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CONTENTS

MEDICAL SCIENCES

Yasynska E.T.

FEATURES OF DAILY AND SEASONAL DYNAMICS OF CARDIAC ARRHYTHMIA ATTACKS IN THE CONTEXT OF NEURO-MENTAL OVERLOAD DURING MILITARY AGGRESSION 3

Biduchak A.

INFORMATION MANAGEMENT IN HEALTHCARE 7

Бідучак А.

ІНФОРМАЦІЙНИЙ МЕНЕДЖМЕНТ В ОХОРОНІ ЗДОРОВ'Я..... 7

Mazur O., Chornenka Zh.

OTITIS EXTERNA UNDER THE MICROSCOPE: A MODERN VIEW OF TREATMENT..... 10

PEDAGOGICAL SCIENCES

Aimova M.Zh.

THE IMAGE OF THE UNIVERSITY AS A COMPONENT OF THE EDUCATION SYSTEM 13

Aimova M.Zh.

THE ROLE OF THE TEACHER'S PERSONALITY IN THE EDUCATIONAL PROCESS 17

Aimova M.Zh.

THE IMAGE OF MODERN EDUCATION 20

Krupko O.

THE ROLE OF THE STUDENT SCIENTIFIC CLUB IN THE SCIENTIFIC DEVELOPMENT OF STUDENTS 22

TECHNICAL SCIENCES

Камбарова Мухайёхон Содиқжоновна

ПОЛУЧЕНИЕ И ПРИМЕНЕНИЕ ФУНКЦИОНАЛЬНЫХ НАНОМАТЕРИАЛОВ 24

Qambarova Muhayyokhon Sodiqjon qizi

SYNTHESIS AND APPLICATION OF FUNCTIONAL NANOMATERIALS..... 24

PHYSICAL AND MATHEMATICAL SCIENCES

Худайкулыев Шамурат, Худайкулыева Энеджан

РЕШЕНИЯ ТРИГОНОМЕТРИЧЕСКИХ ЗАДАЧ БЕЗ ИСПОЛЬЗОВАНИЯ ТРИГОНОМЕТРИЧЕСКИХ ФУНКЦИИ (ИЛИ ЛЕГКИЙ СПОСОБ РЕШЕНИЯ ТРИГОНОМЕТРИЧЕСКИХ ЗАДАЧЕЙ). 27

Hudaykulyyev Shamurat, Hudaykulyyeva Enejan

SOLVING TRIGONOMETRIC PROBLEMS WITHOUT USING A TRIGONOMETRIC FUNCTION (OR AN EASY WAY TO SOLVE A TRIGONOMETRIC PROBLEM). 27

MEDICAL SCIENCES

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FEATURES OF DAILY AND SEASONAL DYNAMICS OF CARDIAC ARRHYTHMIA ATTACKS IN THE CONTEXT OF NEURO-MENTAL OVERLOAD DURING MILITARY AGGRESSION

Abstract.

The article analyzes 1998 cases of acute cardiac arrhythmias registered in 2023–2024. It is proven that the highest frequency of attacks is observed in women, as well as in age groups over 60 years old. The dominance of extrasystole, atrial fibrillation and impulse conduction disorders is established. It is shown that Monday is the busiest day of the week in terms of the number of attacks, and the winter-autumn period is the season of increased arrhythmia activity. The influence of stress and neuropsychiatric stress associated with Russia's military aggression, which contributes to an increase in the frequency of attacks, is taken into account. The results emphasize the need for targeted preventive measures in certain periods to reduce the risk of attacks and optimize the work of emergency medical care.

Keywords: *cardiac arrhythmias, frequency of cardiac arrhythmia attacks, daily and seasonal dynamics, neuropsychiatric overstrain, stress, emergency medical care, prevention of arrhythmias.*

Introduction. For effective long-term and current planning and organization of the work of the emergency medical care and disaster medicine center, which provides specialized emergency care to patients at the pre-hospital stage, it is necessary to carefully record the intensity of incoming calls. An important aspect is to analyze the relationship between the number of calls and factors such as gender and age of patients, seasons, months, days of the week and hours of the day. The data obtained allow identifying the busiest periods of work of emergency medical care teams, which allows for more rational planning of resources and determining the needs of the population in specialized teams of the appropriate profile.

In addition, the level of calls is significantly affected by the organization and quality of work of outpatient clinics in the city, since timely and high-quality provision of primary health care can reduce the burden on the emergency medical service [3, 7, 12]. Analysis of such factors is key to increasing the efficiency of the emergency medical care system, which ultimately improves patient treatment outcomes and reduces mortality in the population [5, 9].

One of the key factors influencing the frequency of cardiac arrhythmias is stress and neuropsychiatric stress. In the context of Russia's prolonged military aggression against Ukraine, a significant part of the population is exposed to constant psychological pressure, which increases the risk of cardiac complications. Chronic stress activates the sympathoadrenal system and leads to an imbalance in the autonomic regulation of cardiac activity, which contributes to the appearance of heart rhythm disturbances [1, 3].

Psycho-emotional stress associated with military operations can not only provoke new cases of arrhythmias, but also worsen the course of existing disorders. During 2023–2024, an increase in the number of arrhythmia attacks was recorded, which correlates with the exacerbation of military events and the increase in the level of anxiety among the population [2, 5].

Given this, when assessing risk factors for cardiac arrhythmias, not only somatic but also psychosocial aspects should be taken into account, which significantly affect the clinical course of the disease. The implementation of comprehensive measures to reduce stress load can significantly improve the results of treatment and prevention of cardiac arrhythmias [4].

Presenting the main material.

To study the problem, a comprehensive analysis of clinical data and factors influencing the occurrence of cardiac arrhythmias in patients was conducted.

The purpose of the article: studying the daily and seasonal dynamics of cardiac arrhythmia attacks, taking into account the influence of neuropsychiatric overload and stress factors in the context of military aggression.

Materials and methods: The study materials were obtained based on documents of the Municipal Non-Profit Enterprise “Chernivtsi Regional Center for Emergency Medical Care and Disaster Medicine” of the Chernivtsi Regional Council, in particular, on the basis of the emergency (ambulance) medical team departure cards (form No. 110/o) for 2023–2024, which related to cases of cardiac rhythm and conduction disorders. During the provision of emergency medical care, all patients underwent an electrocardiographic examination in 12 standard leads, with recording of

information about the time and place of arrhythmia occurrence. In addition, anamnesis data was taken into account, which included information about living conditions, the impact of military events, socio-economic status and factors that caused chronic psycho-emotional stress. Subsequently, according to the departure cards, patients were classified by gender, age groups and forms of cardiac rhythm disorders.

In the period 2023–2024, 1998 cases of emergency medical care for acute attacks of cardiac arrhythmias were recorded. Of all cases, 1031 (54.3%) involved women, while 867 (45.7%) involved men. The predominance of women is partly explained by the higher number of women in the urban population (by more than 8.5%), as well as the higher mortality rate among men over the age of 60.

Distribution by age category

Analysis of the age structure showed the following:

- 18–29 years old— 67 people (3.4%);
- 30–39 years old— 134 people (6.7%);
- 40–49 years old— 310 people (15.5%);
- 50–59 years old— 412 people (20.6%);
- 60–69 years old— 549 people (27.5%);
- 70 years and older— 572 people (28.6%).

Distribution by forms of rhythm disturbances

According to the clinical forms of heart rhythm disorders, the structure of cases was as follows:

The structure of appeals by clinical forms of arrhythmias and conduction disorders was distributed as follows:

- Extrasystole— 676 cases (33.8%).
- Atrial fibrillation and flutter— 457 cases (22.9%).
- Impaired impulse conduction— 395 cases (19.8%).
- Paroxysmal tachycardia— 299 cases (15.0%).
- Other forms (in particular, parasystole, Wolff–Parkinson–White syndrome (WPW), sick sinus syndrome, etc.) — 209 cases (10.5%).

To study the patterns of distribution of cardiac arrhythmia attacks during the week, the average daily rates of their frequency for each day of the week in 2023 and 2024 were analyzed. This approach allows us to identify days with an increased risk of arrhythmias, as well as assess changes between two years, which may be associated with increased neuropsychiatric strain and stress factors. This is important for optimizing medical care and developing preventive measures.

Table №. 1.

Average daily rates of cardiac arrhythmia attacks by day of the week (2023-2024)

Day of the week	2023 (M ± m)	2024 year (M ± m)
Monday	3.8 ± 0.1	3.8 ± 0.1
Tuesday	2.8 ± 0.2	2.7 ± 0.1
Wednesday	2.6 ± 0.1	2.6 ± 0.1
Thursday	2.8 ± 0.2	2.8 ± 0.2
Friday	2.3 ± 0.2	2.8 ± 0.1
Saturday	2.2 ± 0.1	2.6 ± 0.1
Sunday	2.6 ± 0.1	2.8 ± 0.3

The study found clear differences in the average daily frequency of cardiac arrhythmia attacks depending on the day of the week. In particular, the highest rates were recorded on Monday in both years - 3.8 cases per day, which is approximately 1.5 times higher than the average values for other days. This pattern may be associated with the increased stress levels characteristic of the beginning of the working week.

Consistently lower values are observed on Tuesday, Wednesday and Thursday (2.6–2.8), with the indicators remaining practically unchanged throughout both years. This indicates a certain stability in the influence of environmental factors and the rhythm of life in the middle of the week.

Interestingly, the frequency of attacks on Fridays increased in 2024 to 2.8 (compared to 2.3 in 2023), which may indicate changes in behavioral or psychoemotional factors at the end of the week.

Analysis of weekends revealed an increase in the indicators in 2024: on Saturdays - to 2.6 (from 2.2 in 2023), on Sundays - to 2.8 (from 2.6). This suggests that arrhythmias do not decrease on weekends, probably due to a violation of the usual daily routine,

changes in diet, alcohol consumption, or the presence of chronic psycho-emotional overload, which is not compensated during the rest period.

As a result, there is a trend towards a decrease in the differences between weekdays and weekends in 2024, which may indicate a general increase in the level of neuropsychiatric stress throughout the week.

In order to identify seasonal changes in the frequency of cardiac arrhythmia attacks, an analysis of relative monthly indicators, expressed as a percentage of the average daily annual frequency, was carried out for 2023 and 2024. The collected statistical data made it possible to outline periods of increased probability of arrhythmias, which is of important practical importance for improving the organization of medical care and implementing preventive measures.

Assessment of monthly changes allows us to trace the influence of a number of external and internal factors, including weather conditions, physiological biorhythms, level of physical activity, emotional state and lifestyle on the frequency of attacks. This approach contributes to a better understanding of the dynamics of the pathological process and allows us to plan medical care taking into account expected peaks of load.

Determining potentially dangerous periods during the year is an important condition for timely diagnosis, prevention, and reducing the risks of developing

serious complications in patients with cardiac pathology.

Table №. 2.

Relative monthly rates of cardiac arrhythmia attacks (in % of the average daily annual frequency) for 2023 and 2024

Month	2023 (%)	2024 (%)
January	129.0	111.0
February	97.3	98.9
March	93.1	98.7
April	91.9	89.3
May	95.0	88.7
June	94.1	96.1
July	92.9	95.7
August	97.9	108.1
September	119.8	96.9
October	96.9	127.1
November	99.9	91.9
December	98.0	104.7

Analysis of the monthly dynamics of cardiac arrhythmia attacks in 2023 and 2024 allowed us to identify features of seasonal variability, which are important for planning medical interventions and preventive measures. During 2023, the highest frequency of arrhythmia attacks was observed in January (129%) and September (119.8%), which exceeded the average annual rates. These periods may be associated with sharp changes in external conditions, cold climate, workload after winter holidays, or the beginning of the active work and school season. At the beginning of 2024 — in January — the rate also remained elevated (111%), although it did not reach the values of the previous year.

During 2024, the most pronounced increase in the frequency of attacks was recorded in October (127.1%) and August (108.1%). This indicates a certain shift of the peaks of arrhythmia activity to late summer and autumn, probably due to the combined effect of changes in temperature, disruptions to the usual rhythm of life, emotional stress, or seasonal factors.

The spring months — March, April, and May — are characterized by a more stable course and lower rates (from 88% to 98%), which may reflect a relatively favorable period with less stress on the cardiovascular system.

Compared to 2023, some months in 2024 — particularly August, October, and December — show a higher frequency of attacks. Such fluctuations may be the result of changes in the nature of risk factors, working conditions, lifestyles, or the level of medical surveillance.

Conclusion.

1. The results of the analysis of data for 2023–2024 showed an increase in the frequency of cardiac arrhythmia attacks at the beginning of the workweek, as well as in the winter and autumn months. The highest rates are on Monday, January, August, September and

October, which may be associated with changes in weather conditions, physiological stress and the peculiarities of the organization of daily life.

2. The results obtained should be taken into account when planning preventive and therapeutic measures, developing seasonally oriented information campaigns, as well as when forming a surveillance system for patients with an increased risk of arrhythmias.

