothes as a signifier, as a set of "material" elements, and as a signified - a conceptual part - an idea that is not visually directly perceived and "manifests" only through the signifier pointing to it – clothes.

The costume as an external design of one's own self in symbols and signs indirectly captures philosophical concepts, marks aesthetic, psychological, and moral preferences of people. It is with the help of a costume that it is possible to see more clearly the image of the world that develops in the consciousness and subconscious of a person, including a modern person, to reveal his ideas about his own role and place in this world [7].

As a universal and multifaceted phenomenon, the costume attracts the attention of representatives of various branches of humanitarian knowledge: philosophers, cultural scientists, ethnographers, sociologists, art historians, historians, economists, psychologists, designers, etc. Accordingly, there are different approaches to the analysis of the phenomenon of the costume and its functions.

Costume design is closely related to such a broad concept as fashion. First of all, fashion is the temporary dominance of a certain style over the rest. Fashion is a cultural, social phenomenon that is subject to cyclical changes. It determines our clothes, ideas, attitudes, behavior, and even lifestyle. Fashion often means the most fragile and rapidly passing popularity. Fashion influences art, literature, cuisine, architecture, entertainment, and more. It also includes such an important concept as the aesthetic ideal of a particular era [8, 9].

Design is a creative project activity, the purpose of which is to create a harmonious environment that most fully satisfies the material and spiritual needs of a person.

Fashion design is one of the areas of design activity, the purpose of which is to design clothes as one of the elements of the subject environment that satisfies the corresponding material and spiritual needs of a person. Creating a collection of modern clothes requires the designer to rely on internal experience and knowledge gained during the training process in order to be able to put them into practice with maximum benefit. The designer must take into account the utilitarian, aesthetic, symbolic, and social functions of the costume in modern society. The result of designing for a

designer is not only a specific thing, it is, first of all, an artistic image that can become a way of life for the person who will wear it [8].

The creative process of creating clothes is the achievement of unity of form and content. Under the influence of the surrounding reality, the designer has an idea that is embodied in an artistic image. The image of an idea is transformed into a form during design. To achieve good work results, a designer must have the ability to see and clearly formulate a task, develop original ideas, and quickly come up with solutions to a given problem. The entire design process is divided into 4 main stages: informational and analytical – the research part; synthetic and communicative – the practical part.

Conclusions

The work of a designer is a complex phenomenon and consists of several successive levels:

1. The emergence of the idea and the formulation of the task.
2. Identification of the creative source, collection of information. Associative thinking is very important in the creative process. It manifests itself in the transformation of objective, abstract and psychological associations into graphic searches for a solution to the object. The creative process is also related to the ability to abstract. Abstraction is a mental distraction from a number of properties of an object, highlighting its main features.
3. Intensive work, high concentration. The use of various heuristics and design methods.
4. A respite. A distraction from work, so that after a while you can return to solving problems and evaluate them with a fresh look.
5. Insight – obtaining the final optimal solution.
6. Completion, completion of the work, generalization, conclusions, evaluation, design.

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OFFICER OF STUDENTS OF THE FACULTY OF MILITARY EDUCATION THE ROLE OF PEDAGOGICAL AND PSYCHOLOGICAL SCIENCES IN THE FORMATION OF QUALITY

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Annotatsiya. Ushbu maqolada harbiy ta’lim fakulteti talabalarini ofetser sifatida shakillanishida pedagogik-psixologik bilimlarini oshirishning o‘rni va ahamiyati hamda yosh avlod tafakkurini shakllantirish, ularning dunyoqarashini tarbiyalash orqali bilimga munosabatini takomillashtirib borish bo‘yicha kerakli ma’lumotlar mavjud.

Kalit so‘zlar: *Qurolli Kuchlar, pedagogika, psixologiya, ta’lim-tarbiya, intellektual, texnologik, ma’naviy-axloqiy, moddiy-texnik, axloqiy-jangovar, harbiy xizmat.*

Аннотация. Данная статья содержит необходимую информацию о роли и значении повышения педагогико-психологических знаний в становлении студентов факультета военного образования офицерами, а также о формировании мышления подрастающего поколения, совершенствовании их отношения к знаниям через воспитание мировоззрения.

Ключевые слова: *Вооруженные силы, педагогика, психология, учебно-воспитательная, интеллектуальная, технологическая, духовно-нравственная, материально-техническая, морально-боевая, военная служба.*

Abstract. This article contains the necessary information on the role and importance of improving pedagogical-psychological knowledge in the formation of students of the Faculty of military education as openers and on the formation of thinking of the younger generation, improving their attitude to knowledge by educating their worldview.

Keywords: *Armed Forces, pedagogy, psychology, education, intellectual, technological, spiritual-moral, material-technical, Moral-Combat, military service.*

Introduction

The President Of The Republic Of Uzbekistan Is The Supreme Commander-In-Chief Of The Armed Forces Sh.M. On the occasion of the 28th anniversary of the establishment of the Armed Forces of the Republic of Uzbekistan and the day of the defenders of the Fatherland, Mirziyoyev noted the following, including in the festive table; “we will continue to attach first-rate importance to the training of highly

qualified military personnel, the extensive introduction of advanced foreign experience, pedagogical and information and communication technologies. [1] Our state considers the increase in the level of professionalism of military personnel during the period of rapid reforms in the armed forces to be one of the most necessary conditions for maintaining a sufficient level of combat mobility. Persons such as an officer of an armed forces training school, a pre-conscript military training teacher, are the main person in the educational process, they carry out basic didactic principles in practice, forms and methods of teaching and training.

Also our Honourable President Sh.M. Mirziyoyev stressed the importance of Education, "...we are obliged to pay special attention to educational work in creating a healthy spiritual environment in our army, to organize the process of military training on the basis of advanced technical and technological means, in a new way-methods, to consistently continue the work we started on the path of improving the intellectual criteria and traditions of military service" -he said [2]. In this sense, military pedagogy is one of the criteria that ensure the success of the activities of future officers in mastering knowledge and laws related to Psychology.

One of the requirements of the military reforms implemented due to the need to protect the creative work and peaceful life, tranquility of the people of our country is the training of highly qualified specialists for our Armed Forces, military personnel with high intellectual, spiritual and moral potential.

Literature Review

In the implementation of this work, the importance of social sciences, including military pedagogy, along with military ones, is invaluable. Because it is impossible to effectively carry out the work of training a military specialist who meets modern requirements without having sufficient knowledge, skills and qualifications in providing education and training to his subordinates [3].

One of the main requirements for students of the Faculty of military education is not a narrow-specialty specialist with limited knowledge in a particular field, but a person with deep intellectual abilities, with a wide worldview, high culture and spirituality, with his own knowledge, personal example, it is necessary to have an educator who will be able to educate and educate his students in [4].

Research Methodology

Military psychology is a science about the inner world of military personnel and military communities, the laws of mental development, and is directly related to the activities of an officer. It should be noted that military psychology is closer to practice than theory, that is, the military is oriented to the analysis and solution of the problems encountered in its activities.

The content of the military-pedagogical process also depends on the economic potential of the country, the level of development of the productive forces. The more advanced the country's economy, the more the material and technical basis of the Armed Forces develops, the more the level of supply of modern weapons, equipment increases. Under the influence of the military-technical factor, the content, forms and methods of education and upbringing change and improve [5].

Mastering psychological knowledge will help students of the faculties of military education in service and educational activities, that is, revealing the conditions for better understanding, memorization, attention, thinking activities. Psychology is of great importance in the study of literature, language, history and other social sciences that reflect a person's spiritual life. Military psychology data is widely used in military pedagogy.

Without knowing the mental characteristics of the military personnel, the work of training and training them cannot be well established. In short, the purpose of military psychology is to facilitate and improve the work of military personnel. The organization and conduct of combat and spiritual and educational training as in the brochure provides for the formation of moral and combat qualities in military personnel [6].

Also, the formation of such qualities will also depend on the state of discipline in military communities as a whole.Experienced commanders know how to influence the mind of one or another military officer, taking into account the state of mind in their units when organizing the educational and educational process, and educator-commanders, who do not know the laws of acquiring knowledge, skills and qualifications, ways to mature a person as a full-fledged person, make mistakes [1].

Training and training is a complex process that involves influencing the minds of military personnel in such a way that they acquire the knowledge, skills and skills necessary for them to successfully conduct hostilities. Under such influence, such qualities are again formed in them as political awareness, loyalty to military duty and a sense of responsibility for the Defense Of The Motherland [7].

