



# ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING

**KHOREZMSCIENCE.UZ**





## CONTENTS

<b>Section 1. MODERN PROBLEMS OF PEDOGOGY AND PSHYCHOLOGY.....</b>	<b>4</b>
MIRSANOV URALBOY MUHAMMADIYEVICH /// FORMATION OF STUDENTS 'COMPETENCE ON OBJECT-ORIENTED PROGRAMMING LANGUAGES.....	4
UMIDBEK ABDULLAEVICH SAPAEV /// FACTORS OF FORMATION OF INNOVATIVE EDUCATIONAL ENVIRONMENT IN HIGHER EDUCATION INSTITUTIONS.....	9
AKMALDINOVA FERUZA INOKJON KIZI /// SCIENTIFIC AND THEORETICAL BASIS FOR THE DEVELOPMENT OF STUDENTS 'LOGICAL THINKING ABILITIES IN TEACHING MOTHER TONGUE....	14
IBRAGIMOV UTKIR NURMAMAT UGLU /// FORMATION OF STUDENT CARTOGRAPHIC COMPETENCE ON THE BASIS OF INDIVIDUAL EDUCATIONAL TECHNOLOGY.....	18
OKBAYEVA NILUFAR URAKOVNA /// APPLICATION OF MATHEMATICAL MODELING IN SCHOOL COURSES (NATURAL) SUBJECTS.....	22
AKHMEDOV AXAT AXROROVICH /// DEVELOPMENT OF EXPERIMENTAL COMPETENCE OF FUTURE PHYSICS TEACHERS....	26
ARZIKULOV DILSHOD NEMATOVICH /// SOCIO-PSYCHOLOGICAL FACTORS OF SPORTS PEDAGOGICAL ACTIVITY.....	30
KUZIBOYEVA MAHFUZA MIRZAYEVNA /// THE IMPORTANCE OF USING NEW PEDAGOGICAL TECHNOLOGIES IN UZBEK LANGUAGE LESSONS IN MEDICAL UNIVERSITIES.....	34
AKHMEDOV AXAT AXROROVICH /// INNOVATIVE METHODS OF CONDUCTING LABORATORY CLASSES AT PEDAGOGICAL UNIVERSITIES.....	38
ISMOILOV TEMURBEK ISLOMOVICH /// RESEARCH OF THE FOUNDATIONS OF COLLEGIAL MANAGEMENT IN EDUCATIONAL INSTITUTIONS OF HIGHER EDUCATION.....	49
<b>Section 2. MODERN PROBLEMS OF PHILOLOGY AND LINGUISTICS.....</b>	<b>54</b>
AKHMEDOVA AZIZA KOMILOVNA /// HEROES OF THE NOVELS “ARROWSMITH” AND “THE THREE ROOTS” IN TERMS OF VALUES..	54
TURAKULOVA BAKHTINISO NURIDDINOVNA /// PROBLEMS OF TEACHING GRAMMAR FOR SECONDARY AND INTERMEDIATE LEVEL STUDENTS.....	58



**Section 3. MODERN PROBLEMS OF TECHNICAL SCIENCES.....62**

**ARTIKBAEV MUXAMMAD AZIMJON O`G`LI, YULDASHEV MUKHAMMAD SHEXNAZAROVICH /// THE DEVELOPMENT OF INCUBATOR FOR EGGS BASED ON ARDUINO MICROCONTROLLER: ANALYSIS ABOUT OPTIMIZATION OF HATCHING POULTRY.....62**

**AZAMJON TOKHIROV IBRAHIM UGLI /// DESIGN OF INTEGRATED MECHATRONIC MACHINES.....67**

**Section 4. ACTUAL PROBLEMS OF HISTORY, PHILOSOPHY AND SOCIOLOGY.....71**

**DIYORJON ABDULLAEV /// ISSUES OF COMING OUT THE ART OF AWARD BADGES AND MEDALS.....71**

**SULTANOV SIROJBEEK XABIBULLAEVICH /// SOCIAL JUSTICE TRENDS IN SOCIETY.....76**

**KAMILOV FARKHOD OBLAKULOVCH /// SOCIO-PSYCHOLOGICAL APPROACH IN THE SCIENTIFIC STUDY OF THE PROBLEMS OF CHILDREN WITH DISABILITIES.....81**