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Bukovinian State Medical University, Chernivtsi, Ukraine*ORCID: <https://orcid.org/0000-0003-3475-1497><https://doi.org/10.5281/zenodo.16848935>**INFORMATION MANAGEMENT IN HEALTHCARE****Бідучак А.***д.мед.н., доцент кафедри соціальної медицини та організації охорони здоров'я Буковинського державного медичного університету, Чернівці, Україна***ІНФОРМАЦІЙНИЙ МЕНЕДЖМЕНТ В ОХОРОНІ ЗДОРОВ'Я****Abstract.**

The article examines the concept of information management in the healthcare system as one of the key elements of the digital transformation of the medical industry. The main goals, objectives and tools of information management are determined, in particular, medical information systems, electronic medical records, big data analytics and clinical decision support systems. The impact of information management on the quality of medical care, patient safety, and resource management efficiency is analyzed. Special attention is paid to the challenges of implementing digital solutions in healthcare, such as technical, legal and organizational barriers. Examples of international experience and modern initiatives in Ukraine are considered. Prospects for the development of information management are outlined with an emphasis on personalized medicine, telemedicine and the use of artificial intelligence.

Анотація.

У статті розглянуто концепцію інформаційного менеджменту в системі охорони здоров'я як одного з ключових елементів цифрової трансформації медичної галузі. Визначено основні цілі, завдання та інструменти інформаційного управління, зокрема медичні інформаційні системи, електронні медичні записи, аналітику великих даних та системи підтримки клінічних рішень. Проаналізовано вплив інформаційного менеджменту на якість медичного обслуговування, безпеку пацієнтів, ефективність управління ресурсами. Особливу увагу приділено викликам впровадження цифрових рішень у сфері охорони здоров'я, таким як технічні, правові та організаційні бар'єри. Розглянуто приклади міжнародного досвіду та сучасні ініціативи в Україні. Окреслено перспективи розвитку інформаційного менеджменту з акцентом на персоналізовану медицину, телемедицину та застосування штучного інтелекту.

Keywords: information management; healthcare; medical information systems; electronic medical records; eHealth; digitalization of medicine; clinical solutions; telemedicine; information management; artificial intelligence in medicine.

Ключові слова: інформаційний менеджмент; охорона здоров'я; медичні інформаційні системи; електронні медичні записи; eHealth; цифровізація медицини; клінічні рішення; телемедицина; управління інформацією; штучний інтелект у медицині.

In the modern world, healthcare is undergoing profound changes due to the rapid development of information and communication technologies. Digitalization encompasses not only individual processes of providing medical services, but also changes general approaches to managing medical institutions, interaction between patients and doctors, processing clinical data and ensuring evidence-based medicine. Against this background, information management is of particular importance – a system for managing information flows and resources, which allows ensuring the effective functioning of medical organizations in the context of digital transformation.

In countries with a developed healthcare system, information management has long become a necessary condition for improving the quality of medical services, reducing costs, improving the accessibility of medical care and increasing patient safety. The use of medical information systems, electronic medical records, clinical decision support systems, analytical platforms

based on big data and telemedicine technologies is significantly changing the role of information in the medical field – from an auxiliary resource to a strategic tool [1].

In Ukraine, as in many other countries, the digital transformation of healthcare has become a state priority program, implemented through the implementation of an electronic healthcare system (eHealth), electronic prescriptions, declarations and referrals. However, the implementation of information management faces a number of barriers: from technical and regulatory to personnel and ethical. Given the relevance of the topic, this study is devoted to the analysis of theoretical and practical aspects of information management in healthcare, the study of modern information technologies, the assessment of their impact on the medical field and the identification of key problems and prospects for further development.

The **purpose of the article** is to analyze the role and significance of information management in the

healthcare system, study its main components, tools, impact on the quality of medical services and identify the main problems and prospects for development in the context of digitalization of the medical industry.

Research material and methods. The materials for the study were scientific publications, analytical reports, official documents of the Ministry of Health of Ukraine, legislative acts in the field of digital transformation of medicine, as well as examples of the implementation of information systems in medical institutions in Ukraine and abroad [2].

The following scientific methods were used in the study: analysis of scientific literature; comparative method; system approach and generalization method.

Results. Information management in healthcare is an integrated system of methods, processes and technologies aimed at the effective management of information resources of medical institutions in order to improve the quality of patient care, ensure evidence-based medicine and improve management decisions [3].

Main tasks:

- ▶ Collection, processing and analysis of medical data (clinical, epidemiological, administrative, etc.).
- ▶ Ensuring continuity and consistency of information flows.
- ▶ Optimization of decision-making processes.
- ▶ Monitoring and evaluation of the effectiveness of medical services.
- ▶ Support for electronic document flow in the healthcare system.

Components and tools of information management:

1. Medical information systems. These are specialized software and hardware complexes that automate the activities of medical institutions. They cover various subsystems: registration, laboratories, pharmacy support, diagnostics, finances, etc.

2. Electronic medical documentation:

- Electronic medical records – digital versions of traditional patient cards containing medical history, test results, prescriptions.
- Electronic prescriptions – reduce service time and reduce the risk of errors when prescribing medications.

3. Clinical decision support systems. Intelligent systems that analyze incoming medical information and offer the doctor the most optimal diagnostic or treatment options based on the evidence base.

4. Information analytics:

- Forecasting the development of diseases.
- Identification of risk groups.
- Assessment of treatment effectiveness.
- Formation of state health policy.

The importance of information management at the level of health care institutions [4]:

1. Increasing efficiency. Process automation allows healthcare professionals to spend more time with patients, not on paperwork. Fewer errors, more transparency in work.

2. Ensuring patient safety. Thanks to electronic information exchange, the risk of incorrect diagnosis or

treatment is reduced, especially in the case of repeated hospitalizations.

3. Optimizing management. Analytics allow administrators to better plan resource allocation, monitor staff workload, financial costs and treatment outcomes.

4. Problems and barriers to implementation:

- Technical difficulties:
 - lack of common standards for interaction between systems;
 - limited infrastructure in rural areas.
 - Human factor:
 - staff resistance to change;
 - low level of digital literacy among doctors.
 - Ethical and legal issues:
 - confidentiality and protection of personal data;
 - lack of sufficient regulation at the state level.
5. Global and national examples:
- International experience:
 - Estonia: fully digitalized healthcare system; access to medical history online.
 - Israel: powerful analytics systems for pandemic management.
 - Ukraine: implementation of the eHealth system – a unified electronic healthcare system; connection of institutions to the National Health Service of Ukraine; implementation of electronic referrals, declarations, prescriptions.

6. Development prospects:

- artificial intelligence in diagnostics;
- telemedicine for remote patient monitoring;
- integration with international data exchange systems;
- expanding patients' opportunities for independent access to their own medical information.

Conclusions. Information management in healthcare is not just a technical tool, but a strategic element of the transformation of the entire system. Its successful implementation requires a comprehensive approach: investments in technology, staff training, updating the regulatory framework and active participation of patients. It is thanks to modern information solutions that medicine has a chance to become more personalized, effective and accessible to everyone.

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Harnessing the power of clinical decision support

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OTITIS EXTERNA UNDER THE MICROSCOPE: A MODERN VIEW OF TREATMENT

Resume.

During life, on average, every tenth person suffers from otitis externa at least once, and 3-5% of the population suffers from its chronic form. The disease is most common in childhood and among people who are in conditions of high humidity for a long time. The increase in the number of patients with otitis is associated not only with the adverse effects of the environment, the widespread and uncontrolled use of drugs that cause immunological changes in the body, but also with the increase in the prevalence of allergic pathology. A significant role in the etiopathogenesis of otitis is played by the general condition of the body. In this regard, otitis externa is very often observed in patients with diabetes mellitus, impaired immune status.

Keywords: *otitis externa, types, main symptoms, differential diagnosis, treatment tactics*

The share of inflammatory diseases of the external ear in patients of different age groups, according to numerous domestic and foreign studies, is about 17% of all ENT pathologies. In the outpatient and polyclinic chain, the proportion of patients with various forms of otitis reaches 38%, half of them suffer from external otitis. Currently, there is a tendency to increase the incidence of external otitis in people of all age groups.

Such protective mechanisms as a weak acidic environment (pH 5.0-5.7) on the surface of the skin of the external auditory canal and the protective properties of earwax prevent excessive formation of microflora. The development of the inflammatory process in the external ear is preceded by a violation of the integrity of the skin, which can be caused by many factors: injuries, skin changes against the background of metabolic disorders, diabetes mellitus, dermatitis, eczematous processes. Favorable factors for the occurrence of external otitis are narrow external auditory canals, the presence of exostoses, and wearing a hearing aid.

According to the literature, inflammatory diseases of the external ear are of a bacterial nature in 60-98% of cases. The microbial landscape in external otitis has undergone certain changes over time. Thus, the role of *Pseudomonas aeruginosa* has increased on average to 78%, while *Staphylococcus aureus* is detected only in 9-27% of cases of the disease. Starting as external otitis caused by *Pseudomonas aeruginosa*, malignant external otitis can progress to *pseudomonas osteomyelitis* of the temporal bone. Less commonly, inflammatory diseases of the external ear are found to be *Staphylococcus epidermidis*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Enterococcae*, *Escherichia coli*, *Proteus*, *Klebsiella pneumoniae*, *Mycoplasma pneumoniae*, anaerobes and other microorganisms. In addition to bacterial microflora, pathogenic fungi play a significant role in the development of external otitis. In a number of cases,

the etiotropic factor is bacterial or bacterial-fungal associations.

Clinical presentation of otitis: main symptoms

The main symptoms of otitis externa are pain in the ear (70%), itching (60%), decreased hearing (32%) and a feeling of pressure or distension (22%). Otoscopically, hyperemia and infiltration of the skin of the membranous-cartilaginous part of the auditory canal are determined, its lumen sometimes narrows so much that the eardrum becomes inaccessible for examination. The desquamated epithelium mixes with pus, resulting in a mushy mass with a sharp putrid odor. When pressing on the tragus or pulling the auricle back and up, as a rule, such patients experience pain, which allows for differential diagnosis between inflammation of the external and middle ear. Diffuse external otitis should be differentiated from malignant external otitis, furunculosis, bullous external otitis and seborrheic dermatitis. Oncological diseases of the external ear, fortunately, occur infrequently.

Diffuse external otitis media is characterized by damage to the skin of the external auditory canal, subcutaneous tissue (membranous-cartilaginous part) and the periosteum lying directly under the skin in the bony part of the external auditory canal. The disease is usually accompanied by ear pain, decreased hearing, itching and purulent discharge. The diagnosis is based on the presence of typical signs of diffuse inflammation of the skin of the external auditory canal, which sometimes extends to the eardrum. The process is acute or chronic with periodic exacerbations. In a number of cases, external otitis media caused by *Pseudomonas aeruginosa* can become malignant and transform into *pseudomonas osteomyelitis* of the temporal bone. Without treatment, the infection progresses, spreading to the auricle, scalp and parotid salivary glands. Later, the lesion affects the middle and inner ear, which can

lead to the development of meningitis and otogenic brain abscess.

In limited external otitis, the inflammation is always localized in the fibrocartilaginous part of the external auditory canal. This should be taken into account during the differential diagnosis of purulent otitis media accompanied by mastoiditis, when otoscopically determined skin overhang in the anterior superior part of the external auditory canal. The stage of infiltration is characterized by local hyperemia and skin induration. In the abscess stage, skin redness can spread to the entire surface of the external auditory canal, but a sharply painful infiltrate with a clear purulent core at its apex, dense on palpation, is always determined. For limited external otitis, the lesion of the hair follicle and the subcutaneous tissue around it is characteristic. The disease is accompanied by pain in the ear of a gradually progressive, constant nature, which increases when opening the mouth and chewing. Hearing loss is not a characteristic symptom; however, with large boils that block the lumen of the external auditory canal, conductive hearing loss may develop on the affected side.

Diagnosis and differential diagnosis of otitis

The diagnosis of otitis externa is based on the patient's complaints, history of the disease, data on the general clinical picture, as well as the results of otoscopy. The optimal diagnostic method is considered to be laboratory microbiological studies aimed at identifying the causative agent of the disease and determining its sensitivity to specific therapy. Differential diagnosis of diffuse external otitis should be carried out with acute otitis media, purulent mumps, erysipelas, perichondritis of the auricle (without involvement in the inflammatory process of the earlobe) and herpetic otitis.

The characteristic signs of erysipelas of the external ear are symptoms of general intoxication: an increase in body temperature to 39-40 ° C, chills and headache. Erythematous, bullous and bullous-hemorrhagic forms of erysipelas are distinguished. In the erythematous form, there is marked hyperemia and edema of the skin of the entire auricle with clear edges, including the earlobe, as well as sharp tenderness on palpation. The bullous form of the disease is characterized by the formation of bubbles with serous contents against the background of hyperemia of the auricle. In the bullous-hemorrhagic form, the bubbles have serous-hemorrhagic contents. It is also possible for erysipelas to spread to the eardrum. Perichondritis of the auricle is a diffuse inflammation of the epichondral tissue with involvement of the skin of the external ear. Serous and purulent perichondritis are distinguished by their form. The causes of the disease can be injuries, burns, insect bites. Sometimes a complication of a furuncle of the external auditory canal develops, as well as diffuse external otitis. The clinical picture of perichondritis is characterized by pain in the area of the auricle or external auditory canal with irradiation into adjacent tissues. Edema and hyperemia spread throughout the auricle, except for the lobe. In the future, fluctuations may appear due to the formation of purulent exudate. During the progression of the disease, cartilage melts with rejection of necrotic tissues and subsequent

deformation of the auricle. With herpetic otitis, pronounced intoxication and fever are observed. Sharp pain in the ear, itching, tingling are also characteristic. The features of herpetic ear lesions include rashes in the form of pink spots with the subsequent formation of vesicles with transparent contents. The rashes are localized along the sensitive nerves (posterior surface of the auricle, earlobe, skin of the external auditory canal). After the bubbles open independently, crusts form after 7-10 days, after which no traces remain on the skin. This disease can cause complications such as arachnoiditis, meningitis, brain abscess, peripheral facial nerve paresis, as well as vestibular disorders and sensorineural hearing loss.