Analysis and Results

Educational and educational influence will be aimed primarily at the psyche, mind of a person, in order to properly organize such an influence, it is necessary to know the human psyche well. Human psyche is manifested in its sensations, perception, memory, thinking, etc. In everyday life, each of us observes and evaluates the manifestation of spiritual activity of others.

The main pedagogical task of students of the Faculty of military education as a teacher of pre-conscription primary training in secondary schools in their future activities is as follows: organization and leadership of educational activities; statement of educational material on a systematic and scientific basis; arouse interest in students in obtaining knowledge and form positive motives; formation of skills for independent; examination of the state of combat and socio-political training of subordinates, assessment of knowledge, skills and qualifications.

The study of military psychology, as a teacher of initial training before the call, helps students to act in the same way as their circumstances, to see their positive, negative characteristics and individual aspects inherent in them, to see what and why they arise, to establish contact with other people around them by tevarak-surroundings. Anyone who has seriously studied this science will be able to see the strengths and weaknesses of Uzi, work on themselves, learn to further improve their positive qualities and get their defects associated with yoga [8].

Mastering psychological knowledge helps in service and educational activities, that is, reveals the conditions for better understanding, memorization, attention, thinking activity. Psychology is of great importance in the study of literature, language, history and other social sciences that reflect a person's spiritual life [9].

Military psychology data is widely used in military pedagogy. Without knowing the mental characteristics of the military personnel, it is impossible to pour them into a good path of training and tanning. In short, the purpose of military psychology is to facilitate and improve the work of military personnel [10].

The organization and conduct of combat and spiritual and educational training as in the brochure provides for the formation of moral and combat qualities in military personnel. Also, the formation of such qualities will also depend on the state of discipline in military communities as a whole [8].

Educational and educational influence will be aimed primarily at the psyche, mind of a person, in order to properly organize such an influence, it is necessary to know the human psyche well. Human psyche is manifested in its sensations, perception, memory, thinking, etc. In everyday life, each of us observes and evaluates the manifestation of spiritual activity of others [9].

Conclusions

As a conclusion, we can say that from the point of view of military psychology, the activity it consists of a system of behaviors that are integrated into the satisfaction of existing esoteric beings through the use of various tools. Means of carrying out military activities (military equipment, firearms...) as well as the legal norms (military regulations, orders of commanders and chiefs) that its participants (military personnel) follow are distinguished by their originality. Each person has the inner world of Uzi, the individual psychological characteristics of the concept of psychology, so to speak.

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THE SIGNIFICANCE OF THE QUESTIONNAIRE METHOD IN INVOLVING YOUTH STUDENTS IN SPORTS AND HEALTH TOURISM ACTIVITIES

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Annotasiya. Ushbu maqolada sog‘lom turmush tarzini targ‘ib qilishda jismoniy madaniyatning vositasi sifatida sport-sog‘lomlashtirish turizmini o‘rni, talaba yoshlarni jismoniy tarbiya va sportga jalb qilishda mutaxassislarning fikrlari va munosabatlarini so‘rovnoma usuli orqali o‘rganish bayon qilingan va uning natijalari tahlil qilingan.

Kalit so‘zlar: *Mutaxassis, anketa-so‘rovnoma usuli, jismoniy tarbiya, turizm, sport, sog’lomlashtirish, vosita, jismoniy rivojlanish, funksional holat, jismoniy tayyorgarlik, salomatlik, samaradorlik.*

Аннотация. В данной статье описывается роль спортивно-оздоровительного туризма как средства физической культуры в пропаганде здорового образа жизни, анализируются мнения и позиции специалистов по привлечению студентов и молодежи к занятиям физической культурой и спортом методом опроса, а также анализируются эго результаты.

Ключевы слова: *Специалист, анкетный метод, физкультура, туризм, спорт, оздоровление, средство, физическое развитие, функциональное состояние, физическая подготовленность, здоровье, эффективность.*

Abstract. This article, describes the role of sports-health tourism as a means of physical culture in the promotion of a healthy lifestyle, the opinions and attitudes of experts in attracting students and youth to physical education and sports through a survey method, and its results are analyzed.

Keywords: *Specialist, questionnaire method, physical education, tourism, sports, health improvement, means, physical development, functional state, physical fitness, health, efficiency.*

Introduction

The requirement to involve the population in physical education and mass sports in the world, to study the functional status and level of physical fitness of students studying in higher education institutions, to implement sports and health tourism, taking into account climatic and environmental conditions is increasing sharply. It is from this point of view that the problem of strengthening the health of students through various means, including sports and health tourism, is very urgent. The number of hours allocated to physical education in higher education institutions is decreasing. Based on this, in order to prevent problems related to the physical condition and health of student youth, who are socially active groups of the population, to attract them to a healthy lifestyle, to form necessary life skills, and to improve their physical fitness and functional condition, sports - health tourism activities, especially walking tours, are one of the effective means of strengthening the health of students, observing the principles of a healthy lifestyle, and increasing their physical activity. improvement of educational standards and curricula is required.

Today's era demands that we should make a healthy lifestyle in our daily life among the population. In order to regularly engage in physical education and mass sports and to form life skills for a healthy lifestyle, as well as to systematically and effectively organize mass physical activity events, to create appropriate infrastructure and other necessary conditions in this regard: in the Republic in the development of public sports and promoting a healthy lifestyle among the population, walking and running are defined as the priority types of sports [1].

In the physical education system of our country, a special place is given to tourism as a means of physical education. Physical exercises are considered the main means of physical development, and physical exercises are divided into gymnastics, games, sports and tourism. Compared to other factors of physical education, tourism is rich in physical exercises that are used in life and practical conditions. Accordingly, they differ in their viability and practicality.

Literature Review

The study of scientific literary sources shows that a number of scientific researches have been carried out on raising the level of physical fitness, education and development of physical qualities of the young generation through sport-health tourism and physical education. Among the scientists in the countries of the Commonwealth of Independent States Matveev L.P., Vasilkovskaya Yu.A., Ovsyannikova I.N., Brilliantova O.O., Shtikh E.A., Mardasova E.V., Milevskiy E.V., Donskova L.I., Makarov A.A., Myagkova E.V., Semirekov V.A., Fedyakin A.A., Radchenko V.I., Likholetov V.V., Pochebut D.A., Tarasenya T. Yu., Abdumalikov R.A., Salomov R.S., Abdullayev A., Khonkeldiev Sh.H., Mahkamjonov K.M., Yunusov T.T., Holdarov T.Kh., Rakhimov V.Sh., Nabiev T.E., Abdurakhmanova A.A., Kosimova V.S., the scientific sources of Mukhammadiev K.B. and other scientists are of great importance [2-4, 12, 16].

Research Methodology

In order to implement the pedagogical experience in the research, experts in attracting young students to physical education and sports among the 30 students. Do you think that the general functional state and physical fitness of students of higher education institutions have improved, using sports and fitness exercises in physical education classes? Is it possible? Is it possible to conduct physical education classes in the form of non-traditional sports activities? Do you use action games to achieve the main goal of physical education classes? Do you use special exercises aimed at improving the health of students, how do you feel about teaching the science of sports and health tourism as a lesson in physical education and non-sports fields in higher education institutions, etc. On the basis of the questionnaire, a sociological study was conducted to determine the opinions of students, and the answers were developed statistically.

Analysis and Results

The results of the questionnaire survey conducted among experts of the higher educational institution on the issues of physical education and sports involvement of students and youth made it possible to determine the following. Here are some of them:

“Do you think that the general functional condition and physical fitness of students in higher education institutions have improved?” 20% of experts answered “yes, well, 73.3% answered no,” and 6.7% said they had a different opinion.

“Is it possible to use sports and fitness exercises in physical education classes?” 76.7% of specialists answered “yes, sports and health exercises should be used in physical education lessons,” 13.3% answered “no, it is not necessary, it is appropriate to conduct them based on physical education programs,” 10% of experts they had a different opinion.

“Is it possible to conduct physical education classes in the form of non-traditional sports training?” to the question, 90% of the respondents expressed the opinion that "yes, of course, it is possible to conduct physical education classes in the form of non-traditional sports training, 10% no, if they use other types of sports based on the program expressed the opinion that it will be.

“Do you use movement games to achieve the main goal of physical education classes?” 80% of respondents said that yes, I use action games in my lessons to achieve the main goal, while 20% of experts had a different opinion, that is, it is impossible to deviate from the plan in order to achieve the main goal.