**Section 5. ACTUAL PROBLEMS OF NATURAL SCIENCES.....87**

**MAMBETALLUYEVA SVETLANA MIRZAMURATOVNA, MATKARIMOV NIZOMJON BAXTIYOROVICH /// THE ECOLOGICAL IMPORTANCE OF THE DEVELOPMENT OF UNDERGROUND PARTS OF EUPHRATES POPLAR (*POPULUS EUPHRATICA OLIVIER*).....87**

**MATKARIMOVA GULNAZ MAKSUDJANOVNA /// MEDICAL PROPERTIES OF CORNUS MAS L.....91**

**KHUSHNUDBEK ODILBEKOVICH ESHCHANOV, MUHABBAT MATNAZAROVNA BALTAYEVA, ABDUSHKUR ABDUKHALILOVICH SARIMSAKOV, AMIR ANVAROVICH SHIGABUTDINOV /// SYNTHESIS OF COPPER AND SILVER NANOPARTICLES USING HYDROLYZED FIBROIN.....95**



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**FORMATION OF STUDENTS 'COMPETENCE ON OBJECT-ORIENTED PROGRAMMING LANGUAGES**

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**Annotatsiya.** Ushbu maqolada kompetensiyaviy yondashuv asosida talabalarni obyektga yo'naltirilgan dasturlash tillarini o'rgatishga hamda ularning dasturlashga oid kompetentligini shakllantirish bo'yicha taklif va tavsiyalar keltirilgan.

**Kalit so'zlar:** obyektga yo'naltirilgan dasturlash, kompetensiya, amaliy dastur, kompyuter.

**Аннотация.** В этой статье представлены предложения и рекомендации по обучению студентов объектно-ориентированным языкам программирования на основе компетентностного подхода и развитию их навыков программирования.

**Ключевые слова:** объектно-ориентированное программирование, компетенция, приложение, компьютер.

**Annotation.** This article provides suggestions and recommendations for teaching students object-oriented programming languages based on a competency-based approach and developing their programming competencies.

**Keywords:** object-oriented programming, competence, application, computer.

**Introduction.** Improving existing approaches to the formation of students' competence in object-oriented programming in higher education institutions, as well as the development of computer science and information technology remain relevant [1]. The solution to these problems is to develop an alternative algorithm for teaching programming technologies in accordance with the methodological features of pedagogical research for the training of future specialists in the field of informatics [2-4]. This requires, first of all, the analysis of the literature in the field and the analysis of research in this area.

**Literature review.** The implementation theory and methodology of information and communication technologies in the system of continuing education, methods of creation and use of e-learning tools, problems of application of distance learning technologies and improvement of methods of teaching computer science has been investigated by Commonwealth of Independent states and our countries scientists such as A.A. Abdukodirov, M. M. Aripov, R. Bokiyev, F.M.Zakirova, M.H.Lutfullayev, A.Toyloqov, U.Yu.Yuldashev, J.K.Nurbekova, S. B. Panyukova, M. M. Abdurazakov, V. A. Kastronova, V. G. Jujjalov, A. Beshenkov, T. A. Boronenko, A.G. Gane.

However, their research is not sufficiently scientifically based on improving the methodology of teaching programming languages, in particular, object-oriented programming languages and the formation of students' competence in this subject.



At the same time, although N.A. Otakhanov's research has focused on the methodology of teaching object-oriented programming languages, his research has not paid enough attention to the formation of students' competence in object-oriented programming. Therefore, the proposed research is relevant for today's education system.

To solve this problem, we first concluded that it is necessary to analyze the views of researchers on the concepts of competence, competency approach, in particular to object-oriented programming.