Treatment tactics for otitis externa

Due to the lack of early microbiological diagnostics, treatment tactics for otitis externa in adults and children are mainly based on the initial empirical administration of systemic and local anti-inflammatory drugs. A prerequisite for the effectiveness of antimicrobial therapy for otitis externa is the appointment of broad-spectrum antibacterial drugs with a high level of bioavailability and safety, as well as symptomatic and hyposensitizing therapy.

Therapy for otitis externa is determined by the clinical picture and the nature of the pathogenic microflora. With an uncomplicated course of the disease, a short course of local composite drugs containing antibiotics is sufficient. For patients with moderate severity and severe diffuse external otitis media, in case of increased body temperature, spread of the inflammatory process beyond the auditory canal, presence of regional lymphadenopathy, suspicion of spread of infection to the middle ear or signs of necrotizing process, as well as prolonged course, systemic antibiotic therapy is recommended.

For the treatment of external auditory canal furuncle, as a rule, systemic antibiotics are used. The drugs of choice are protected penicillins or cephalosporin drugs. In the infiltration stage, it is advisable to use antibacterial ointments 3-4 times a day as local therapy, possibly in combination with physiotherapy (UHF therapy). If such treatment is ineffective in the abscess stage, surgical intervention (opening of the furuncle) is resorted to.

Treatment of erysipelas is carried out in a hospital setting. Antibiotics of the penicillin series are used in combination with hyposensitizing therapy. The affected areas are treated with a 3-5% solution of potassium permanganate.

In perichondritis of the auricle, the drugs of choice are broad-spectrum antibiotics: cephalosporins of the III-IV generation, fluoroquinolones - for adults and children over 15 years of age. The affected areas are treated with a 3-5% solution of potassium permanganate, ointment applications with polymyxin are performed, as well as physiotherapeutic procedures (UVF, UHF therapy, laser therapy). In the event of fluctuations, subperichondral abscesses are opened and drained with the removal of necrotic tissue areas.

In case of herpetic lesions of the external ear, treatment should be comprehensive: detoxification, anti-inflammatory and hyposensitizing therapy. In addition,

acyclovir should be prescribed as a specific antiviral agent. To prevent secondary bacterial inflammation, antibiotics of the penicillin and cephalosporin series are used.

Nitrofungin is indicated for mycotic external otitis. It is prescribed for various types of fungal skin lesions: trichophytosis, fungal eczema, epidermophytosis, candidiasis. In candidiasis, nitrofungin treatment can be combined with clotrimazole. In case of damage by mold fungi, amphotericin B, amphoglucamine, mycoheptine are effective.

The choice of etiotropic therapy for bacterial diffuse external otitis depends on the type of pathogen. For systemic antibacterial therapy, broad-spectrum antibiotics are used, giving preference to drugs with anti-cyanopneusin activity (III generation cephalosporins, fluoroquinolones - for adults and children over 15 years of age).

Topical drugs play a central role in the treatment of external otitis. Given the spectrum of the main pathogens of acute diffuse external otitis, it is necessary to use drugs that are active against *Staphylococcus aureus* and *Pseudomonas aeruginosa*, and taking into account the characteristic pain syndrome, it is advisable to prescribe local drugs that include an anesthetic component. Aminoglycosides are most often used as antibacterial agents for the local treatment of diffuse external otitis, since these drugs quite fully cover the spectrum (primarily gram-negative microorganisms - pathogens of external otitis) and provide a pronounced application effect. Drugs used for local therapy of external otitis are available in the form of ointments, creams, ear drops. The latter are the universal and most common form of the drug. Ideally, they contain polymyxins - antibiotics that are synthesized by a certain strain of spore-forming bacillus and belong to cyclic peptides in chemical composition.

Basic measures for the prevention of external otitis:

1. Avoid trauma to the ear canal:

Do not use cotton swabs to clean the ears, as they can damage the skin and contribute to infection.

2. Prevent water from entering the ears:

Use earplugs when swimming and dry the ears thoroughly after swimming.

3. Clean the ears properly:

Use a soft towel or cotton pad to remove water and wax without going deep into the ear canal.

4. Do not use headphones that fit tightly:

Limit the use of vacuum headphones that prevent aeration of the ear canal.

5. Treat diseases in a timely manner:

Thoroughly treat upper respiratory tract infections that can lead to otitis.

6. Strengthen the immune system:

Lead a healthy lifestyle, eat right, exercise, and avoid hypothermia.

7. Avoid polluted water:

Swim only in proven and clean water bodies.

8. See a doctor at the first sign of symptoms:

If you experience pain, itching, discharge from the ear, or hearing loss, see a doctor for diagnosis and treatment.

Following these simple rules will help prevent the development of otitis externa and keep your ears healthy.

Conclusion. Although otitis externa has many causes, there are certain unified principles of examination and treatment that allow you to overcome the disease in most cases. However, otitis externa is an insidious disease that should not be neglected and must be treated actively, as the disease can have serious consequences.

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PEDAGOGICAL SCIENCES

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THE IMAGE OF THE UNIVERSITY AS A COMPONENT OF THE EDUCATION SYSTEM

Abstract:

With the development of market relations and the intensification of competition between universities, special attention is paid to image as one of the key instruments of competitiveness. Increased competition in the educational services market is associated with a demographic decline in the population, a decrease in demand for some areas of study. The purpose of the article: to reveal the essence and foundations of the formation of both external and internal image of the university.

Key words: *educational institution, image, university, university image, student, target audience, service, education, effective image.*

With the development of market relations, public consciousness began to operate with the concepts of individuality, distinctiveness, image of subjects of socio-economic relations. The understanding of competition formed the basis. This made it possible to identify the most successful subjects in the market space. The issue of identification also affected the education system. According to V.I. Slobodchikov, "education is, first of all, the history and path of formation of "the truly human in man" in all his gifts and acquisitions. And at the same time - a way for everyone to affirm their own image, their face".

"Education in itself," writes S.A. Tangyan, "is a vital function. Without it, there is no society. It simultaneously performs cultural, social, economic and ethical functions. It ensures continuity, transmits knowledge, know-how and developed norms ... It reproduces and develops the potential that allows society to move forward, progress, renew itself, change, including in the field of economics".

At present, the problems of reputation, public opinion about a specific higher education institution and, consequently, the formation and management of its attractiveness are receiving an increasingly wider resonance in the field of education, in the media, at the level of interpersonal communication of employees of higher education institutions, students and their parents.

The formation of a positive image of a university and its maintenance affects not only the strengthening of competitiveness and its prospects, but also, in general, allows us to testify to the level of development of education in the region and the country, which significantly affects the image of Russian education. Today, in the unfolding rivalry, educational institutions resort to various forms of competition, among which a significant role is given to image.

The concept of "image" was first used in advertising practice in America in the 50s. The concept of "image" was introduced into scientific use only in the early 60s of the 20th century by K. Balding. Somewhat later, image becomes the main element of the theory and

practice of "Public Relations". The field of scientific research of image began to take shape in the early 90s of the 20th century, when the first theoretical works appeared, based on the social-perceptual approach (A.A. Bodalev), psychology of social cognition (G.M. Andreeva) and psychology of communication (A.A. Leontiev). These works contributed to the disclosure of psychological patterns of perception and understanding of a person by a person, the specifics of the formation of the phenomenon of the first impression, socio-psychological effects and mechanisms of interpersonal and intergroup perception, the study of the content of social ideas and stereotypes, mass communication processes, prepared the basis for a meaningful address to the problems of image formation of various objects. Among the first special studies in the field of image, it is worth mentioning the works of E.V. Grishunina (formation of the image of an organization), F.A. Kuzin (study of business image), E.I. Manyakina (formation of political image), B.G. Ushakov (study of image as a socio-psychological problem), I.A. Fedorov (consideration of image as a way of programming human behavior), V.M. Shepel (study of the specifics of image).

Scientific research carried out with the direct use of the category "image" in the domestic scientific literature is related to the issues of leadership and is mainly focused on the study of the image of politicians (E.V. Egorova-Gantman, E.I. Manyakina, etc.), public figures (R.F. Furs), parties and associations (A.V. Garmonova, O.A. Podgornova). Works have appeared devoted to the formation of the image of higher education teachers (G.A. Busygina, L.Yu. Donskaya), education and educational services (N.A. Kadochnikov, E.B. Karpov). Among the modern foreign authors engaged in research and practical developments in the field of forming an individual's image, it is necessary to name such specialists as P. Bird, V. Birkenbil, L. Brown, J. Bruner, P. Weil, D. Judy, F. Davis, F. Lee, M. Spillane, D. Yager, etc.; The authors of significant works devoted to the formation of corporate image (organizational image) are B. Gee, G. Dowling, J.P. Beaudoin, F. Kotler, D. Mercer, F. Rogers, L. Iaccoca.

Today, the concept of "image" has been widely used and applied in a variety of fields of knowledge. G.G. Pocheptsov characterizes image as "the most economical way of generating and recognizing complex social reality; as a result of information processing; as a condensed text; as a communicative unit through which one can work with mass consciousness".

According to E.A. Blazhnov, "image is a visual image of an object that has an emotional impact on people". The emotionality of the image requires finding special means of maintaining it: after all, emotions are bright, but short-lived.

O.V. Dancheeva and Yu.M. Shvalb emphasize that "image is a set of meanings, thanks to which some object becomes known and with the help of which people describe it in a certain way, remember it, relate to it", i.e. the authors consider image as a system of people's ideas about some object. Comparing the interpretations of the concept of "image" accepted in various fields of science, we came to the conclusion that its existing definitions differ greatly from each other, but for the most part they boil down to an image that performs certain functions (V.G. Zazykin, E.B. Perelygina, E.A. Petrova, O.A. Feofanov, etc.).

Image has become an integral part of any organization that directs its actions to the formation of a favorable image in a market economy to establish harmonious relations with the public. Universities today are not only directly connected with society, but also directly influence its development and condition.

S.A. Tangyan believes that the pedagogical and economic aspects in the activities of an educational institution in modern conditions do not exclude, but complement each other. The intensification of competition in the educational services market was a prerequisite for the formation of the concept of the image of the university. By forming the image of the university, the image of education is built, thereby forming the image of an educated person. The system of "instilling" such a worldview is possible thanks to special events that unite people in a single space, time, impulse.

In this case, the image of an educational institution is formed not for the benefit of making a profit, but for mutual understanding and interaction in the development of education and society as a whole. The concept of "image of the university" in Kazakhstan appeared recently, in the mid-90s. XX century, when it became clear that education is a service that should meet the needs of society along with many others. At this time, in addition to state institutions, this service began to be increasingly provided by commercial universities. In the 1990-2000s, theoretical justifications for the image of a university appeared, the concept of "effective image of a university" was introduced. An effective image of a university is an image in which a set of positive characteristics about the university as a whole contributes to the achievement of the main goals of the university, creates a stable associative connection between the holistic image and the PR object, and forms symbolic and publicity capital. An effective image increases competitiveness in the educational services market. It attracts applicants and faculty, the level of teaching in-

creases and, accordingly, the level of graduates increases. This facilitates the organization's access to various resources: financial, informational, human, material. The image should be purposeful and meet the expectations of consumers of educational services. When forming an effective image, it is necessary to clearly define in which direction to work, i.e. to specify what type of image to develop.

In this case, it is necessary to understand what elements the university image consists of. N.K. Moiseeva identifies 8 components in the structure of the university image.

1. The image of the educational service is people's ideas about the unique characteristics that, in their opinion, the service has. Additional services (attributes) are what provide the university with distinctive properties.

2. The image of consumers of educational services includes information about the lifestyle, social status and some personal (psychological) characteristics of consumers.

3. The internal image of the organization is the ideas of teachers and students about the university. The main determinants of the internal image are the culture of the organization and the socio-psychological climate.

4. The image of the rector of the university and the scientific council includes ideas about the abilities, attitudes, value orientations, psychological characteristics, appearance.

5. The image of the staff is a collective, generalized image of the teaching staff.

6. Social image - ideas of the general public about the social goals and role of the university in the economic, social and cultural life of society.

7. Visual image - ideas about the organization based on visual sensations that capture information about the interior of buildings, lecture halls, and the corporate symbols of the organization.

8. Business image - ideas about the organization as a subject of business activity.

Developing market relations in education have also led to the development of competition between universities. It is this that encourages educational institutions to take an active market position, improve the quality of educational services, study the demand for educational products and the needs of the labor market. Professional education institutions are well aware of the intensification of competition, and the increased demands of consumers of educational services to the university itself push the heads of institutions to use tools that help attract various groups of consumers.