“Do you think the level of physical fitness of university students is the same?” 53.3% of experts said yes, most students have the same physical condition, while 26.7% said no, students’ physical condition varies depending on their gender. 20% of experts gave a different answer. It can be seen that physical education and sports specialists did not conduct tests or experiments to determine the physical condition of students studying at the Higher Education Institution.

“Do you use special exercises aimed at improving the health of students in physical education classes?” 33.3% of the respondents said yes, we use it, 46.7% of the respondents said that they do not have specialists, we study according to the program, we cannot deviate from the scope of the program, 20% of the experts answered that

they use other types of sports. It can be seen that physical education classes do not use health-oriented exercises.

"How do you feel about sports and wellness tourism being taught as a lesson in physical education and sports non-specialized areas in higher education institutions?" 70% of specialists would be appropriate, apart from physical culture faculties, sports and health tourism should be taught as a lesson to students of other fields, 20% of experts should combine physical education and sports and health tourism lessons 10% of experts answered that it should be carried out on the basis of the program, and other sports should be introduced.

From the analysis of the results of the survey, it became clear that physical education and sports experts believe that the participation of students in physical education activities is insufficient for health care and strengthening, physical qualities education, students are not allowed to participate in non-traditional types of sports in addition to physical education classes. They believe that it is very important to engage in health tourism circles, to engage in physical exercise.

Conclusions

1.Sports and wellness tourism is an important factor and tool in developing the young generation's physical qualities, health level, longevity, cultural entertainment, patriotism, devotion to the ideals of national independence, and training them to be professional serves as.

2.Tourism, based on forms and methods of active movement, was and remains one of the means of physical education. This is emphasized by the leading specialists in the field of physical education and sports.

3.Physically active activities along with medicine will closely help the students to prevent various diseases. In this case, physical exercises, especially sports-health tourism activities, help to restore and strengthen health.

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PERSONAL CHARACTERISTICS OF FUTURE TEACHERS IN USING HISTORICAL AND ETHNOGRAPHIC MATERIALS IN THE DEVELOPMENT OF ETHNOPEDAGOGICAL CULTURE

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Annotatsiya. Ushbu maqola bo‘lajak o‘qituvchilarning etnopedagogik madaniyatini shakllantirish va rivojlantirishda tarixiy-etnografik materiallardan foydalanishning ahamiyatini tahlil qiladi. Etnopedagogik madaniyat – milliy qadriyatlar, an’analar va xalq pedagogikasiga asoslangan ta’lim jarayonining muhim jihatlaridan biridir. Ushbu yo‘nalishda tarixiy va etnografik ma’lumotlardan foydalanish bo‘lajak pedagoglarda xalq tarixi va madaniyati haqida chuqur tushunchalarni shakllantirishga xizmat qiladi. Maqolada o‘quvchilarni o‘z milliy ildizlariga yaqinlashtirish, o‘tmish madaniyati va urf-odatlarini ta’lim jarayonida integratsiya qilish orqali etnopedagogik yondashuvlarni rivojlantirishning samarali usullari ko‘rib chiqiladi. Xususan, tarixiy-etnografik manbalar yordamida milliy madaniyat, urf-odatlar, xalq o‘yinlari va qadriyatlarga asoslangan darslar bo‘lajak o‘qituvchilarning kelajakdagi pedagogik faoliyatini boyitadi va ularni milliy o‘zlikni anglashga o‘rgatadi. Shuningdek, maqolada etnopedagogikaning ta’lim jarayonida qanday amalga oshirilishi, an’anaviy madaniyatning pedagogikaga integratsiyalashuvi va bu jarayonning o‘quvchi shaxsiyatiga ta’sir etuvchi omillari haqida so‘z yuritiladi.

Kalit so‘zlar: *Etnopedagogika, etnopedagogik madaniyat, tarixiy-etnografik materiallar, milliy qadriyatlar, an’analar, xalq pedagogikasi, bo‘lajak o‘qituvchilar, ta’lim jarayoni, milliy madaniyat, xalq o‘yinlari, milliy o‘zlikni anglash, urf-odatlar.*

Аннотация. В данной статье анализируется значение использования историко-этнографических материалов в формировании и развитии этнопедагогической культуры будущих учителей. Этнопедагогическая культура является одним из важных аспектов образовательного процесса, основанного на национальных ценностях, традициях и народной педагогике. В этом направлении использование историко-этнографической информации служит формированию у будущих педагогов глубоких представлений об истории и культуре народа. В статье рассматриваются эффективные пути развития этнопедагогических подходов путем приближения учащихся к своим национальным корням, интеграции прошлой культуры и традиций в образовательный процесс. В частности, уроки, основанные на национальной культуре, традициях, народных играх и ценностях с помощью историко-этнографических источников, обогатят

будущую педагогическую деятельность будущих учителей и научат их пониманию национальной самобытности. Также в статье говорится о том, как этнопедагогика реализуется в образовательном процессе, интеграции традиционной культуры в педагогику и факторах, влияющих на личность ученика в этом процессе.

Ключевые слова: *Этнопедагогика, этнопедагогическая культура, историко-этнографические материалы, национальные ценности, традиции, народная педагогика, будущие учителя, образовательный процесс, национальная культура, народные игры, осознание национальной идентичности, традиции.*

Abstract. This article analyzes the importance of using historical-ethnographic materials in the formation and development of ethnopedagogical culture of future teachers. Ethnopedagogical culture is one of the important aspects of the educational process based on national values, traditions and folk pedagogy. In this direction, the use of historical and ethnographic information serves to form deep understandings of the history and culture of the people in future pedagogues. The article considers effective ways of developing ethno-pedagogical approaches by bringing students closer to their national roots, integrating past culture and traditions in the educational process. In particular, lessons based on national culture, traditions, folk games and values with the help of historical and ethnographic sources will enrich the future pedagogical activity of future teachers and teach them to understand the national identity. The article also talks about how ethnopedagogy is implemented in the educational process, the integration of traditional culture into pedagogy, and the factors affecting the student's personality in this process.

Keywords: *Ethnopedagogy, ethnopedagogical culture, historical-ethnographic materials, national values, traditions, folk pedagogy, future teachers, educational process, national culture, folk games, awareness of national identity, traditions.*

Introduction

Education of future teachers in the spirit of national culture and traditions is one of the important issues in the current educational process. Understanding the national culture, respecting people's traditions and values is one of the main factors that improve the professional skills of every pedagogue. Ethnopedagogy plays an important role in this process. Ethnopedagogy includes not only the study of national culture and traditions, but also their effective use in the educational process. From this point of view, the use of historical and ethnographic materials is of particular importance in the development of ethnopedagogical culture of future teachers [1]. Historical-ethnographic materials help to get acquainted with the unique cultural heritage and past history of the people, and also strengthen the awareness of national identity among students. With the help of these materials, future pedagogues will have the opportunity to deeply study past educational methods, folk customs, values and cultural traditions and integrate them into the modern educational process. The article analyzes the specific aspects of the use of historical-ethnographic materials in the development of

ethno-pedagogical culture of future teachers and highlights the educational significance of this process. The issue of formation and development of ethno-pedagogical culture of future teachers is one of the widely discussed topics in the educational process. Many studies and sources reveal the place of ethnopedagogy in national education, its methodological foundations and practical aspects. In particular, scientific research on folk pedagogy, integration of national traditions into education, and specific features of the use of historical-ethnographic materials are reflected in many literatures [1, 2].

1. **The role of folk pedagogy in education:** Many scientific literatures emphasize the role of folk pedagogy in the educational process. Folk pedagogy is formed on the basis of national values, customs and traditions, and its main goal is to educate the young generation in the spirit of national identity and appreciation of values. Studies show that education based on folk pedagogy is one of the effective methods of preserving national culture and passing it on to generations.
2. **Historical and ethnographic sources:** Historical and ethnographic sources have a great role in the development of ethnopedagogical culture. As shown in a number of literatures, historical-ethnographic materials are important in studying the unique cultural heritage, customs, traditions and values of the people. For example, M. Usmanov's work "National Games and Sports" elaborates on the pedagogical importance of national folk games. Such works are of practical importance for future teachers, as they allow organizing the educational process based on historical and cultural information.
3. **Integration of ethnopedagogy into the educational process:** The methods and methodology of the integration of ethnopedagogy into the educational system are widely covered in research. The methods of educating teachers on the basis of national culture and history, forming them as carriers of national customs, values and traditions to students have been analyzed in many scientific works. By introducing the ethnopedagogical approach to the educational process, students get closer to their national roots, which serves to develop their national identity and cultural consciousness.
4. **Literature as an educational methodology:** There is a lot of literature on the integration of historical and ethnographic materials into the educational process and their use as a methodology. Recommendations are made that historical events, national games and elements of folklore can be used as educational tasks to increase students' interest in national and historical culture. These materials support teachers in their pedagogical activities and enrich their educational process with national diversity.