In this regard, in particular, scientific researches were carried out by such scientists in the country and the Commonwealth of Independent States, such as N. Muslimov, Yu. M. Asadov, N. N. Narziyeva, N. Sh. Turdiyev, D. Sh. Temirov, T. T. Shoyardonov, A.L. Andreyev, I. A. Zimnya, A.V. Khutorskiy, V. V. Popova, Ye.V. Boyarova, V.A.Bolotov, M.E.Bershadsky, V.I.Baydenko. Based on the analysis of the scientific works of these researchers, the following information can be given.

According to the Merriam-Webster Dictionary, the term "competence" originated in 1596. [5] I. A. Zimnya associates with this word the name of Aristotle, who suggested that it is associated with the Greek word "atere" - "power".

J. Raven's 1984 Competency in Modern Society provides a broad definition of competence. It is a phenomenon that "it is made up of a large number of components, many of which are independent of each other, some components belong to the more cognitive realm, others to the emotional realm. These components can complement each other in effective self-management." [9]

According to I.A. Zimnya, due to the growing difficulties in our modern life, people need to be prepared for different situations. However, competent education is designed to help people solve problems in a variety of situations [7].

According to N. Muslimov, competence is not the acquisition of specific knowledge, skills and abilities by the student, but the acquisition of integrative knowledge and practical actions in an independent direction [8].

According to N. Sh. Turdiyev, Yu. M. Asadov, S. N. Akbarova, D.. Sh.Temirov, the competency approach is derived from the word "competition" and "to compete"., Literally translated, it means "competitiveness" [9].

Competence (Latin "Competere" - correspondence) - means the ability to apply knowledge, skills, the ability to act successfully on the basis of practical experience to solve common problems, as well as to achieve high results in a particular field [11, 12].

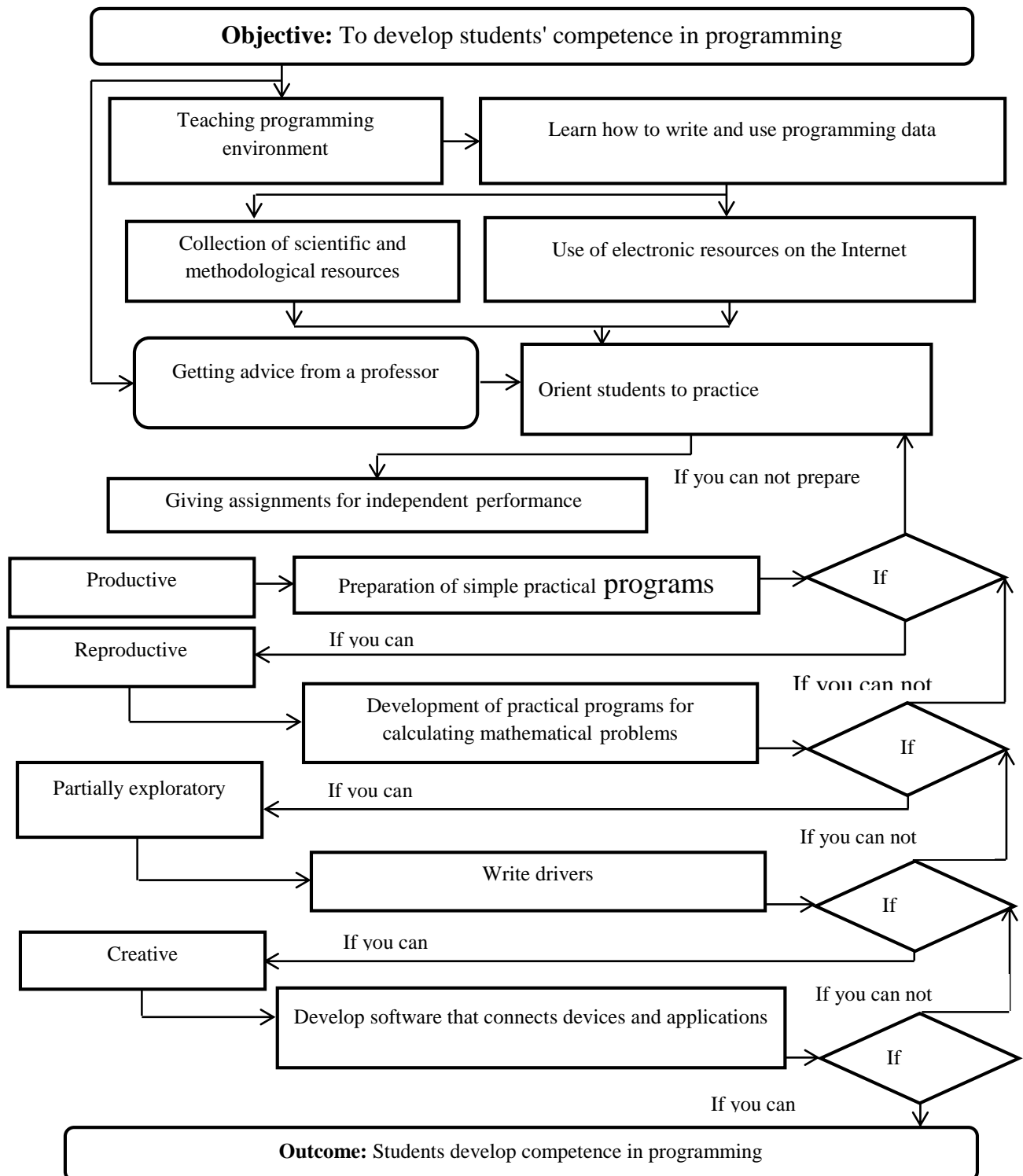
Based on the views of the above researchers, the following definitions of object-oriented programming and object-oriented competency approach can be made:

**Definition 1.** Object-oriented programming competence is the ability to apply the knowledge, skills, and competencies gained from object-oriented programming languages to the creation of applications. That is, object-oriented software can be used to automate the activities of various industries, manage databases, and create a variety of entertainment programs.

**Definition 2.** A competency-based approach to object-oriented programming languages is to teach students not only how to program and perform simple calculations, but also how to create modern applications.



**Research methodology.** As the intellectual potential of mankind grows, the challenges facing programmers are changing. Therefore, changes in the demand for programming have led not only to changes in languages, but also to changes in writing technology. Therefore, it is necessary to teach students programming languages based on a competency-based approach [11]. To do this, students need to organize in-class and out-of-class learning activities based on the algorithm proposed below (see Figure 1).



**Figure 1. To develop students' competence in programming.**



Initially, programming languages were used to process large amounts of data. This required that both the programmer and the user be computer literate. Today, due to the improvement of applications, the computer is used more by users who do not have an understanding of its hardware and software. The computer is not a tool for users to study it in depth, but rather a tool to solve problems that are relevant to their work.

As users of this new generation make it easier to work with applications, the complexity of the applications themselves will increase. Modern object-oriented programming languages should have an interface consisting of a large number of windows, menus, dialogues and visual graphical environments that provide a high level of interaction with the user according to special rules.

In this regard, according to N. A. Otakhanov, object-oriented programming is such a new direction of programming, that the software system is considered as a set of interacting objects, and each object belongs to a certain class, and each class is thought to form some kind of tree [10].

This proposed algorithm is important, because it allows students to independently study object-oriented programming and make the necessary decisions.

Thus, instead of non-competent methods (such as informational interviews, traditional supervision), methods should be used to develop students' competencies. To do this, students should search for additional information on programming literature, the Internet; addressing issues of redundancy or lack of information; information regulation; creating applications for the need; analysis and generalization of information; discussions and debates; work on practical projects; assignments such as group and practical projects.

Competency-building tasks should be not only academic but also practical. The thinking student ask, "Why should we do this?" should not be a question. It should not only be used on specific topics related to practice, but also on problematic issues based on real-life situations.