It is important to emphasize that one of the sustainable competitive advantages of universities is invisible (intangible) assets, which include the image of the university, corporate culture, and organizational management structure. Public relations, in our opinion, is the function of managing an educational institution that helps establish and maintain communication, mutual understanding, disposition and cooperation between the organization (educational institution) and society. PR technologies solve various problems: they provide the organization's management with information about public opinion and help it develop countermeasures,

ensure that the management acts in the interests of the public; keep it ready for various changes by anticipating trends in advance, use research and open communication as the main means of activity. A competitive educational institution is one whose name is "on everyone's lips", it is known and distinguished from others; people strive to get a job there and pass the competition to study there, and its leader is held up as an example to everyone, because this institution provides a stable level of quality of educational services.

Thus, we can talk about the need to form publicity (publicity, openness, popularity) of the university. Publicity is formed by broadcasting information about the educational institution through the media (radio, television, print). It is important to note that the process of forming the publicity of an educational institution should be manageable, and all information that the university sends to the external environment, to one degree or another, is image-related. Image is functional. It is not an end in itself, but is needed to effectively solve the tasks set, including economic - material benefits that the educational institution will receive after attracting new consumers of services. A positive image of a university not only attracts consumers of educational services, but also broadcasts the values that the university is guided by in the process of training specialists, demonstrates the openness of the educational institution and its participation in solving economic and social problems.

Since image is a generalized portrait, it is necessary to highlight those aspects that are important for various groups of the public. Four components can be distinguished in the image of a university:

1) the image of the service - how high-quality and necessary are the educational services it provides;

2) the management and financial image - how effectively is the university managed, how optimally are the budget funds received by the educational institution and the extra-budgetary funds earned by it in the process of providing additional paid educational services and non-educational activities distributed;

3) the public image - is the university active as a "member of society", as a subject of the region, what participation does the educational institution take in solving pressing social (and often cultural) problems;

4) the image of the educational institution as an employer - how it treats its employees and teachers, how is initiative (creative and scientific) supported, what professional growth is offered, what is the salary, etc. Thus, the image of an educational institution is not only a means, a management tool, but also an object of management, accompanied by targeted information work aimed at target groups of the public.

The public is understood as a group of people inside or outside the organization, with whom the organization interacts in one way or another. Public relations exist not only at the level of the university - consumer, but much more broadly:

- university - teachers and students,
- university - government,
- university - commercial and non-profit foundations,
- university - graduates.

Today, the question of ranking public groups arises - determining the main target groups, in other words, those public groups whose assessment and attention are very important for the university.

The target group is a set of specific representatives of the audience, similar in socio-demographic characteristics, interests, purchasing power.

The target audience of educational institutions is specific, but experts divide it into external and internal.

Applicants are high school students, potential students, young people aged 17 to 28 who graduated from school or a specialized school, college or other educational institution, people wishing to get a second higher education. This category of the target audience is external.

"Today, a university is mainly chosen by parents who will pay for tuition in the future. Therefore, the advantages have to be highlighted specifically for them:

in first place - the price of services;

in second place - the comfort of study (provision of a hostel, meals, equipping the university with all modern equipment, the availability of opportunities for an active student life - clubs of interest, trade unions);

"in third place is the quality of education, the presence of a state diploma," Vershinin notes. An equally important target audience is students and the teaching staff. This type of target audience refers to the internal public. The target audience of educational institutions is usually specific - it is not only 11th grade graduates and their parents, but also people who want to get a higher, and often a second higher education.

Among the priority promotion channels for educational institutions, event-events are singled out - this is constant work with both students and employers, organizing round tables, scientific and practical conferences, seminars with the involvement of leading specialists in these areas, meetings with graduates. All this has a double effect,

firstly, this is additional information about what we need to work on, what additional specializations to introduce;

secondly, to help in the employment of students, which is a plus for the image of the educational institution.

Not only extensive promotions are very popular, but also targeted events, in particular, the participation of universities in the region in exhibitions, for example, "Education and Career". This is an additional opportunity to convey information to the end consumer, to interest potential clients.

Another way to interest future students is an open day, which allows you to inform future students about the conditions for admission, get the necessary information, see and "touch" the creations of students of this educational institution. It should be noted that the learning process in educational institutions of the region is focused on international standards: work in many educational institutions of the region is structured in such a way that the issue of the importance of attending lectures, seminars, practical classes in most cases is absent; the effectiveness of interaction with such a target audience as students depends not only on the attitude towards them, but also on informing them.

The world has long stepped into the information society, a university that supports innovations needs to use this resource. Time is a very important resource, it is necessary not only to own it, but also to manage it correctly. Will a student want to enter a university where time is not valued? Will a student want to enter this university at all, if he is treated like this? All these questions are removed when working with the public. University websites solve several problems.

Firstly, with the help of the site, visual components of the image of the educational institution are presented, and this allows broadcasting a favorable image,

secondly, the site is a channel of communication with the public and it is possible to provide a wide range of information, removing additional questions,

thirdly, the site creates a condition of interactivity, which means that the probability of a backlash from target groups is high, thanks to which it is possible to analyze the attitude of site visitors to the university, conduct sociological research.

The university positions itself with the help of the site. The site contains all the necessary information for a wide range of the public (students, parents, employers, applicants, teachers). The content of the educational institution's site varies. It may include the following information.

The university structure block is a business card. It contains information about the university management, divisions, departments, centers, educational and methodological department, library. The information block is presented by the following tabs: history of the university, today, symbols, details. The direction block reflects the main ways of the university's work: educational and upbringing work, research activities, students' research activities, intellectual property protection News: events, announcements, announcements. Updates that occur almost daily show the life and activities of the university, form a characteristic of the dynamism, modernity, mobility of the institution. Blocks with a target focus: applicants, students. A wide range of information in these areas: for applicants - entrance examinations, admission conditions; for students - this is academic work (class schedule, bells, session and intersession work schedule, schedule of individual consultations with teachers, debtors in subjects), scientific work (history and work of the Student Scientific Society, competitions), assistance in employment of graduates and students. The site forum is an interesting, and most importantly, popular platform for professional

communication. This is a platform for exchanging opinions, answers to user questions, feedback from students and graduates. The university, using the Internet, gets a unique tool for creating sustainable relationships with its community both inside it and in the external environment. Internet capabilities make it possible to take into account the individual interests of the mass consumer or the interests of an active group of the public in real time.

Thus, reforming one of the elements of the social system, namely education, affects not only the further development prospects of this area, but also the use of new strategies by higher education institutions in the field of providing educational services, positioning the university. The formation of an effective image of a higher education institution and its maintenance affects not only the strengthening of its position in the local market of educational services, but also, in general, allows one to testify to the level of development of education in the region and in the country, which significantly affects the image of education.

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*Aimova M.Zh.**Associate Professor of the Department of
Natural Sciences of the Yessenov University***THE ROLE OF THE TEACHER'S PERSONALITY IN THE EDUCATIONAL PROCESS****Abstract:**

The article examines the personality of a teacher as a specialist characterized by the following qualities: professionalism, pedagogical culture, pedagogical mastery, professional and pedagogical competence. Professionalism is an integrated quality of a teacher's personality, the result of his pedagogical activity, the ability to productively and competently solve social, professional and personal problems. Pedagogical culture is the highest manifestation of a teacher's professionalism. It covers the following components: scientific erudition, general culture, pedagogical thinking, pedagogical ethics, speech culture, communication culture, spiritual wealth. Pedagogical culture should be formed purposefully and constantly developed, since it ensures the improvement of the educational process and self-improvement of each teacher.

Key words: *communicative activity of a teacher, pedagogical process, pedagogical activity, skill, requirement, subjective pedagogical reality, teacher's speech, professional pedagogical activity, professional competence of a teacher, pedagogical system, knowledge, teacher, learning activity, educational process, educational space, changing world, communicative activity.*

"If the educator turns out to be deaf and dumb to the legitimate demands of the time, then he himself will deprive his school of vitality" K. D. Ushinsky.

The modern paradigm of education presupposes a rethinking of the tasks of the entire education system, both general secondary and vocational. Without this, any reforms and innovations will be deliberately unsystematic, local and fragmentary. It is safe to say that new trends in determining the nature and role of the development of the education system are global, philosophical in nature and coincide not only at the level of European countries, but also the entire world community. More than a hundred years ago, one of the most famous naturalists of his time, Thomas Huxley, defined education as the study of the rules of the game called "life". Education, according to these rules, meant the ability to live according to the laws of nature, and nature, in turn, included in his view a person in his relationships with other people, with the living and non-living environment.

Thomas Huxley wittily noted that if a child's future well-being depended on his ability to play chess, there would hardly be any parents who would allow their child to grow up without ever learning to distinguish a bishop from a pawn. Huxley's metaphor is quite applicable to modern educational requirements, where the main rule is to teach how to learn, to teach how to be prepared for the conditions of a rapidly changing world. The need to develop the ability to learn fundamentally changes the nature of the relationship between teacher and student, allows us to take a new look at the optimization of the educational process and rethink existing methods of teaching certain disciplines.

Well begun is half done — says the English proverb. The leading role, of course, is given to the teacher. Professionalism and skill have always been associated with the ability to teach. Today, educational activity, like everything else in this world, has undergone significant changes. Among the many types of teacher activity, teaching is undoubtedly the leading

one. It is no coincidence that the word "teacher" in its original meaning is someone who teaches, instructs. In the context of high rates of development of science, technology, information flows, educational activity has undergone serious changes compared to what it looked like even a decade ago.

Firstly, the teacher has ceased to be the only source of new knowledge for students. Today, he has many assistants and competitors — computers, television, the Internet, an information-rich environment.

Secondly, society has changed its idea of the goals and results of education. Education today is no longer limited to the ability to reproduce acquired knowledge and, moreover, is not identified with "multi-knowledge" or erudition, but presupposes competence in many areas. This is the ability to select from the array of knowledge that which will help to conduct independent research and solve problems and, accordingly, obtain missing knowledge, and the ability to evaluate the environmental, social, moral consequences of technological projects that are created on the basis of the studied science, i.e. to do what specialists today call a humanitarian examination. It is easy to assume that since the product of training changes qualitatively, the activity of training itself undergoes significant changes.

The organizational function of the teacher in the learning process begins to prevail over the informational and communicating one. In other words, the way of mastering it depends on the culture of society. If modern culture is characterized by intensity, life based on scientific achievements, information saturation, creativity in solving problems, then these features are also inherent in the process of introducing a person to the world of culture - learning. In order to master the activity of learning at a professional level, the teacher himself must be a professional in his field. The communicative and didactic competence of the teacher is manifested in a number of characteristics of his activity.

The teacher is the organizer of the pedagogical process, constantly interacting with students and colleagues. All this imposes great responsibility on him, great demands are made on him. A successful teacher is distinguished by the ability to create a situation of communication in the lesson and outside it - i.e. to build relationships based on empathy. Achieving a new quality of work of a teacher, designated by the concept of competence, is ensured by mastering the orientation basis of professional and pedagogical activity (orientation towards the competence type of pedagogical decisions, possession of experience in designing and implementing highly effective pedagogical technologies).

The teacher's competence is achieved by forming a holistic image of this activity in his/her consciousness, due to which the implementation of system-forming pedagogical actions is ensured, the basis of which are the following three:

- designing the content of the educational process based on the correlation of the educational standard and the real situation of development of students;
- implementation of various models of assimilation of socio-cultural experience - reproduction, action on orientation, co-creation, experience and extraction of "living" knowledge, reflection of one's own experience and construction of life dispositions;
- placing students in the position of subjects of the educational process with an orientation towards the most complete manifestation of subjectivity, taking into account the given age and social situation of development of the participants in the process. The discrepancy between the new professional functions of teachers and the traditional model of their training (identity crisis) is especially acute in cases where new areas and tasks of professional and pedagogical activity are not supported by the corresponding scientific and substantive-methodological base.

A modern teacher needs:

- orientation in a rapidly changing world and the dimensions that occur in education, in its new priorities;
- an idea of the reconstruction of the educational field taught by him in the direction of key competencies;
- real skills in the use of project, computer and communication technologies;
- orientation towards the student with his characteristic selectivity, desire to receive informal preparation for a life career;
- assimilation of modern methodological culture, erudition, "not fixation" on his subject.
- development of his own teaching system, which will make him competitive in the educational services market.

Speaking about the decisive importance of the teacher for any pedagogical success, we do not have studies that clearly answer the question: what is the teacher's contribution to the pedagogical process? Contribution is understood as the role, the function performed by the personal and professional sphere of the teacher, the world of his reality. It is absolutely clear

that the diversity of "pedagogical realities" is determined precisely by the active position of the teacher, since the instructions coming from outside - standards, "technologies", as a rule, are common to everyone.

Subjective pedagogical reality is:

1. an ideal form of existence in the teacher's consciousness of pedagogical tasks and means of their solution;
2. a project of a pedagogical system that implements his author's plan;
3. a system of professional and personal reflection of the teacher. The value of this concept lies in its important methodological functions:
 - explanatory - indicates the sources of pedagogical successes and failures;
 - project-managerial - reveals the conditions for designing pedagogical systems;
 - educational - any element of the educational content must pass through the subjective pedagogical reality of the teacher, be enriched by it, acquire a form in which it can be learned.

The specificity of pedagogical activity, its unique goal, consists in creating the world of another person, in creating another subjective reality. In reality, a teacher for a student is not just one of the conditions for his development along with others. He is the very basis for the emergence of the student's subjectivity. This integrity exists as a key idea, a concept of the pedagogical system.

From this position, the famous saying of K. D. Ushinsky is understandable: "It is not experience that is transmitted, but a thought derived from experience." As a subject of communicative activity, a teacher constantly performs various actions. With the help of pedagogical communication, an environment with given characteristics of relationships and interactions is created in the educational space.