The analysis of the literature shows that the use of historical and ethnographic materials in the development of ethnopedagogical culture is an effective tool for educating future teachers in the spirit of national identity and respect for traditions. At the same time, this process helps preserve and develop national values in modern education.

Research Methodology:

This study is dedicated to the study of the peculiarities of using historical-ethnographic materials in the development of ethnopedagogical culture of future teachers. Historical-analytical, pedagogical observation, and experimental methods were chosen as the main research methodology. Through these methods, the effectiveness of historical and ethnographic materials used in the development of ethnopedagogical approaches in the process of national education and their influence on the educational process was studied.

1. **Historical-analytical method:** The historical-analytical method was used in the study to determine the influence of national values and traditions on the educational system, the development of folk pedagogy and its place in the modern educational process. Using this method, it was analyzed how folk games, customs and cultural traditions were used in national pedagogy and education systems. Also, the identification of pedagogical content in historical-ethnographic sources and their application to the modern educational process was analyzed.
2. **Pedagogical observation:** It was observed how future teachers use historical-ethnographic materials in the process of developing their ethno-pedagogical culture. During the pedagogical observations, it was studied how the teachers included information about national games, folk tales, customs and national clothes in the educational process. The observation method made it possible to assess the level of adoption of ethnopedagogical approaches by future teachers.
3. **Experimental method:** As another important methodological aspect of the research, the experimental method was chosen. According to this method, special pedagogical experiments were carried out, and the impact of classes based on historical-ethnographic materials on the ethno-pedagogical culture of future teachers was studied. During the experiment, control and experimental groups were formed: historical-ethnographic materials were widely used in the teaching process in the experimental group, and traditional educational methods were preserved in the control group. Through the results of the experiment, the effectiveness of the integration of historical and ethnographic sources into the pedagogical process is determined.
4. **Questionnaire and interview methods:** Questionnaire and interview methods were used to assess the difficulties of future teachers in the process of formation of ethno-pedagogical culture and their interest in national culture. With the help of questionnaires, the interest of future teachers in national culture and traditions, the level of adoption of ethnopedagogical approaches, and the experience of using them in the educational process were studied. Through interviews, teachers' opinions about their pedagogical experiences and the effectiveness of historical-ethnographic materials were analyzed.

The research methodology is aimed at determining the effectiveness of the process of using historical-ethnographic materials in the development of ethnopedagogical culture of future teachers. The information obtained through historical-analytical, pedagogical observation and experimental methods illuminates the scientific and practical aspects of the introduction of national culture and traditions into the educational process.

Analysis and Results:

The results of the research conducted to study the effectiveness of the use of historical-ethnographic materials in the development of ethnopedagogical culture of future teachers showed that these materials play an important role in organizing the educational process in the spirit of national identity awareness, respect for traditions and cultural values [21].

The main results of the study are as follows:

1. **Increasing awareness of national identity:** The educational process organized with the help of historical and ethnographic materials increased students' interest in national culture. Students in the experimental group have a deeper understanding of national history, customs and national games, and they have achieved higher scores on the level of national identity awareness.
2. **Enrichment of pedagogical approaches:** It was found that the use of historical-ethnographic materials is an effective means of enriching the educational methodology for future teachers. Educational lessons based on national culture, folk customs and traditions have broadened the creative approaches of teachers.
3. **Improving students' knowledge:** It was observed that the students of the experimental group had a higher level of final knowledge from the lessons using historical and ethnographic materials compared to the students of the control group. These lessons provided students with a broader knowledge of folk pedagogy, culture and history.
4. **Increase in students' motivation:** When historical-ethnographic materials are included in the educational process, it was found that students' motivation towards the educational process increased by familiarizing themselves with national values. In particular, lessons with national games and folk tales aroused great interest among students.

Table 1. Comparison of study results of experimental and control groups.

Indicators	Control group	Experimental group
Level of awareness of national identity	65%	85%
Richness of pedagogical approaches	60%	80%
Knowledge level (preferential grades)	70%	90%
Student motivation	Average	High
Acceptance of ethnopedagogical approach	68%	88%

Analysis of Results

1. **Level of national identity awareness:** Students in the experimental group were more interested in national history and culture, which led to an increase in the level of national identity awareness. This indicator was 20% higher than the control group.
2. **Richness of pedagogical approaches:** Lessons organized on the basis of historical-ethnographic materials made it possible for teachers to try new pedagogical methods and this increased their creative approach.
3. **Level of knowledge:** The level of knowledge of the students of the experimental group increased significantly. This results from the results achieved through lessons organized on the basis of historical-ethnographic materials.

4. **Students' motivation:** In the experimental group, students were more interested in the educational process, which shows the motivational role of national games and fairy tales in education.

The analysis and results show that the use of historical-ethnographic materials in the development of ethnopedagogical culture of future teachers is an effective tool for improving their national identity awareness, pedagogical skills and knowledge levels.

1) Inclusion of historical-ethnographic materials based on national culture in educational programs - in order to educate teachers in the spirit of national identity awareness and respect for values, it is necessary to systematically include lessons and materials based on historical-ethnographic sources in educational programs.

2) Organization of special seminars and trainings for teachers - it is recommended to regularly hold seminars and trainings in order to improve the skills of future teachers in the practical application of ethnopedagogical approaches. This allows them to effectively use historical and ethnographic materials in the educational process.

3) Organization of lessons and events based on national games and traditions - by holding interactive lessons and cultural events based on national games, folklore and traditions, it is necessary to increase students' interest in education and expand opportunities for teaching national heritage [22].

Conclusions

The use of historical-ethnographic materials in the development of ethnopedagogical culture of future teachers is important in the educational process. The results of the research show that education organized on the basis of national culture, folk customs, traditions, and historical-ethnographic materials increases students' awareness of national identity, respect for culture, and motivation for the educational process. Observations and lessons conducted in the experimental group made it possible to enrich the pedagogical approaches of students and deepen their study of national values.

It was also found that teachers can effectively integrate national education systems into modern educational methods by using historical and ethnographic materials. This process helps to develop the creative approaches of future teachers, increase their pedagogical activity and effectively fulfill the task of passing the national heritage to generations.

1. **Inclusion of historical and ethnographic materials in educational programs:** In the educational process, it is necessary to use historical and ethnographic materials more widely on the basis of national culture and values. This allows teachers to educate in the spirit of national identity and cultural appreciation.
2. **Creation of special training manuals:** special training manuals and methodological recommendations should be developed based on historical and ethnographic materials and national games. These manuals serve as textbooks for future teachers and enrich the educational process.
3. **Organization of educational seminars and trainings:** It is recommended to organize seminars and trainings in order to improve the knowledge and skills of teachers on the development of ethno-pedagogical culture. Through these trainings, teachers can learn pedagogical approaches based on national culture and traditions.

4. **Use of innovative pedagogical technologies:** The use of innovative technologies in the use of historical and ethnographic materials makes the educational process more effective. New approaches to teaching national culture can be developed using interactive methods, video lessons, and multimedia resources.
5. **Organization of national games and events:** It is possible to increase students' interest in national culture by including national games and events in the educational process. This encourages them to look at the national heritage with respect and loyalty.

By implementing these proposals, the process of formation of national identity awareness, respect for cultural values and ethno-pedagogical culture in the educational system will be more effective.

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METHODOLOGY OF EXPANDING STUDENTS’ SPATIAL IMAGINATION THROUGH DRAWING AND ANALYSIS

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Annotatsiya. Ushbu maqolada o‘quvchilarda yaqqol tasvir va aksonometrik proeksiyalar to‘g‘risida fazoviy tasavvurini kengaytirish, geometrik yasashlarni ko‘z oldiga keltira olish maqsadida masalalarni bosqichli tushuntirish ko‘rib chiqilgan.

Kalit so‘zlar: *Chizmachilik, yaqqol tasvir, aksonometrik proeksiyalar, ko‘rinishlar, chizmani o‘qish, geometrik shakl, tasavvur.*

Аннотация. В данной статье рассматривается пошаговое объяснение вопросов с целью расширения пространственного восприятия учащихся четких изображений и аксонометрических проекций, визуализации геометрических построений.