**Analysis and results.** The success of the pedagogical experiment in the process of conducting experiments aimed at developing students' competence in object-oriented programming shows the need to take into account its organizational and pedagogical aspects in this process. Therefore, special attention was paid to these aspects. Experimental work was conducted in 2019 among students studying at the Navoi State Pedagogical Institute in the field of "Methods of teaching computer science." A total of 72 students were involved for the experiment and control groups. Mathematical-statistical analysis based on the Student-Fisher criterion was performed in order to check the reliability of the results of the students in the experimental and

control group. Using this criterion,  $\bar{X} = \frac{1}{n} \sum_{i=1}^4 n_i X_i$  formulas were used to determine the appropriate mean values for the samples, the coefficients of scattering,  $D_n = \sum_{i=1}^4 \frac{n_i (x_i - \bar{X})^2}{n-1}$  and of the standard deviations.  $\tau_n = \sqrt{D_n}$ , indicators of variation

$\delta_n = \frac{\tau_n}{\bar{X}}$ , reliable deviations of the estimation of the variance  $\Delta_n = t_{kt} \cdot \frac{D_n}{\sqrt{n}}$ ,



The formulas used to determine the mastery indicators

$$A \% = \frac{\bar{X}}{3} \cdot 100\% - \frac{\bar{Y}}{3} \cdot 100\%$$

The calculation showed that the average mastering rate of the experimental group was higher than that of the control group, an increase of 12.4%.

**Conclusions and suggestions.** In short, building students' competence in object-oriented programming languages is important in today's information technology. It requires the development of effective applications for the management of the entire industry, the implementation of electronic payments, the calculation of mathematical and economic problems, the development of software products for computers and mobile devices, and the exchange of data remotely. This can be done through object-oriented programming languages. Therefore, in order to develop students' competence in object-oriented programming languages in higher education institutions, it is important to first improve science programs and create a new generation of textbooks. At the same time, it is necessary to improve the system of organizing independent learning activities of students. This requires students to be given practical tasks focused on creative thinking and to develop a teaching algorithm that will help them solve it. Therefore, we recommend that students use the above algorithm to develop their competence in object-oriented programming languages. This learning algorithm directs the student to work independently and think critically. As a result, it is possible to achieve the formation of students' competencies.

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## **FACTORS OF FORMATION OF INNOVATIVE EDUCATIONAL ENVIRONMENT IN HIGHER EDUCATION INSTITUTIONS**

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**Аннотация.** Ушбу мақолада инновацион таълим мухитини шакиллантириш ва ривожлантириш йўллари ва тамоиллари тўғрисида илмий тадқиқотлар олиб борилган.

**Калит сўзлар:** инновация, инновацион салоҳият, инновацион таълим, инновацион қобилият, таълим жараёни, таълим технологиялари ва методлари.

**Аннотация.** В данной статье проводится исследование способов и принципов создания и развития инновационной среды обучения.

**Ключевые слова:** инновации, инновационный потенциал, инновационное образование, инновационная способность, процесс обучения, технологии и методы обучения.

**Summary.** This article conducts research on ways and principles of creating and developing an innovative learning environment.

**Keywords:** innovation, innovative potential, innovative education, innovative ability, learning process, learning technologies and methods

**Introduction:** Currently, the lack of innovative thinking specialists is one of the main problems in the manufacturing and service sectors. Addressing these issues is the most important task of higher education institutions. Therefore, the innovative organization of teaching processes in higher education institutions and the creation of a scientifically innovative environment should be one of the main directions of higher education. In this regard, the state has adopted laws and by-laws aimed at creating sufficient opportunities. In particular: President of the Republic of Uzbekistan Sh.Mirziyoyev On October 29, 2019, adopted the Law No. ZRU-576 "On Science and Scientific Activity" [1], according to which it is possible to implement our national development by creating a scientific basis for sustainable development, further development of scientific activity and effective use of national resources, identification of innovative directions, as well as its development. This has once again increased the legal basis of our scientists in the field of scientific activity and the expansion of opportunities for scientific activity, as well as their responsibilities. In order to further



develop innovative activities and create opportunities for innovations, President of the Republic of Uzbekistan Sh. Mirziyoyev adopted the Law "On Innovative Activity" No. ZRU-630 on July 24, 2020[2]. This created opportunities for further development of planned innovation activities in cooperation with the Ministry of Innovation Development, established on November 30, 2017, and the implementation of new innovative developments.