The communicative activity of a teacher is aimed at transmitting educational information, recreating pedagogical relationships, ensuring the interaction of the "consciousnesses" and "psyches" of the participants in the pedagogical process. There are three main types of motives for the communicative activity of a teacher:

- business;
- cognitive;
- personal.

The communicative activity of a teacher can act as part of pedagogical communication, providing its information basis, but can also remain a completely independent type of professional activity.

The main mission of a teacher as a subject of communicative activity is to use and create information flows, manage them within the educational space.

The main component of a teacher's activity is communication, therefore oral speech is an important element of professional skill. All verbal teaching methods are based on the teacher's speech. There is no doubt that the culture of speech is very important for a teacher. And the oral and written speech of a teacher must meet certain requirements:

- the first requirement is the correctness of speech.
- the second requirement for a teacher's speech is its richness.

- the third is accuracy and clarity.
- the fourth is brevity and conciseness.
- the fifth is the emotionality of speech. Emotionality is not an "decoration", but a necessary working element.
- the sixth is the use of lexical means of expression.

In developing the teacher's speech skills, speech technique is of great importance. The poverty of the pitch range of the teacher's speech leads to monotonous sound, impoverishment of the sound palette, and weakening of the pedagogical impact of speech. It was not by chance that A. S. Makarenko associated a high level of pedagogical skills with perfect mastery of vocal means. He believed that one can become a real master only when one learns to pronounce the phrase "Come here" with 15-20 sound shades. Summarizing the above.

The professional competence of a teacher can be defined as the ability to bring his way of life, the core of which is professional work, into line with the image of the world as a holistic and systemic-semantic reality, representing the world in which he lives and acts. Based on the fact that professional education provides the opportunity to manage the education of the future, develop the ability to quickly and clearly respond to the needs of the constantly changing market, the thesis that a modern specialist must necessarily possess a number of professional and personal qualities, united by the concept of "quality formula", is being implemented in the world system of professional training. Japanese researchers include morality, intelligence, skill, and perfection in this formula.

According to Lester Thurow, knowledge and professionalism are today becoming the only source of

long-term sustainable competitive advantage, since everything else falls out of the equation of competition; but knowledge can only be used through the qualification of individuals.

Professional competence of a teacher is a complex individual-psychological formation based on the integration of experience, theoretical knowledge, practical skills and significant personal qualities, which determines the teacher's readiness for the actual performance of pedagogical activity. At the same time, pedagogical professionalism is associated, first of all, with a high level of self-realization of individual characteristics, with an individual style, an individual style of activity.

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THE IMAGE OF MODERN EDUCATION

Abstract:

The article focuses on the issue of shaping and promoting the image of modern education treated as a complex system of educational processes and space perception by various audiences, as an abstract construct revealing itself in specific images of various institutions and actors of the system. The authors analyze these actors' and institutions' potential and their role in forming the image of modern education.

Key words: *education, educational services, image, image making, a social institution image, reputation, brand, social communication, integration of communications.*

In modern conditions, the area of responsibility of the education sphere has expanded to the maximum. Education today solves a number of problems of social development, traditionally belonging to the sphere of family education or state policy. This is a universal tendency, common to the European civilization paradigm, which takes socially significant values out of those established externally (state, media, etc.) and at the same time weakens the natural mechanisms of cultural transmission. Accordingly, society faces the problem of developing new social models of development that meet the challenges of modern times "both in relation to the rapidly changing anthropological reality and in the context of new challenges of a socio-economic and geopolitical nature" [1]. In this context, it is appropriate to raise the question of the image of modern education - does it correspond to public expectations and the pedagogical practice itself?

An image is a stereotypical, emotionally charged image of a person, organization or social institution, formed under the influence of many internal and external factors: the resources of the image object itself, the situational context, information campaigns, opinion leaders, mass media and leadership. As for the image of education, it is a complex phenomenon formed by a set of heterogeneous factors. For example, the historically established leadership of leading British universities leaves a bright positive imprint on the image of the entire British education system. "The image of education can be improved through association with personal (personality) and local (territory, building, cultural object) brands" [2].

When it comes to the image of education, we must take into account the influence of the maximum number of factors relevant to this process. Education is an investment in the future, both personal and national. A positive future is the main theme of image communications in the field of education. Let's consider what factors are significant for applicants when choosing a university and are emphasized in communications.

In the era of information technology, an important factor in the attractiveness of an educational institution is the scale of use of modern - primarily computer - technologies, wide opportunities for access to the Internet, multimedia equipment of the educational

process. Therefore, in advertising materials we often see students using computer civilization technologies. The everyday environment of the educational service is also important - dormitories and other everyday amenities. For a modern applicant, a demonstration of healthy lifestyle opportunities is also important: sports grounds, halls, exercise machines, etc. Factors such as the level of the teaching staff and teaching, the complexity of training are not removed from the agenda. It is worth noting that if at the dawn of the computer revolution it was the technical, technological, and innovative factors that came to the forefront for applicants in comparison with the classical factors of prestige and level of teaching, then at present the situation has begun to change in favor of the latter. It is increasingly difficult to surprise applicants with technologies, while the status of the university, the prestige of the diploma, and the human factor of the teaching staff remain enduring values.

The leading motives for schoolchildren to enter universities include: obtaining a higher education diploma, obtaining a profession that guarantees a source of income and interesting work upon graduation. Thus, it can be said that by purchasing an educational service, an applicant invests in a higher social status and quality of life.

In order to successfully form the image of education and an educational institution, it is necessary to understand the specifics of its communications. Unlike administrative-political and commercial structures, everyone takes part in the communications of an educational institution, for example, a university: the administration, technical staff, teaching staff and students. If business structures strive to regulate communications as much as possible, then in universities this is hardly possible, but their communication potential is much higher. Teachers, by status, are obliged to conduct scientific, educational, and in some universities, marketing work. They publish monographs and articles in journals, speak at conferences and seminars, organize extracurricular work for students, participate in grant competitions and advanced training programs, conduct presentations of the university and educational programs for applicants. Students must do all the same at the student level. The same applies to schools.

Observations and analysis of organizational communications show that in most observed cases - and not only in the field of education, but in any organizations - the elements of these structures involved in marketing and social communications act to a greater or lesser extent in isolation. For example, the advertising department, the press service, corporate media and other communications units may have a poor understanding of each other's activities. Such a situation does not have the best effect on the image. Integration of communications can contribute to improving the image of education and a specific educational institution (university, school). It allows achieving a systemic effect. A systemic effect is achieving communication goals with less expense. In our case, this is improving the image of the university and increasing its popularity among target audiences.

What organizational steps must be taken to achieve a systemic effect? The largest companies have long realized that the status of the person responsible for corporate communications should be as high as possible. This position is often called "director of corporate communications". He reports directly to the first person - the executive director of the company, and all communication structures report to him. In a university, this is the level of the vice-rector. Without such a structural link, integration is impossible: too many departments and individuals of the university are engaged in communications.

One of the laws of PR is: "celebrities add up". The more celebrities and beautiful legends you associate with your institution or project, the brighter its image will be. The law of universal gravitation of images is a phenomenon that is difficult to explain rationally [2]. Images of great personalities are an important resource for image formation in the field of education.

Meanwhile, improving the image of modern education is not only possible, but also necessary. This requires targeted, methodical efforts at all levels, the formation and implementation of a strategic state policy in the field of education and its information support. This is not only about communication activities - about PR of the education system, about films and books that form a positive image of the school, university, teacher. It is about comprehensive support of the education system by the state, since the image of modern education is largely formed by a modern material base, high social status and a decent standard of living for the teacher.

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THE ROLE OF THE STUDENT SCIENTIFIC CLUB IN THE SCIENTIFIC DEVELOPMENT OF STUDENTS

Abstract.

The development of the scientific potential of young people is always a priority and one of the important tasks of education. Studying in higher education institutions provides students with new opportunities that may not always be available during secondary education. The development and promotion of the scientific and research potential of students of higher educational institutions of Ukraine can be organized through the activities of student scientific societies, circles or other associations.

In order to increase the level of scientific interest, the "Student Scientific Society" was created at the Bukovyna State Medical University, which unites students interested in active scientific activity from various faculties and departments of the educational institution. The work of the student scientific society of the Department of Medical and Pharmaceutical Chemistry of the Faculty of Medicine and Pharmacy of the Bukovyna State Medical University is organized in such a way as to create favorable conditions for students wishing to engage in scientific research activities at the department. To this end, both scheduled and extraordinary events are held, in which all members of the student scientific society and research leaders participate.

Keywords: *student, student scientific society, scientific research work, research work, Bukovyna State Medical University.*

Introduction. A Student Scientific Society (SSS) is a voluntary association of students interested in and engaged in scientific research within a separate department or faculty of higher education institutions.

Students' research work is one of the means of improving the quality of training specialists in research activities. Involving students in research work contributes to the formation of a number of creative characteristics in them, in particular, interest in scientific creativity, develops creative thinking, scientific independence, self-organization, a conscious attitude towards learning, deepening and consolidating the knowledge gained during training, and the opportunity to test theoretical knowledge in practice.

That is why the Department of Medical and Pharmaceutical Chemistry of the Faculty of Medicine and Pharmacy of the Bukovyna State Medical University (BSMU) has a scientific research center for pharmacy students, within which students have the opportunity to work in various research areas of the department.

The purpose of this work: to investigate the influence of the work of the student scientific society on the formation of scientific interest of students of the Faculty of Medicine and Pharmacy of the Bukovyna State Medical University.

The main research material. General provisions on the activities of the Student Scientific Society of the Bukovyna State Medical University are defined in Appendix 2 to Order 297-Adm "Regulations on the Student Scientific Society of the Bukovyna State Medical University". From the main provisions, it is important to note that SSS is an independent, non-profit, voluntary association of University students who are interested in scientific problems of medicine and have the ability for creative, organizational and research work. The Student Scientific Society was created to protect the rights and interests of young scientists regarding

scientific activities, support science-intensive ideas, innovations, and knowledge exchange.

Also, at the legislative level, the activities of the SSS are carried out in accordance with the Constitution of Ukraine, the Laws of Ukraine "On Higher Education", "On Associations of Citizens", regulatory documents of the Ministry of Education and Science of Ukraine and the Ministry of Health of Ukraine, in accordance with the Charter of the University and on the basis of the Regulation on the SSS.

The main goal of the student scientific society is to protect the rights and interests of students regarding issues of scientific activity, support for science-intensive ideas, innovations and knowledge exchange, consolidation and comprehensive promotion of scientific, inventive and other creative activities of students of the University.

The main task of the SSS is to encourage and support independent research work of students; to assist in creating conditions for the disclosure of the scientific and creative potential of students; to support talented student researchers, providing them with comprehensive information assistance; to develop cooperation between young scientists; organizing students' participation in research projects, scientific grants, competitions, problem seminars, internships; promoting the formation of a holistic personality of a researcher, a modern scientist with a broad democratic worldview.

The directions of SSS activity are formed at each department individually, based on the research topics of the department or the scientific interests of individual employees of the department, the faculty of BSMU, or directly the scientific interests of students, which can be implemented in the research activities of the department. Accordingly, the department approves the SSS work plan, which is presented to students who wish to participate in scientific research. Students can present

their achievements at conferences, forums, round tables, or SSS meetings.

Any student of the Faculty of Medicine and Pharmacy of BSMU who has expressed a desire to participate in the scientific and research activities of the department can become a member of the student scientific circle of the Department of Medical and Pharmaceutical Chemistry. Meetings at the department are held in accordance with the SSS work plan. Direct scientific research work of students takes place according to a separately established schedule with the supervisors of this work. In addition to the already planned SSS events, round tables are also held to discuss or highlight relevant and interesting information of the members of the society. Such events are managed by the head of the SSS and teachers who are the leaders of scientific research of the members of the society. For quick communication, the head of the student scientific circle created a Telegram channel, where information is exchanged between all participants of the student scientific society of the department.

Students are introduced to the scientific areas of the department by the head of the student scientific group of the department. Students who are interested in scientific activities and express a desire to participate in the scientific and research activities of the department apply for membership in the scientific association of the department.

During the 2024-2025 academic year, 177 I-V year students studied at the Faculty of Medicine and Pharmacy. Of these students, only 27 are active members of the student scientific circle of the department, who conduct scientific research at the department. Of these, 1 was a fifth-year graduating student who was the head of the student scientific group and had been performing his duties since the second year. Another 15 students were only listeners of the student scientific group and only participated in scientific seminars according to the group's work plan. 15 students participated in the preparation and holding of such scientific events as "Chemical Picnics" dedicated to the Day of Science and the Day of Chemist. 5 students are currently conducting research work at the department. Among all students of the Faculty of Medicine and Pharmacy, a total of 35 students showed a desire to engage in scientific activities, but due to lack of time, the number of student researchers is significantly smaller.

Regarding the wishes for organizing scientific work at the department through a student scientific circle, students expressed a desire to work on topics that

do not involve experimental research. Therefore, since last year, the department has begun working on studying the possibilities of applying artificial intelligence in the educational process and has begun to conduct theoretical research using programs for mathematical planning of experiments and modeling and design of biologically compatible compounds with specified characteristics, in particular, antimicrobial properties.