Ключевые слова: *Черчение, четкое изображение, аксонометрические проекции, виды, чтение чертежа, геометрическая форма, воображение.*

Abstract. This article provides a step-by-step explanation of various issues aimed at enhancing students' spatial perception of clear images and axonometric projections, facilitating the visualization of geometric constructions.

Keywords: *Drawing, clear image, axonometric projections, views, reading a drawing, geometric shape, imagination.*

Introduction

The development of spatial imagination is essential in engineering and design education, where interpreting and visualizing objects in three dimensions from two-dimensional representations is crucial. This study, centered on the field of engineering graphics, seeks to enhance students' spatial awareness and visualization skills by employing systematic methodologies in reading and analyzing drawings. Given the increasing significance of spatial perception in engineering disciplines, this research explores methods to strengthen students' comprehension of axonometric projections, geometric shapes, and the ability to read and interpret drawings. By fostering these abilities, students can be more prepared for practical tasks in their education and future careers, equipped with the cognitive tools to visualize complex structures accurately.

Furthermore, the targeted and effective utilization of the numerous educational opportunities available to young people in our country today is one of the foremost issues of our time. In this regard, one of the main tasks is to teach engineering, technology and drawing.

In particular, expanding students' spatial imagination is of great importance in drawing, and it is one of the factors that direct students to creative research.

Reading and analyzing a drawing is of great importance in expanding students' spatial imagination, directing them to creative research and being able to imagine vivid images.

Research Methodology

The research utilizes a structured approach to cultivate spatial imagination through a series of drawing interpretation exercises. Key methods include dissecting objects into basic geometric shapes and progressing through various levels of complexity, helping students form an understanding of both external and internal structures. Exercises involve:

1. Decomposing objects into simple shapes to understand their external surfaces.
2. Employing sections and cuts to explore internal structures.
3. Using conventional symbols and indicators, such as circles and radii, to represent details that are not immediately apparent in the drawing.

These methods were chosen to align with the pedagogical principle of moving from simple to complex concepts. Exercises were designed to foster incremental learning, allowing students to visualize and mentally construct complex spatial models from initial basic forms. Additionally, practical applications, including model-building and interpretation of assembly diagrams, support hands-on learning and strengthen spatial perception.

Analysis and Results

In his book Methodology of Teaching Drawing in High School, Kuzmenko states that “reading a drawing means the process of forming its spatial image while studying a drawing of an object.”

In fact, we look at the drawing, study the height, length and width of the thing depicted in it, as well as the structural parts and conventional signs of its elements. Thus, reading a drawing means imagining a whole image, knowing its dimensions, methods of processing, knowing and understanding its external and internal structures based on the completed images of things.

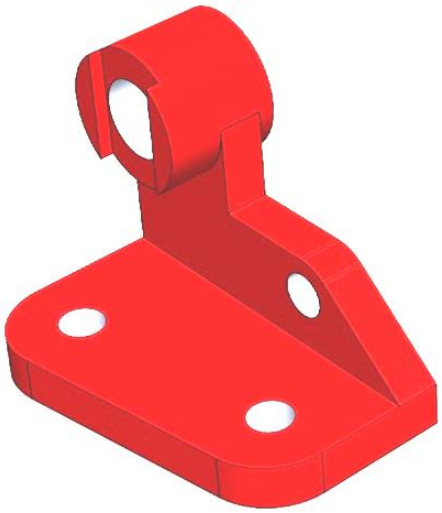


Figure 1. 3D-drawing of the detail.

It can be seen from these that the spatial imagination is the most important factor in reading a drawing, therefore, if the students' spatial imagination is low, they will have difficulty in reading the drawing and their interest in drawing will decrease. That's why we teachers of drawing subjects need to mobilize all our energy and methodological skills to increase students' spatial imagination. Only then will we make our contribution and achieve that the young people will be ready and perfect for future production conditions or educational process.

A literature review of several scientific research studies showed that reading drawings, that is, imagining the results depicted in the drawing, increases in the following order:

1) Using the views in the drawing, divide the object into simple geometric figures and determine the shape of its external surfaces;

2) Understanding and understanding its internal structures using sections and cuts in drawing;

3) after analyzing and studying the components of the thing, reconstructing its whole image in space;

4) To get an additional idea about some surfaces and surfaces of things using conventional symbols such as (ø), (R), (□) and (⌲).

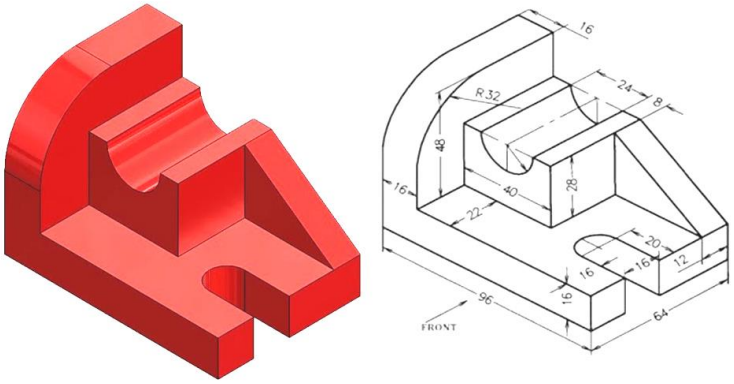
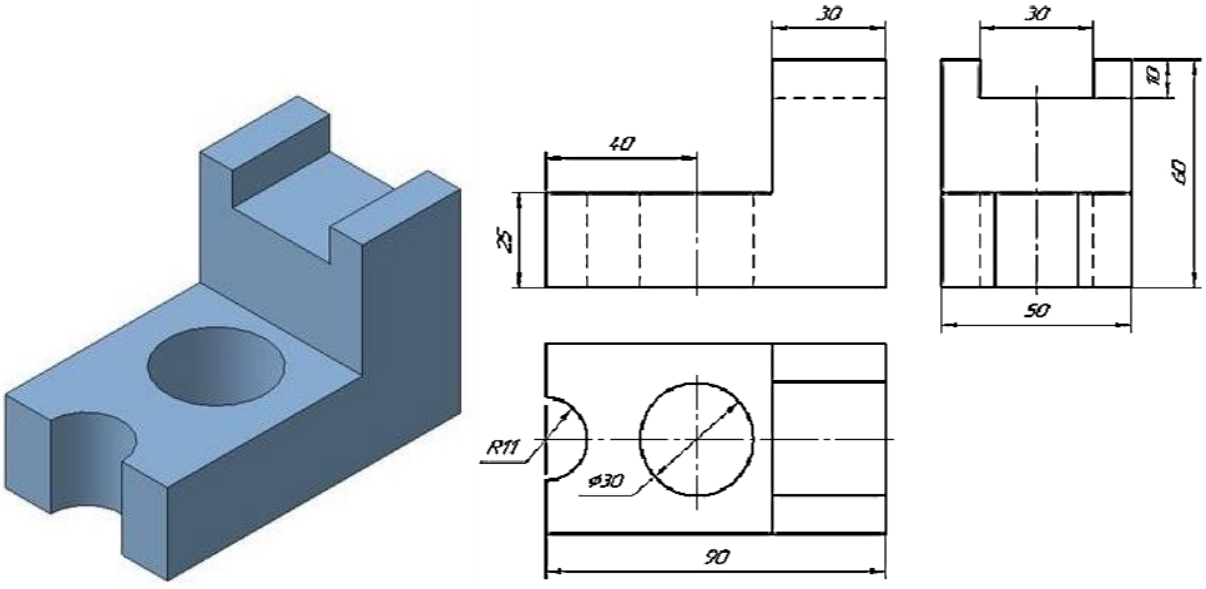


Figure 2. 3D-drawing and schematic view of the detail.

In the analyzed literature on the methods of spatial visualization, only the methods of training are mentioned. Exercise methods include the following types.

1. Using a drawing of simple, medium, complex and extremely complex things, make a clear image of them from simple to complex and compare them with their drawings;
2. Finding projections from the bank of projections that correspond to apparent images, and its opposite, i.e. correctly finding an apparent image of the object corresponding to the given representations.
3. Making a drawing of a thing according to the original or obvious view;
4. Perform visuals and a clear image according to the written description;
5. To make a third out of two things.
6. Make a drawing of the planned elements of cutting things.
7. Making models of things from different materials according to the drawing.
8. Break down the assembly drawing of the assembly unit.

The above-mentioned types of training methods that develop spatial imagination are interconnected and require students to have sufficient theoretical knowledge and practical skills.



A) C)

Figure 3. 3D-drawing and schematic view of the detail.