According to the results of the work of the student scientific circle of the Department of Medical and Pharmaceutical Chemistry for the 2024-2025 academic year, a total of 7 works were published, including 2 articles and 5 scientific theses at international conferences. 12 students of the circle were involved in participating in the prepared materials. 2 students of the circles gave an oral report at the scientific conference "Lviv Chemical Readings - 2025".

Conclusions. Such organization of the work of SSS at the Bukovina State Medical University creates favorable conditions for the development of the scientific and research potential of students and, accordingly, their development and establishment of scientific interest, potential, knowledge and skills, the desire to continue research work by studying in graduate school, working in departments, and in general, the formation of new generations of scientists. It is important to remember that it is by their own example that the department's teachers promote a desire for research work among students and encourage them to engage in this type of activity while studying at the institution.

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ПОЛУЧЕНИЕ И ПРИМЕНЕНИЕ ФУНКЦИОНАЛЬНЫХ НАНОМАТЕРИАЛОВ

Qambarova Muhayyokhon Sodiqjon qizi

Intern Researcher, Nanotechnology Development Center, National University of Uzbekistan named after Mirzo Ulugbek

SYNTHESIS AND APPLICATION OF FUNCTIONAL NANOMATERIALS

Qambarova Muhayyoxon Sodiqjon qizi.

Mirzo Ulug'bek nomidagi O'zbekiston milliy universiteti Nanotexnologiyalarni rivojlantirish markazi stajiyor tadqiqotchisi

FUNKSIONAL NANOMETRIYALARNI OLISH VA QO'LLANISHI

Аннотация.

В статье рассматривается синтез функциональных наноматериалов современными методами и их применение в энергетике, медицине, экологии и сенсорных технологиях. В частности, анализируется взаимосвязь структуры и свойств наноматериалов, полученных с использованием таких технологий, как «зелёный» синтез, золь-гель метод и химическое осаждение из паровой фазы (CVD). В исследованиях установлены высокая поверхностная активность, антибактериальная и электрохимическая эффективность функциональных материалов, таких как диоксид титана (TiO₂), графен и углеродные нанотрубки. Отмечена экологическая безопасность и экономическая целесообразность метода «зелёного» синтеза, а также раскрыт потенциал таких материалов для применения в суперконденсаторах, солнечных батареях, биосенсорах и антибактериальных покрытиях. Статья предлагает комплексный подход на основе современных исследований, проводимых на стыке материаловедения и инженерных наук, к созданию передовых технологий на основе функциональных наноматериалов.

Abstract.

This article examines the synthesis of functional nanomaterials using modern methods and their applications in energy, medicine, ecology, and sensor technologies. In particular, it analyzes the structure–property relationships of nanomaterials obtained through technologies such as green synthesis, sol–gel, and chemical vapor deposition (CVD). The studies have revealed high surface activity, antibacterial, and electrochemical efficiency of functional materials such as titanium dioxide (TiO₂), graphene, and carbon nanotubes. The ecological safety and economic feasibility of the green synthesis method are highlighted, along with the potential of such materials for use in supercapacitors, solar panels, biosensors, and antibacterial coatings. The article proposes a comprehensive approach, based on modern research conducted at the intersection of materials science and engineering, to the development of advanced technologies utilizing functional nanomaterials.

Anotatsiya.

Funksional nanomateriallarni zamonaviy usullar asosida sintez qilish va ularning energetika, tibbiyot, ekologiya hamda sensor texnologiyalaridagi qo'llanilishi maqolada o'rganiladi. Xususan, yashil sintez, sol-gel, kimyoviy bug' fazasida cho'ktirish (CVD) kabi texnologiyalar orqali olingan nanomateriallarning struktura-xususiyat bog'liqligi tahlil qilinadi. Tadqiqotlarda titanium dioksid (TiO₂), grafen, karbon nanonaychalar kabi funksional materiallarning yuqori sirt faoliyati, antibakterial va elektroximik samaradorligi aniqlangan. Shuningdek, yashil sintez usulining ekologik xavfsizligi va iqtisodiyligi qayd etilib, bunday materiallarning superkondensatorlar, quyosh panellari, biosensolar va antibakterial qoplamalardagi potentsial imkoniyatlari yoritilgan. Maqola, funksional nanomateriallar asosidagi ilg'or texnologiyalarni yaratishda materialshunoslik va muhandislik fanlari chorrahasida olib borilayotgan zamonaviy tadqiqotlarga tayangan holda, kompleks yondashuvni taklif etadi.

Ключевые слова: нанотехнологии, функциональные наноматериалы, «зелёный» синтез, биосенсоры, накопление энергии, TiO₂, углеродные нанотрубки, золь-гель, CVD.

Keywords: nanotechnology, functional nanomaterials, green synthesis, biosensors, energy storage, TiO₂, carbon nanotubes, sol–gel, CVD.

Kalit so'zlar. Nanotexnologiya, funksional nanomateriallar, yashil sintez, biosensolar, energiya saqlash, TiO₂, karbon nanonaychalar, sol-gel, CVD.

Kirish (Introduction) Nanotexnologiyalar bugungi kunda turli sohalarda innovatsion yechimlarni taqdim etishda muhim o‘rin egallamoqda. Funksional nanomateriallar o‘zlarining yuqori sirt maydoni, fizik-kimyoviy faolligi va modifikatsiya imkoniyati bilan sanoat, energetika, tibbiyot, qishloq xo‘jaligi va ekologiya yo‘nalishlarida keng tatbiq etilmoqda. Ularning tarkibi va morfologik xususiyatlarini nazorat qila olish imkoniyati bu materiallarni aniq vazifalar uchun moslashtirishga zamin yaratadi.[1, 2]

Zamonaviy ilmiy tadqiqotlar, ayniqsa TiO₂, ZnO, grafen, karbon nanonaychalar, perovskitlar kabi materiallarning xossalari chuqur o‘rganishga qaratilgan bo‘lib, ularning energiya saqlash tizimlari, biosensolar, quyosh elementlari va antibakterial qoplamalarda qo‘llanish imkoniyatlarini kengaytirmoqda. Masalan, yashil sintez texnologiyalari yordamida o‘simlik ekstraktlari asosida ekologik xavfsiz usullar bilan nanomateriallar ishlab chiqarish bo‘yicha dolzarb ishlanmalar amalga oshirilmoqda.[1, 3]

Asosiy qism. Yashil sintez usuli ekologik xavfsiz, toksik bo‘lmagan va energiya jihatdan tejamkor yondashuv sifatida keng tarqalmoqda. Ushbu tadqiqotda *Globularia alypum* o‘simligi barg ekstrakti yordamida TiO₂ nanomateriallari biosintezi amalga oshirilgan. Buning uchun barg ekstrakti turli hajmlarda Ti-butoksidga qo‘shilib, 60 °C haroratda 4 soat aralastirilgan va so‘ngra 20 soat davomida inkubatsiya qilingan. Hosil bo‘lgan cho‘kma 150 °C da quritilib, 500 °C da 2 soat davomida kalsinatsiya qilingan.[2, 4]

Tadqiqot o‘rganilganligi va natijalari (Results)

Milliy Universitet Fizika-mikroelektronika instituti olimi **Shavkat Yuldashev** rahbarligida amalga oshirilayotgan ilmiy loyihalar mavjud. Ular tarkibiga quyidagilar kiradi:

2D nanochakan chalcogenide birikmalari,

Spintronics (GaMnAs, Si:Mn, ZnO doplangan o‘ta magnit yarimo‘tkazgichlar) [5]

2022-yilda nashr qilingan sharh maqolasida O‘zbekiston olimlari o‘z ichiga Sol-gel metodidan foydalangan holda nanomateriallar, poroz materiallar va gidroksidli oksidlar hosil qilish bo‘yicha faol ish olib borayotganliklari qayd etilgan. Bu usul past haroratlarda chiqadi va yuqori tozalik, gibril sifatini ta‘min-

laydi. Xususan, poroz strukturalar yordamida suv tozalash uchun fotokatalitik materiallar ishlab chiqilmoqda. Ushbu tadqiqotlar Samarkand davlat universitetida Prof. Nasimov A.M., Abdurakhmanov E. va Keyingi Materiallar Ilmiy-Tadqiqot markazlari tomonidan amalga oshirilmoqda.

Mazkur tadqiqotlar quyidagilarni o‘z ichiga oladi:

- Silika-polimer gibril nanokompozitlarini sol-gel usuli yordamida yasash va mos sensor qoplamalarga aylantirilishi;

- Poroz (hierarchik) tuzilmali metall oksidlar (Zn, Ti, Zr, Ni) bilan organosilikon matrics kombinatsiyasi orqali suvdagi organik iflosliklarni fotodegradatsiya qilish;

Perovskit bo‘lmagan yuqorilik energiyali batareyalar uchun anod-katod materiallar sintezi, shuningdek yuqori o‘tkazuvchan shisha-seramik nanokompozitlar ishlab chiqish.[6]

O‘rganilgan adabiyotlar asosida turli usullar orqali sintez qilingan funksional nanomateriallarning tarkibi, morfologiyasi, fazaviy strukturasi va funksional xossalari aniqlab chiqildi. Quyida asosiy natijalar bayon etiladi:

Globularia alypum o‘simligi barg ekstrakti asosida sintez qilingan TiO₂ nanomateriallar XRD tahlili orqali **rutile fazasi** mavjudligi bilan aniqlangan. Kristallik darajasi yuqori bo‘lgan zarrachalarning o‘lchami ekstrakt hajmiga bog‘liq tarzda 10–25 nm oralig‘ida bo‘lgan

Ushbu tadqiqotlarda ko‘rsatilganidek, turli sintez usullari orqali olingan funksional nanomateriallarning struktura va xossalari ularning qo‘llanilish sohasiga bevosita ta‘sir ko‘rsatadi. Ayniqsa, **yashil sintez** texnologiyasi ekologik jihatdan xavfsiz, arzon va biosamarador materiallar olishda dolzarb hisoblanadi. *Globularia alypum* barg ekstrakti asosida olingan TiO₂ zarrachalarida kuzatilgan yuqori darajadagi antibakterial faollik — o‘simlik ekstraktidagi biologik faol moddalarning samarali rol o‘ynaganini ko‘rsatadi.

TiO₂ zarrachalarining **Escherichia coli** va **Bacillus cereus** bakteriyalariga qarshi ta‘siri **1, 5 va 10 µg/ml** konsentratsiyalarda baholangan bo‘lib, antibakterial ta‘sir miqdori ortishi bilan mutanosib ravishda kuchaygani kuzatildi. Quyidagi **jadval** va **diagrammada** bu bog‘liqlik yaqqol ko‘rsatilgan:

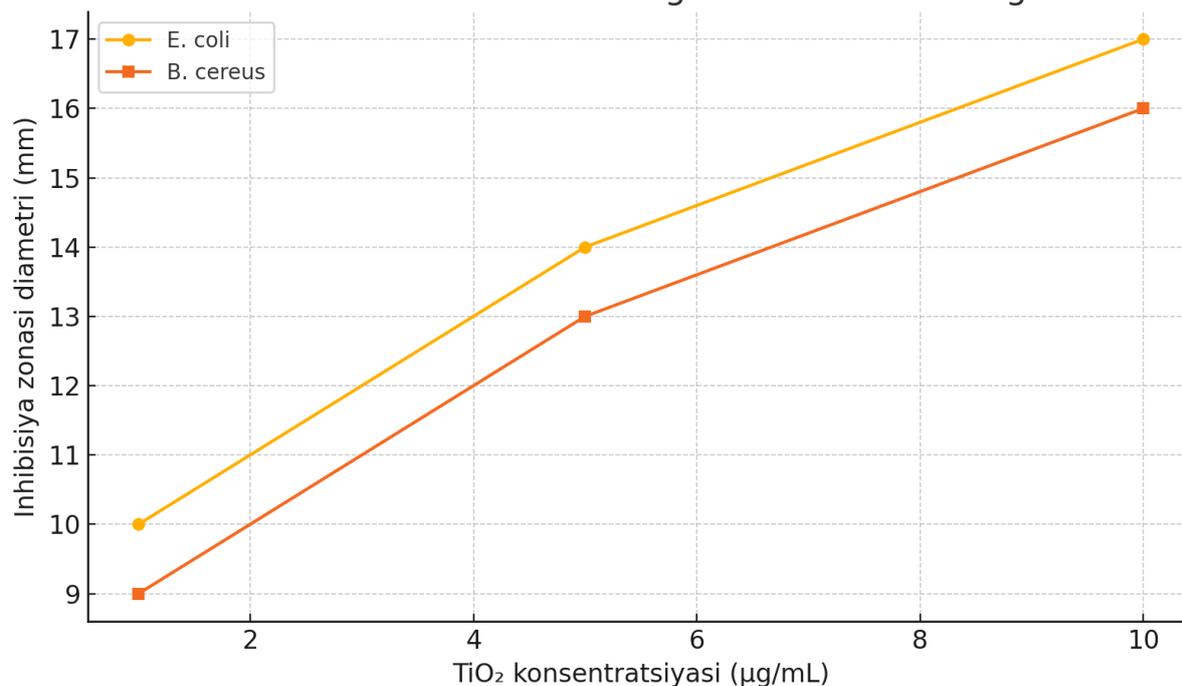
TiO ₂ antibakterial faolligi			
	TiO ₂ konsentratsiyasi (µg/ml)	Escherichia coli (mm)	Bacillus cereus (mm)
1	1	10	9
2	5	14	13
3	10	17	16

Tahlildan kelib chiqqan xulosalar quyidagicha:

- 10 µg/ml konsentratsiyada **E. coli** ga nisbatan maksimal inhibitsiya zonasi **17 mm**, **B. cereus** uchun esa **16 mm** ni tashkil etgan.