If these types of exercises are analyzed from a methodological point of view, they correspond to the principle “From simple to complex.” Therefore, in our work, we found it methodologically correct to study in depth some types of training methods for the development of spatial imagination. Because the students perform these types of tasks in the process of studying the planned projection drawing topics in the drawing science program.

In the first method of developing spatial imagination, students’ spatial imagination is increased by mentally separating them into simple figures using the drawings given in the objects. In fact, if there is a clear image of the object depicted in the drawing, it becomes easier for the student to visualize the object whose appearance is given in the drawings. In this way, they expanded their spatial perception by practicing cutting and cutting objects and putting their dimensions and creating a clear image. In this way, students begin to acquire the knowledge, skills and abilities to understand the images of things formed during the study of subjects such as nature, painting, physics, and mathematics, and to use them in practice.

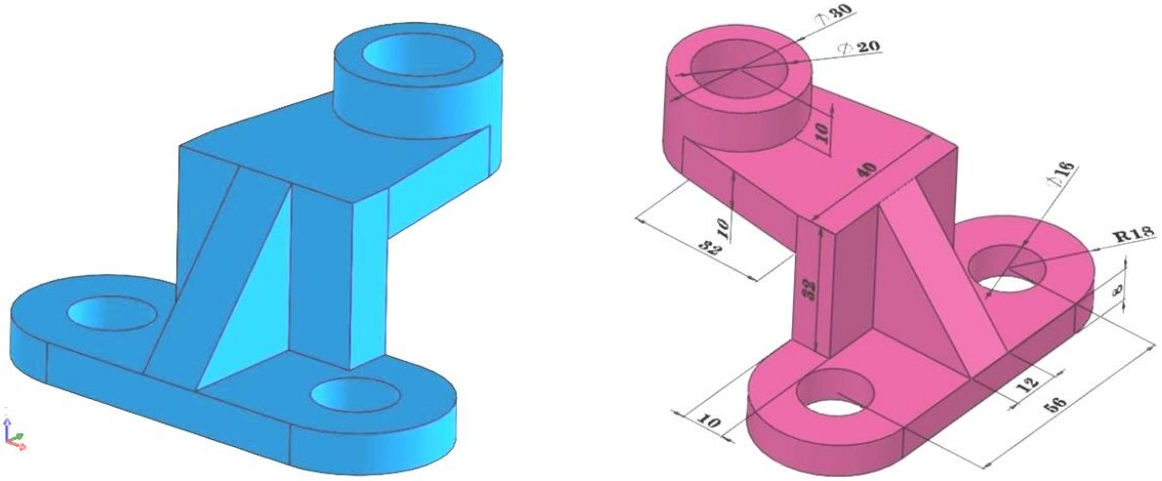


Figure 4. 3D-drawing and schematic view of the detail.

Therefore, it is necessary to accelerate the ability of all students to make drawings of simple geometric objects and embody spatial images according to their drawings. Because students have different abilities. For this purpose, it is explained by demonstrating that a prism, which is a component of objects, details and objects of household and mechanical engineering, consists of cylinders, pyramids, cones, spheres and surfaces of rotation. It is possible to accelerate students' understanding, skills and practical skills by making their appearance in a drawing. For this, using posters and handouts with clear images and drawings of simple surfaces is a methodical and creative approach. In this case, it is appropriate to explain the drawing of the object to the students by comparing it with its original or clear image, as well as by showing the written description, conditional images and symbols.

Based on the clear image of the above-mentioned details, it serves to increase his graphic literacy by performing V frontal, H horizontal and W profile projections as in (Figure 3).

Conclusions

The research underscores the pivotal role of spatial imagination in engineering graphics education. By applying structured methodologies, students significantly improved their ability to interpret and construct mental images from technical drawings, enhancing their readiness for real-world applications. Encouraging the development of spatial skills through drawing analysis can lead to increased graphic literacy and better preparedness for engineering challenges. The study concludes that spatial imagination training not only aids students in comprehending engineering concepts but also contributes to their overall analytical and creative skills, making them more competent and adaptive to future professional demands.

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UDC: 37, 796.03, 796.05

PHYSICAL EDUCATION OF STUDENTS WITH HEARING IMPAIRMENT

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Annotatsiya. ushbu maqolada eshitish qobiliyati zaif talabalarning jismoniy tarbiyasi masalasi nazariy tahlil qilingan.

Kalit so‘zlar: *ta’lim va zaif auditoriya o‘rganuvchisi, fusisal ta’lim, auditorlar qobiliyatlar.*

Аннотация. В данной статье проведен теоретический анализ проблемы физического воспитания студентов с нарушениями слуха.

Ключевые слова: *воспитание, слабослышащий ученик, физическое воспитание, слуховой, способность.*

Abstract. In this article, the theoretical analysis of the issue of physical education of students with hearing impairment has been carried out.

Keywords: *education, a weak auditory learner, physical education, auditory ability.*

Introduction

In various international documents, the right of a person to have health without any restrictions is reflected. In the main document of the World Health Organization, it is specially noted that everyone has the highest level of health regardless of race, religion, political opinion, economic and social status, and that living with pleasure is his primary human right [1]. In developing the physical education of students with hearing impairment all over the world and educating them in accordance with their capacity to know, their adaptation and interpersonal skills to the society is currently a pressing problem because the indicators show that children are growing at an immutable level throughout their lifetime [2-7].

In our country, the education of children with hearing impairment is disputed by legal normative acts. In particular, in accordance with the laws “on education,” “on guarantees of the rights of the child,” “on the national program of training of personnel,” as well as the law “on social protection of Disabled Persons in the Republic of Uzbekistan,” the Cabinet of Ministers adopted Resolution № 256 on the 13th of September in 2013, which determined the educational and educational processes of children.

Literature Review

In addition, in order to contribute to the sustainable development of our country and the increase of the standard of living of the population, the international public fund “Zamin” was established in our country. The activities of the fund “Zamin” are based on 4 directions, consisting of long-term, strategic importance and sustainable projects, of which 4-th direction is an indicator of improving the living conditions and educational conditions of children with hearing impairment. Within the framework of the direction, the program “Development of Education for hearing impaired children” was introduced into practice. Such approaches are aimed at solving the problem of adaptation of children with hearing impairment to life through education.

Children with disabilities usually face a number of difficulties, one of which is the lack of the opportunity to get a full education. Partial or complete loss of hearing deprives children of an important source of information and limits the process of visual development.

In the process of improving physical education and health with children with hearing and speech impairments, the main emphasis should be placed on revealing the characteristics of the child, creating an individual program of correction and development for him on the basis of each complete study of the characteristics of his development.

The main purpose of early diagnosis and assistance to the child is to ensure social, emotional, intellectual and physical growth and achieve maximum success in the development of his or her abilities. It is known that the study of a child with a defect can not only be limited to determining the degree and severity of the deficiency, but also include the process of compensation.

Full development of children with hearing impairment is not possible without physical education, which ensures not only the necessary level of physical development, but also the correction of deviations in various areas of deaf children's activities. Abramova N. noted that from the birth of a deaf child, hearing impairment does not develop. Some compensation for this gap depends on the degree of distortion of the hearing analyzer, and its activation is carried out only with a long-term and systematic work on the development of the hearing perception [2, 3]. There are two main groups of children with hearing impairment: hearing impairment (diagnosed with hearing loss) and deaf (diagnosed with deafness). The hearing-impaired group includes children with hearing impairment, in which at least a minimum level of independent speech development is possible.

The hearing condition of children with hearing impairment is characterized by a very diverse range: from a slight violation of the perception of speech pitch, to a sharp restriction of speech in the oral voice [4]. Given the state of speech, two categories of hearing-impaired children have been identified.

The first category includes children with hearing impairment, when they come to school, poor development of speech (single words, short, incorrectly formed phrases, gross violation of the lexical, grammatical, phonetic structure of speech). The second category includes children with hearing impairment who are well versed in vocabulary combinations with slight deviations in terms of grammatical structure and phonetic structure. To the group of children with hearing impairment - children whose hearing condition does not have the opportunity to spontaneously form speech (without special training).

The deaf are divided into two categories according to the case of speech: The first category is "speechless" children who were born deaf in the period before the formation of speech (up to about two years) or who have lost hearing - these are early deaf children. The second category - children with different levels of speech, whose speech has already lost hearing in the formed period.

Vebitsky G.I. determined the stratified categories of the study of his speech, based on the different methods of perception of speech and the different methods of its formation on the basis of the identification of groups of children with defects in speech [5].

Different types of groups are organized for children divided into groups: 1) group of deaf children; 2) a group of children with a weak hearing and subsequently deaf.
-Chapter One - students whose speech is poorly developed due to hearing impairment;
-Chapter Two-pupils whose speech is not fully formed due to low hearing.

Thus, students with low hearing and limited hearing have similar characteristics, but the first one, learning separately, develops faster and soon loses some similarity to each other. This is achieved by distinguishing the system of teaching for this category of students.

Research Methodology

In general, the problem of teaching children with different levels of hearing impairment is a complex problem that is associated not only with the spiritual development of schoolchildren with different levels of hearing impairment, but also

with their physical education. The role of physiologists, otologists, teachers of the deaf, defectologists, psychologists, sociologists and educators of adaptive physical culture plays a special role in this. There are several ways of developing speech. Tension, intensity, rhythm and spatial orientation are the biological components of a person.

They are also present in action and speech.

Organized movement-develops a sense of perception, forming the fluency, duration, speed, accentuation of the child's speech. Then it can be easier to manage it in macro movements, switching to the control of the micro movements of the articulation muscles. The action will help the imagination of children, bring them to an impressive state (in specially organized games). It produces a self-generated sound and their ability to hear the sound itself. Hearing is closely related to movement, and auditory signals, like visual signals, are involved in the regulation of movements.

There is a close functional link between hearing impairment, speech impairment and motor system [6].

Deaf pupils can distinguish the following distinctive features of the motor sphere: - lack of confidence in sufficiently clear coordination and actions; - difficulty maintaining static and dynamic balance in the deaf; - relatively low level of development of the spatial orientation; - relatively low level of spatial orientation; - the speed, strength, endurance of the development of vital physical abilities, which characterize the physical preparation of children and teenagers, etc.

Violations in the motor sphere of deaf pupils (noted above) are interrelated, the following causes are the basis for them: - hearing impairment structure; - insufficient speech function; - decrease in incoming data volume; - the state of the motor analyzer and the level of functional activity.

The combination of these causes is clearly manifested, especially in coordination abilities, since they are carried out on the basis of the defect of the sensory systems associated with the management of movements. For this reason, deaf learners spend more time mastering complex coordination skills, have a lower level of maximum achievement in terms of accuracy and time of movements, and also have a lower level of hearing impairment in terms of static and dynamic balance.

In the case of a violation of the balance of deaf children of primary school age, slowness, stiffness and small amplitude of movements are noted.

Hearing impairment is associated with memory impairment, especially in primary and secondary school age students. One of the most important components of this function is the ability to coordinate. Also, the ability to coordinate is the basis for the successful formation and improvement of physical attributes. The concept of “coordination skills” is distinguished from the concept of “dexterity,” which is common in everyday life and in scientific, methodological literature on Physical Education. These concepts are close in meaning, but not identical in meaning.

Coordination skills are, first of all, the ability to build inalienable motor movements; second, the ability to change the forms of developed movements, or the transition from one to another in accordance with the requirements in changing conditions.

At the moment, there are a lot of definitions of coordination. Coordination skills are a set of human characteristics that are manifested in the process of solving the tasks of

movement, managing their movements, regulating them, the complexity of different coordination. The leading role in the physical interpretation of coordination abilities is assigned to the coordination functions of the central nervous system [8].

Analysis and Results

The ability to qualitatively coordinate movements, to change new, increasingly complex forms of movements is the most necessary process in life. The period of development of coordination skills consists of a number of genetically programmed stages. This period is considered critical or sensitive, that is, sensitive to environmental influences, and is characterized by an increase in reactivity, a tendency of the body to study certain movements. After that, there are short-term periods during which it is possible to leap in the development of motor skills and move to a new level of performance [9].

In children with auditory analyzer pathology, various deviations are noted, which are responsible for determining the position of the body in space, in the work of the vestibular ligaments as a result of the main violation. The degree of deviation will depend on the degree of hearing impairment. Thus, deviations in the work of the vestibular ligaments are less pronounced due to the fact that in school students with hearing impairment there is little damage to the hearing analyzer, and the management of movements can be much easier. However, practice shows that such statements are inaccurate, and hearing-impaired schoolchildren have shown greater impairment in motion management than deaf peers in some exercises. In people who do not hear, compensation mechanism is more accurately manifested due to deep damage to the hearing analyzer and, accordingly, the vestibular apparatus. In the scientific literature, there are data on high indicators of proprioceptive sensitivity tests among deaf people.

Students with limited hearing are likely to leave their peers behind in terms of orientation to space under normal conditions. That is, in order to adequately develop coordination skills, it is necessary to clearly determine how to overcome motor deviations in hearing impaired and deaf learners.

Under normal conditions, the listener perceives the condition of the child's body and perceives any changes in his condition. With the change of conditions or before the implementation of the events that occurred, many muscles begin to contract and the body returns to its normal state. This reaction often prevents miscarriage.

In students with different hearing abilities, reactions to changes in body condition are significantly reduced. An important role is also played by muscle sensation or proprioceptive sensitivity in the direction of space. The composition of the muscles includes receptors that give irritation when pulled [9].

At the same time, there are violations in the perception of muscles in children with different degrees of damage to the hearing analyzer. They lose the accuracy of the movement and are forced to always check them with their eyes, which plays a key role in the direction of the category of children. In the case of weightlessness, when the force of gravity does not affect the body, direction with the help of a muscular sensation in space is practically impossible. Similar feelings are experienced by people with disorders in the hearing analyzer.

Sensitive periods of the level of development of coordination skills in hearing impaired and deaf students coincide with different age periods and do not coincide with those of students with hearing impaired (by weight). In many coordination skills in hearing impaired students, the smoothness of age dynamics (low indicators of age growth) is noted, while in hearing impaired students, more often the sensitive periods in coordination abilities are more clearly expressed.

Considering the degree of the underlying disease, the methods of perception of information, the violation of species coordination and the period of development of intuition can serve as the basis for a differentiated approach, even for each of the coordination abilities and load parameters in the selection of tools, methods, methodological techniques. The importance of differentiation within the group in the implementation of correction and development methods for external differentiation in hearing impaired and deaf students is significant. Speed training in the program (running, jumping, throwing) training of the deaf at school age is also of great importance.

Korotkova E.A. believes that the expediency of using speed and strength exercises is confirmed by two theoretical positions of orientation: the types of basic coordination skills include these coordination exercises. The purposeful use of walking, running, jumping, running and daily activities, speed training necessary for the implementation of any movements, also creates favorable conditions for increasing the level of physical development [9].

The training process is based on the speed-direction methodology principle. Corrective effect of physical education includes balance development, activation exercises for schoolchildren with hearing impairment. Children are rhythmic beats of the drum; the tambourine is first visually perceived by the voice.

Through the development of speed qualities in students, different types of running in the process of physical education: jumping, throwing, performing exercises with a ball are practiced. The main methods-playful and competitive, relay races, plot play compositions, organization of round-the-clock lessons, repeated training. In the lessons of differential physical therapy, exercises such as the use of special exercises for the development and strengthening of this necessary muscle-ligament, breathing and correction exercises, exercises and stretching of muscles for balance are performed.

Personal lessons include: - Individual special exercises; -motor lessons for deaf children; The hands of teachers and children move at the same time as well as the quality of pronunciation tasks is strengthened by exercises. In order to maintain OPTIONALITY, it is necessary to use a wide range of exercises, exercises in the form of a game.

When training with defective children of primary school age, the teacher should be more motivated to give the children. One of the stylistic requirements when conducting classes with children who have a defect in the ear: This is the presence of mirrors in the gym, which allows them to be visually evaluated.

In the opinion of Shapkova L.V. in the lessons of physical education in special schools, schoolchildren should be taken individually and stratified [10].

Conclusions

In place of the conclusion, we can say that a special approach to the education and training of children with hearing impairments is required, precisely because of the shortcomings existing in physical education classes, the correct choice of teaching methods and tools will have a positive impact on their future.

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MEANS OF PROVIDING EMOTIONAL EXPRESSIVENESS IN MEDIA DISCOURSE

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Annotatsiya. Ushbu maqolada media diskursning asosiy xususiyatlaridan biri bo‘lgan “kommunikativ uslub” tahlil qilinadi. Maqolada kommunikatsion uslubning asosiy elementlari: ma’no va mazmun, tayyorlangan format, auditoriyaga moslashuv va retorik uslublar kabi muhim jihatlarni o‘z ichiga oladi. uningdek, maqolada tilning funksiyalari, xususan, meta-tiliy va appellativ funksiyalar media diskursga qanday ta’sir qilishini ko‘rsatadi.