- 5 µg/ml konsentratsiyada ham sezilarli antibakterial ta‘sir mavjud bo‘lib, bu konsentratsiyalarda ham bakteriyalarning o‘shida to‘xtash kuzatilgan.

- Past konsentratsiyada (1 µg/ml) esa faollik darajasi sezilarli darajada past bo‘lgan, bu dozaga bog‘liq ta‘sirni isbotlaydi.

TiO₂ nanozarrachalarining antibakterial faolligi

Bundan ko‘rinib turibdiki, biosintezlangan TiO₂ zarrachalari nafaqat optik va morfologik afzalliklarga ega, balki biologik faollik nuqtai nazaridan ham tibbiy va sanitariya sohaslarida keng qo‘llanishi mumkin.

Shuningdek, **sol-gel** usuli bilan olingan poroz va gibrid nanomateriallar yuqori yuzasi va sirt faolligi tufayli fotokatalitik reaksiyalarda yuqori samaradorlik namoyon etmoqda. Bu esa ekologik tozalash texnologiyalarida, xususan, suvdagi organik iflosliklarni yo‘q qilishda amaliy ahamiyatga ega. CVD texnologiyasi orqali olingan grafenli plyonkalar esa elektr o‘tkazuvchanlik va shaffoflik jihatidan elektronika va quyosh batareyalari uchun istiqbolli material hisoblanadi.

O‘zbekistonda olib borilayotgan tadqiqotlar ham bu natijalarni mustahkamlab, ilmiy-amaliy yechimlarga olib kelmoqda. Sol-gel va CVD usullarida qo‘llanilayotgan kompozitlar, shuningdek, biologik asosli sintez usullari materiallar fanida yangi bosqichni boshlab bermoqda.

Xulosa. Ushbu tadqiqotda turli sintez usullari, jumladan yashil sintez, sol-gel va CVD texnologiyalari asosida olingan funksional nanomateriallarning tarkibiy, morfologik va funksional xossalari tahlil qilindi. Natijalar shuni ko‘rsatdiki:

- **Yashil sintez** orqali olingan TiO₂ zarrachalari yuqori antibakterial faollik, ekologik xavfsizlik va iqtisodiy samaradorlik bilan ajralib turadi.
- **Sol-gel** texnologiyasi poroz tuzilmali, yuqori faollikka ega metall oksid nanokompozitlarini yaratishda istiqbolli usul hisoblanadi.

- **CVD** texnologiyasi yordamida yuqori o‘tkazuvchan, shaffof va mustahkam grafenli materiallar olish mumkin bo‘lib, ular quyosh batareyalari, sensorlar va nanoelektron qurilmalarda muhim o‘rin tutadi.

Foydalanilgan adabiyotlar

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PHYSICAL AND MATHEMATICAL SCIENCES

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РЕШЕНИЯ ТРИГОНОМЕТРИЧЕСКИХ ЗАДАЧ БЕЗ ИСПОЛЬЗОВАНИЯ ТРИГОНОМЕТРИЧЕСКИХ ФУНКЦИИ (ИЛИ ЛЕГКИЙ СПОСОБ РЕШЕНИЯ ТРИГОНОМЕТРИЧЕСКИХ ЗАДАЧЕЙ).

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SOLVING TRIGONOMETRIC PROBLEMS WITHOUT USING A TRIGONOMETRIC FUNCTION (OR AN EASY WAY TO SOLVE A TRIGONOMETRIC PROBLEM).

Аннотация:

Тригонометрические задачи можно решить не используя тригонометрических функций. Для этого надо его изменить не с помощью круга который разделён на несколько частей (360° градусов) (транспортер – измерительный прибор), а с помощью прямоугольного треугольника (измерительный прибор) который даёт значение $\operatorname{tg} A$ (тангенс A) угла, при таком измерение углов оно даёт легко решить любые тригонометрические задачи. Для решения задачи используется всего лишь три формулы: 1) теорема Пифагора. $c^2 = a^2 + b^2$. 2) сумма отрезков $a = a_1 + a_2$. 3) новый вид измерения углом $b = \angle A \cdot a$. здесь c , a , b – стороны треугольника $\angle A$ угол между сторон.

Abstract:

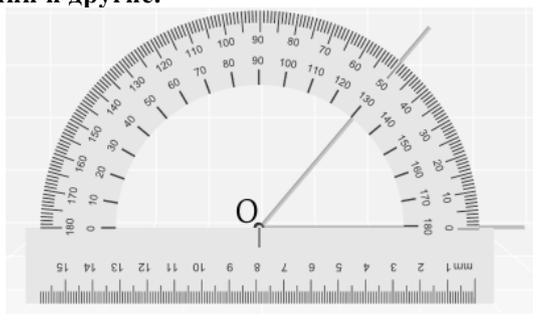
Trigonometric problems can be solved without using trigonometric functions. To do this, it must be changed not by using a circle that is divided into several parts (360° degrees) (conveyor – measuring device), but by using a right triangle (measuring device) which gives the value tg (tangent A) of the angle, with this angle measurement it makes it easy to solve any trigonometric problems. Only three formulas are used to solve the problem.: 1) the Pythagorean theorem. $c^2 = a^2 + b^2$. 2) the sum of the segments $a = a_1 + a_2$. 3) a new type of measurement angle $b = \angle A \cdot a$. here c , a , b are the sides of the triangle $\angle A$ is the angle between the sides.

Ключевые слова: простой способ решения тригонометрических задач без использования тригонометрических функций.

Keywords: a simple way to solve trigonometric problems without using trigonometric functions.

Тригонометрия.

Тригонометрия используются в таких областях как медицина, анализ финансовых рынков, теория вероятностей, экономика, оптика, фармацевтика, химия, картография, архитектура, биология в астрономии и другие.



Тригонометрия позволяет, изучать отношения между сторонами и углами в любом треугольнике.

У треугольника есть три стороны три углы. Стороны могут быть катет и гипотенуза.

Гипотенуза: В прямоугольном треугольнике гипотенуза. это сторона, противоположная прямому углу. Она является самой длинной стороной в прямоугольном треугольнике.

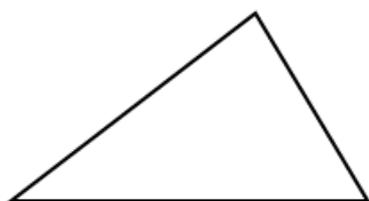
Катеты: Катеты - эти две стороны, которые образуют прямой угол. Другими словами, они прилегают к прямому углу.).

Для измерения углов используют **транспортир**. Транспортир накладывают на угол так, чтобы вершина угла совпала с центром транспортира, а одна из сторон угла прошла через нулевое деление на шкале. Тогда другая сторона угла укажет величину угла в градусах на той же шкале.

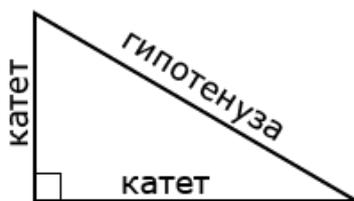
Виды треугольников.

Треугольник бывают: **1) Остроугольный** треугольник: Все три угла острые (меньше 90° градусов). **2) Прямоугольный** треугольник: Один угол прямой (равен 90° градусам).

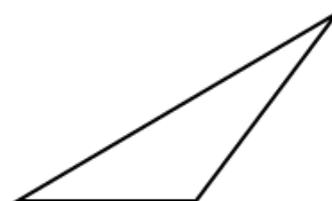
3) Тупоугольный треугольник: Один угол тупой (больше 90° градус)



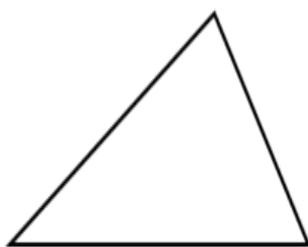
Остроугольный



Прямоугольный



Тупоугольный



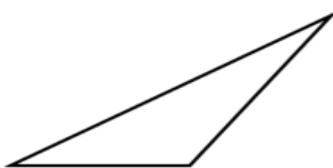
Остроугольный

Остроугольный треугольник – это треугольник, у которого все углы острые, то есть меньше 90° .



Прямоугольный

Прямоугольный треугольник – это треугольник, у которого один из углов является прямым, то есть равен 90° . Стороны, образующие прямой угол называется катетами, а сторона, лежащая напротив прямого угла, называется гипотенузой.



Тупоугольный

Тупоугольный треугольник – это треугольник, у которого один из углов является тупым, то есть больше 90° .

Новый способ измерения углы в тригонометрии.

При измерение новым способом углов в тригонометрии даёт легко решить любые тригонометрические задачи. Для решения используется всего лишь три формулы: 1) теорема Пифагора. $c^2=a^2+b^2$.

2) сумма отрезков $a=a_1+a_2$.

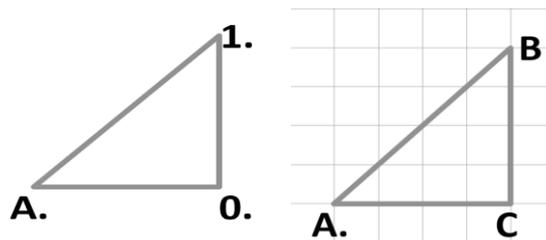
3)новый вид измерения углом $b=\angle A \cdot a$. здесь c , a , b -стороны треугольника $\angle A$ угол между сторонами.

1) Теорема Пифагора — в прямоугольном треугольнике квадрат длины гипотенузы равен сумме квадратов длин катетов. В прямоугольном треугольнике квадрат гипотенузы (c) равен сумме квадратов катетов (a , b); $a^2 + b^2 = c^2$.

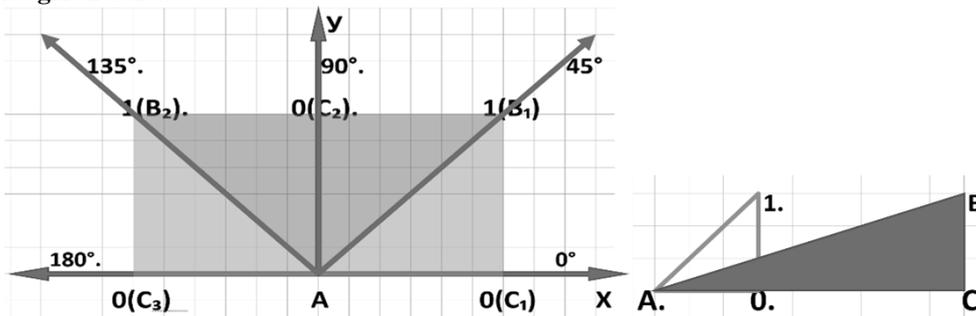
2) суммой нескольких отрезков называют отрезок, составленный из длин данных отрезков. $a=a_1+a_2$

Разностью двух отрезков называют отрезок, длина которого равна разности от вычитания длины меньшего отрезка из длины большего. $a_1=a-a_2$.

3) новое измерения углов. $b=\angle n \cdot a$, здесь b вертикальный катет, a горизонтальный катет треугольника $\angle n$ угол между сторонами.



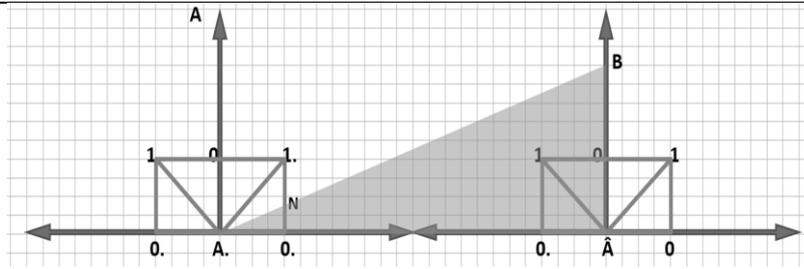
В новом тригонометрии для измерения углов используют прямоугольный треугольник. В котором катеты равны между собой. Треугольник оно будет равна на tg угла прямоугольный треугольника. Например прямоугольный треугольник ABC ; $BC=AC$, $ACB=90^\circ$, ACB ; Для измерения используют B , C противоположная сторона где $B=1$, а $C=0$. Тангенс — это тригонометрическая функция, определяемая как отношение противолежащего BC к прилежащему катету AC прямоугольного треугольника. $\text{tg}A=BC/AC$.



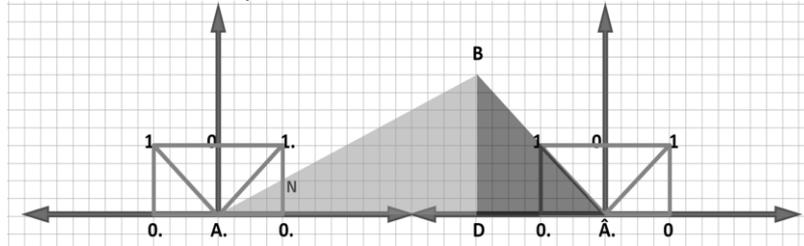
При изменении угла ABC треугольник накладывают на угол так, чтобы вершина угла A совпала с началом треугольника A , а одна из сторон AC угла прошла через нулевое деление на шкале. Тогда другая сторона AB угла укажет величину угла в на той же шкале как показано на рисунке. При таком измерении угла величина угла будет равен к tg (тангенсу) угла прямоугольного треугольника.

Для измерения угла от 0° до 180° используется 4 прямоугольный треугольник. На рисунке 1) AB_1C_1 ; 2) AB_1C_2 ; 3) AC_2B_2 ; 4) AB_2C_3 ; здесь:1) $\text{tg}A0^\circ=0$; 2) $\text{tg}A45^\circ=1$; 3) $\text{tg}A90^\circ=0$; 4) $\text{tg}135^\circ=1$; 5) $\text{tg}180^\circ=0$;

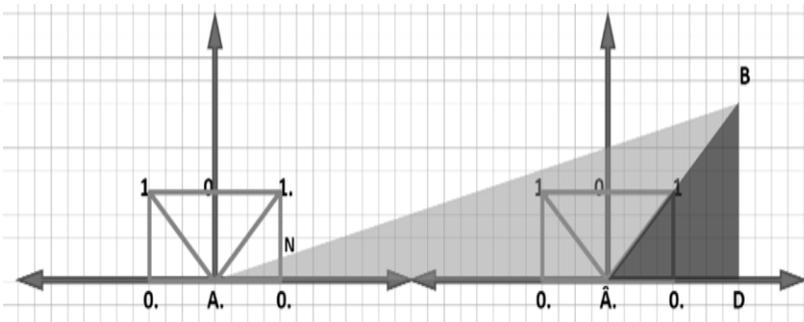
При измерении угла : а)если угол от $0^\circ-45^\circ$ и от $135^\circ-180^\circ$ то A угол умножают на AD катет и получают BD Катет или при умножении прилежащего катета AD на угол A получают противолежащий катет BD или $BD=AD \cdot \angle A$; б) если угол больше $45^\circ(45^\circ-135^\circ)$ меньше 135° то для получения противолежащего катета BD прилежащий катет AD надо разделить на угол A или $BD=AD/\angle A$



а) прямоугольный треугольник имеет два катета \hat{BA} один вертикальный, другой \hat{AA} горизонтальный и одной наклонной гипотенузы.



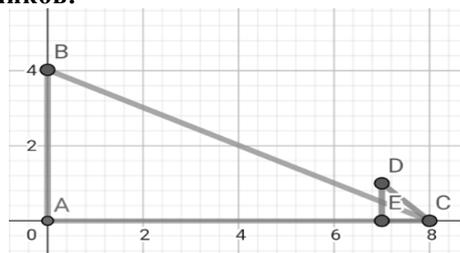
б) остроугольный треугольник можно смотреть как две прямоугольные треугольники на рисунке 1) \hat{ABD} ,



2) \hat{ABD} которые лежат противоположной стороне от общей \hat{BD} вертикальной катета они имеют один вертикальный катет и две горизонтальный катет 1) \hat{AD} и \hat{DA} которые равны при добавления. $\hat{AD} = \hat{AD} + \hat{DA}$.

с) тупоугольный треугольник состоит из двух разных прямоугольных треугольников которые расположен в вертикальном катете \hat{BD} треугольнике в одной стороне 1) первый треугольник \hat{ABD} , 2) второй \hat{ABD} треугольник, у них вертикальный катет одинаковой \hat{BD} , Здесь \hat{ABA} тупоугольный, треугольник.

Примеры для треугольников:



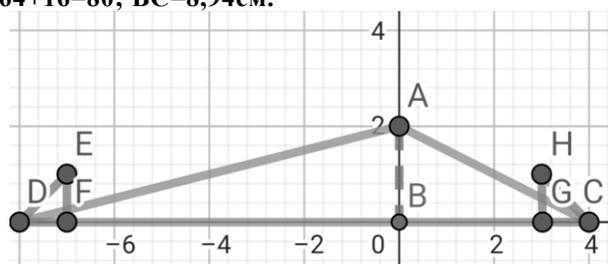
а) Пусть дан прямоугольный треугольник ABC. Дано: \hat{AC} сторона=8см; $\angle C = n = 0,5$; Найти: 1) \hat{AB} -? 2) \hat{BC} -? сторон. Решения; формулы: 1) $\hat{AB} = \hat{AC} \cdot n$; 2) $\hat{BC}^2 = \hat{AC}^2 + \hat{AB}^2$; (теорема Пифагора);

1) $\hat{AB} = \hat{AC} \cdot n$

$n = 8 \cdot 0,5 = 4\text{см.}$

$\hat{AB} = 4\text{см.}$

2) $\hat{BC}^2 = \hat{AC}^2 + \hat{AB}^2 = 8^2 + 4^2 = 64 + 16 = 80$; $\hat{BC} = 8,94\text{см.}$



б) пример: остроугольный треугольник. дан сторона $DC=12\text{см}$: и D угол $=0,25$; $\angle C$ угол $=0,5$;
 дан сторона $DC=12\text{см}$: и D угол $=0,25$; $\angle C=n=0,5$; угол.
 Найти: 1) AB -? высоту, 2) DB -? и 3) BC -? отрезки, 4) DA -? и 5) AC гипотенузы-? формулы: 1) $DC=DB+BC$ (сумма отрезков равен сумма его частей).

а) $AB=n_1 \cdot DB$. $DB=AB/n_1$. б) $AB=n_2 \cdot BC$. $BC=AB/n_2$. $AC=12\text{см}$.

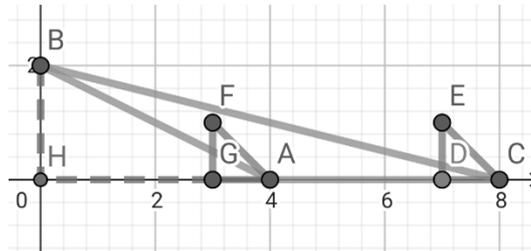
$$DC=BD+BC = \frac{AB}{n_1} + \frac{AB}{n_2} = \frac{AB \cdot n_2 + AB \cdot n_1}{n_1 \cdot n_2} = \frac{AB(n_1 + n_2)}{n_1 \cdot n_2}; DC = \frac{AB(n_1 + n_2)}{n_1 \cdot n_2};$$

$$AB = \frac{DC \cdot n_1 \cdot n_2}{n_1 + n_2}; DC = \frac{AB(n_1 + n_2)}{n_1 \cdot n_2}; AB = \frac{DC \cdot n_1 \cdot n_2}{n_1 + n_2};$$

$$DC=12\text{см}. n_1=D=0,25. n_2=C=0,5.$$

$$1) AB = \frac{12 \cdot 0,25 \cdot 0,5}{0,25 + 0,5} = \frac{1,5}{0,75} = 2\text{см}. 1) AB=2\text{см}. 2) DB = \frac{AB}{n_1} = \frac{2}{0,25} = 8\text{см}. 2) DB=8\text{см}. 3) BC = \frac{AB}{n_2} = \frac{2}{0,5} = 4\text{см}.$$

$BC=4\text{см}$.



$$4) DA^2 = AB^2 + DB^2 = 2^2 + 8^2 = 68. DA = 8,25\text{см}. 5) AC^2 = AB^2 + BC^2 = 2^2 + 4^2 = 20. AC = 4,47\text{см}.$$

с) тупоугольный треугольник. Дан ABC тупоугольный треугольник, сторона $AC=4\text{см}$; $\angle A=0,5$. и $\angle C=0,25$ углы.

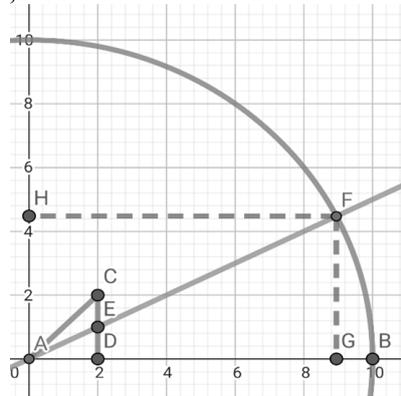
Найти: 1) BH высоту-? 2) HA -? 3) HC -? сторон. 4) BA -? и 5) BC -? гипотенузы. $HC=HA+AC$. $AC=HC$. HA .

$BH=HA \cdot n_1$. $HA=BH/n_1$. $BH=HC \cdot n_2$. $HC=BH/n_2$.

$$AC=HC-HA = \frac{BH}{n_2} - \frac{BH}{n_1} = \frac{BH \cdot n_2 - BH \cdot n_1}{n_1 \cdot n_2} = \frac{BH(n_2 - n_1)}{n_1 \cdot n_2};$$

$$AC = \frac{BH(n_2 - n_1)}{n_1 \cdot n_2}; HB = \frac{AC \cdot n_1 \cdot n_2}{n_2 - n_1} = \frac{4 \cdot 0,5 \cdot 0,25}{0,5 - 0,25} = 2\text{см}.$$

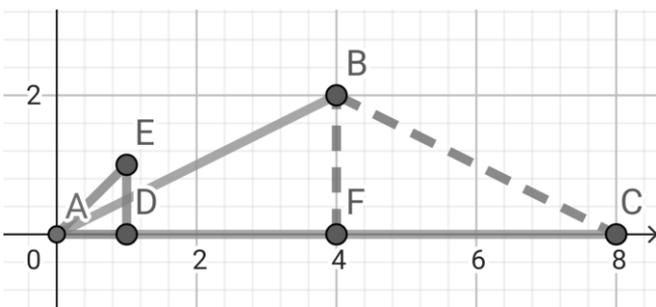
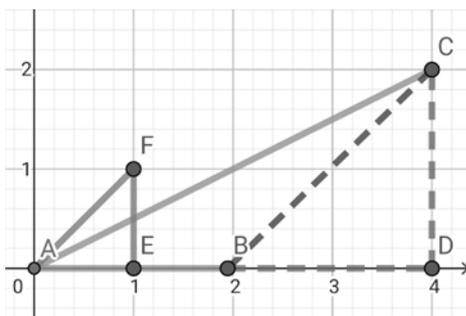
1) $BH=2\text{см}$. $BH=HA \cdot n_1$; 2) $HA=BH/n_1=2/0,5=4\text{см}$. 2) $HA=4\text{см}$. $BH=HC \cdot n_2$.
 3) $HC=BH/n_2=2/0,25=8\text{см}$. 3) $HC=8\text{см}$. 4) $BA^2=BH^2+HA^2=2^2+4^2=20$. $BA=4,47\text{см}$.
 5) $BC^2=BH^2+HC^2=2^2+8^2=68$. $BC=8,25\text{см}$.



д) при движении по окружности.

Если отрезок $AB=10\text{см}$. Двигается по кругу, и повернулся на угол $\angle A=n=0,5$. Здесь $AB=AF$ Найти: 1) $(HF=AG)$ -? и 2) $(FG=HA)$ -? сторону. Здесь угол $\angle A=n=0,5$. 1) $AF^2=FG^2+AG^2$. $FG=AG \cdot n$. $AF^2=AG^2+AG^2 \cdot n^2=AG^2(1+n^2)$. $AF^2=AG^2(1+n^2)$.

$$1) AG^2 = \frac{AF^2}{1+n^2} = \frac{10^2}{1+0,5^2} = \frac{100}{1,25} = 8,94\text{см}. 1) AG=8,94\text{см}. 2) FG=AG \cdot n=8,94\text{см} \cdot 0,5=4,47\text{см}. 2) FG=4,47\text{см}.$$



е) дан две отрезок AB и AC и угол между ними A отрезок $AC=8\text{см.}$ второй $AB=4,47\text{см.}$
 $\angle A=n=0,5$. Найти: 1) $BF=?$ и 2) $FC=?$ сторону. $AB^2=BF^2+AF^2$. $BF=AF \cdot n$.
 $AB^2=$ ($AF \cdot n^2+AF^2=AF(n^2+1)$.
 $AF^2=AB^2/(n^2+1)=4,47^2/1,25=15,98$. $AF=4\text{см.}$

1) $BF=AF \cdot n=4 \cdot 0,5=2\text{см.}$ $AC=AF+FC$. 2) $FC=AC-AF$. $FC=8-4=4$. $BC^2=BF^2+FC^2=2^2+4^2=20$; $BC=4,47\text{см.}$

f) дан 2 стороны AB и AC и A угол между ними; 1) $AC=4,47\text{см.}$ 2) $AB=2\text{см.}$ стороны и $\angle A=n=0,5$
 угол; Найти: 1) $AD=?$ 2) $CD=?$ 3) $BD=?$ 4) $BC=?$ стороны.

Решения: 1) $AC^2=AD^2+CD^2$. $CD=AD \cdot n$. $AC^2=AD^2+(AD \cdot n)^2=AD^2+AD^2 \cdot n^2=AD^2(1+n^2)$; $AC^2=AD^2(1+n^2)$;
 1) $AD^2=AC^2/(1+n^2)$; $AD^2=4,47^2/(1+0,5^2)=20/1,25=16$; 1) $AD=4\text{см}$

2) $CD=AD \cdot n=4 \cdot 0,5=2$; $CD=2\text{см.}$ 3) $AD=AB+BD$;

3) $BD=AD-AB=4\text{см.}-2\text{см.}=2\text{см.}$ $BD=2\text{см.}$ 4) $BC^2=BD^2+CD^2=2^2+2^2=8$; $BC=2,83\text{см.}$

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