Kalit so‘zlar: *Kommunikativ uslub, Media diskurs, Stil, ma’no, mazmun, Format, Auditoriya, Retorika.*

Аннотация. В данной статье анализируется “коммуникативный стиль,” одна из ключевых особенностей медиа-дискурса. В статье рассматриваются основные элементы коммуникативного стиля: смысл и содержание, подготовленный формат, адаптация к аудитории и риторические стили. Также в статье показывается, как языковые функции, в частности, метаязыковая и аппеллятивная функции влияют на медиа-дискурс.

Ключевые слова: *Коммуникативный стиль, Медиа-дискурс, Стиль, Смысл, Содержание, Формат, Аудитория, Риторика*

Abstract. This article analyzes “communicative style,” a key feature of media discourse. The article highlights key elements of communicative style: meaning and content, prepared format, audience adaptation, and rhetorical styles. It also explores how language functions, particularly metalinguistic and appellative functions, influence media discourse.

Keywords: *Communicative style, Media discourse, Style, Meaning, Content, Format, Audience, Rhetoric.*

Introduction

The media discourse has a crucial role in molding attitudes, evoking strong emotions, and giving us information about our everyday lives in today’s society. The messages that are spread by print, radio, television, the internet, and social media have an impact on people’s mentalities, and this impact frequently depends on language’s creative potential and capacity to arouse feelings.

The use of language in media is quite deliberate, employing a variety of rhetorical and linguistic tactics to evoke particular emotional reactions in the viewer. This includes the use of emotive words, metaphors, rhetorical questions, repetition, etc.

- Dramatization, sensationalism, and exaggeration are frequently used by the media to amplify the emotional effect of tales and draw in viewers. This may entail drawing attention to the events' dramatic, startling, or outlandish aspects.
- How issues are framed and told in media coverage can influence how viewers think and feel about them. Selected viewpoints, angles, and contextual information are used to elicit particular feelings in the viewer.
- In addition to spoken words, nonverbal indicators such as tone of voice, facial expressions, and images in television and internet media can also imply emotions.
- Journalists, media personalities, and anchors are educated to modulate their delivery in ways that evoke strong feelings in the audience, such as authority, empathy, or outrage.
- Media content can have its emotional appeal and memorability increased by carefully placing advertisements, music, and other production components.

One of the most important aspects of media discourse is the ability of words to evoke emotional responses, or emotional expressiveness. It contributes to the attraction, memorability, and impact of messages. Messages that are emotionally expressive can encourage action, change attitudes, and create positive connections. In order to accomplish the three primary objectives of media content - building relationships, influencing attitudes, and inspiring action - emotional expressive language tools are crucial. Let's explore the processes that allow for emotional expressiveness in media conversation and explore the significance and potency of language. We are aware that media discourse plays a crucial role in today's modern society.

Daily news, entertainment programs, films, advertisements, and various other media content are delivered to us through television, radio, print media, the internet, and social networks. The core element of this delivered media content is its emotional expressiveness, which plays a critical role in creating its emotional impact.

Literature Review

Roman Jakobson asserts that language is a tool for expressing human emotions and eliciting particular feelings in the listener, in addition to being a means of informational communication. One of language's six main functions, according to Jakobson, is the emotional function.

This illustrates how Jakobson sees the expressive or emotional function as a unique and important linguistic function that allows the speaker to communicate their own attitudes, feelings, and states through language. This function helps to elicit specific emotions in the listener in addition to information transmission.

According to Jakobson, language has more uses than only communicating facts. It may also be used to communicate and elicit feelings in interpersonal interactions. This highlights the complexity of language. This knowledge is crucial for a number of disciplines, including communication theory, psychology, and linguistics [1-7].

The capacity of language to elicit feelings is known as emotional expressiveness. Stated differently, it refers to the ability of language to convey and elicit emotions in both the audience and the journalists or media content providers. The persuasive and creative capabilities of language are demonstrated by its emotional expressiveness in media discourse. Emotional expressiveness on television is essential for influencing

viewers' thoughts, arousing their feelings, holding their interest, and guaranteeing that the content will stick in their memory.

The book "Linguistics and Poetics" by Russian-American linguist and literary theorist Roman Jakobson is one of the foundational works on the emotional function of language. This work addresses the issues of eliciting and conveying emotions in audiences and provides insights into language itself. In this work, Jakobson identifies the following six main purposes of language: conative, emotive, poetic, phatic, metalinguistic, and informational. We shall use this theory to evaluate television shows.

1. Informative Function: The informative function is usually the main focus of news broadcasts, such as CNN and BBC News. They make an effort to deliver news in an impartial and objective manner, with a focus on accuracy and clarity.

2. Emotive Function: The emotive function is highlighted in drama series, reality shows, entertainment programs, etc. Their goal is to evoke strong feelings in the viewers. Voice competition shows such as "The Voice" showcase the emotional expressiveness of their artists.

3. Poetic Function: Poetic function is given priority in artistic films, musicals, poetry programs, etc. Their objective is to arouse aesthetic feelings in the viewers. The main goal of award shows like "The Oscars" is to highlight artistic accomplishments.

4. Phatic Function: The phatic function is the main topic of talk shows, debates, in-person conversations, etc. They make an effort to interact with the crowd and get their feedback. Speeches, arguments, in-person conversations, and other media texts particularly highlight the phatic function. These writings make an effort to engage the audience and get their feedback.

5. Metalinguistic Function: The metalinguistic function is highlighted in language-focused media materials, grammatical analysis, and language-related programs. The goal of these texts is to examine the peculiarities of language.

6. Conative Function: Advertisements, political speeches, social announcements, and other media texts that aim to persuade the audience to take specific actions or change their opinions emphasize the conative function.

In media discourse, style is typically referred to as "discourse style" or "communicative style." In essence, it is a language and expression style selected to fit a certain situation and goal. In media discourse, style is critical since it impacts the message's effect and reception [2].

Research Methodology

Analytical and comparative analysis techniques are used in this article. It examines the traits of communication style in a variety of media texts (news, articles, advertising, etc.). Additionally, it uses comparative research to pinpoint how language's metalinguistic and appellative functions affect media discourse.

Analysis and Results

The study of communication style and its essential components in media discourse is the main goal of this article. Meaning and substance, prepared format, audience adaptation, and rhetorical approaches are the primary areas of analysis. These

components are essential to the process of molding messages in the media. The following are the key components of this style:

1. Meaning and Content: The message's core idea and substance are expressed through the media style. Furthermore, the audience's response to the media discourse message is significantly influenced by its meaning and content. Authors draw in the audience by accurately identifying the material and communicating the meaning in order to increase the effect.
2. Prepared Format: It might be generic or individualized, professional or informal. The message's form, presentation, and design all influence how the audience perceives it. Media messages are more enticing when they have a unique format and design.
3. Audience Adaptation: The connection's efficacy is ensured by tailoring the style to the intended audience. It is essential to take the audience's demands and interests into account when implementing the communicative style. Because every audience is different, writers modify their writing to achieve successful communication.
4. Rhetorical Styles: The intention to persuade an audience by using logical, emotional, or thematic approaches. The use of rhetorical styles heightens impact. They arouse feelings in the audience and influence their opinions. For this reason, rhetorical styles are deployed. The following objectives are aided by rhetorical styles: strengthening the effect, arousing feelings, and supporting the development of ideas. Rhetorical techniques are therefore employed in media texts to sway the audience and mold their rational and sentimental thought processes [5].

These components fortify the bond with the audience and improve the success of media discourse. Every media text has an own way of expressing each communicating style. Based on this analysis, communicative style and its elements in media discourse play a crucial role in increasing the impact of information. The analyzed aspects - meaning and content, prepared format, audience adaptation, and rhetorical styles - are essential for effective communication and engaging the audience.

As a result, understanding communicative style in media discourse and correctly comprehending its unique elements helps in critically analyzing media messages and assessing their impact. This, in turn, enables the presentation of interesting and important information for the audience [4].

Conclusions

This article analyzed the communicative style and its key elements in media discourse: meaning and content, prepared format, audience adaptation, and rhetorical styles. As mentioned in the article, communicative style plays an important role in media discourse. It helps to increase the impact of the presented message, engage the audience, urge them to certain thoughts, or evoke emotions. The article also provided information about the specific influence of meta-language and appellative functions in media discourse. Understanding the influence of communicative style and its unique elements in media discourse helps to critically analyze media messages and accurately assess the impact of media messages.

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