In order to achieve these goals, it is necessary to implement innovative measures aimed at the continuous growth of economic performance of production and service enterprises and organizations as a result of the formation and development of an innovative environment in all areas by providing professionals with innovative thinking. It is obvious that it is connected with the innovative potential of specialists delivered to the field, and for this it is necessary to apply innovative educational technologies in the educational process of higher education institutions, as well as to form and develop innovative educational mechanisms that force students to think innovatively.

**Literature review:** Many scholars (M. Jakovljevic, Francesco Pisanu, Su Wangchu, Diao Hailin, Peng Qiong, Zhaoji Yu, La Jolla) have conducted research on the creation of an innovative learning environment and the introduction of new educational technologies and methods in the educational process. In particular, the Russian scientist G. Belyakov says the transition to innovative development is impossible without improving the higher education system. Most scholars interpret the concept of innovation differently, but San Francisco scholars R. Evans and R. Leppmann, on the other hand, emphasize that innovation has two small coupons. The first is an idea or thing that is new to a particular person or group, and the second is a change that occurs because of the acceptance of an object or idea. California scientist Peter Serdyukov argues that innovation requires three major stages: the idea, its implementation, and the result of the change that occurs as a result of the implementation of the idea.

**Research Methodology:** The introduction of innovative educational technologies and methods in the educational process leads to a further increase in students' interest in science and a sharp increase in mastery rates. In the process of traditional education, it is necessary to master and memorize all the information on pre-prepared subjects. In the process of new innovative education students are able to think freely, learn independently, develop creative skills in science and industry, independently analyze information in science, share knowledge, the availability of opportunities to discuss and draw conclusions, as a result of which the formation and development of innovative potential of personnel emerging from higher education institutions, which is one of the main indicators of quality.

**Analysis and Findings:** Innovation encompasses a range of relationships, namely scientific, technological, organizational, financial, and commercial activities. Innovations are carried out in the following sequence:

The first stage is to identify problems and generate innovative ideas;

The second stage is to gather enterprises and organizations that support innovative ideas;

The third stage is the implementation of innovative ideas.



So one of the first steps in the process of innovating is to identify the problem and study it in detail. Therefore, the organization of practical and laboratory classes for students of technical higher education institutions on the basis of modern equipment and technologies would create the basis for students to have a great impression and innovative ideas. It also served as a great basis for creating a database of problems that would allow the formation of continuous new innovations.

The potential for innovation in technological processes requires organizational, institutional and pedagogical changes. As a result of his pedagogical observations, the Italian scholar Francesco Pisanu puts forward five general principles for students to study news based on the “How People Learn” approach:

- Students learn knowledge better in conjunction with what they already know or because of their development;
- Students learn better as a result of working together, and learn new knowledge when they ask questions and in the process of thinking about what they have learned and how they have learned;
- Students learn better, when the information and knowledge offered to them is tailored to their knowledge needs;
- If students have in-depth knowledge and individual abilities are strongly linked to general concepts and the knowledge learned is based on multiple applications;
- Students learn new knowledge better if they can analyze and evaluate what they have learned

These five principles are useful in developing scientific innovative solutions aimed at integrating new innovative technologies into the teaching process.

Innovative education is education aimed at developing innovative abilities and creative thinking as its main value area. Innovative education mainly includes the following four aspects:

First - to awaken the critical consciousness of students and encourage students to find the courage to ask questions;

Second - to involve students in innovative activities and the use of innovations in everyday life;

Third - to allow students to implement innovative ideas as a result of innovative creative thinking in the educational process of higher education institutions; fourth - through the ability to teach, teach and develop students' creative practice.

Due to the formation of innovative educational processes in higher education institutions, we can see a sharp positive change in the educational activities of each student. In an innovative educational environment, students develop the ability to learn and think freely, to freely meet the needs of disciplines in the field, along with independent learning, the formation of innovative thinking, interest in finding problems in the field and finding innovative solutions, expanding opportunities for personal innovative thinking, the ability to think individually about the prospects of the field and science is formed, and most importantly, students' innovative learning activities are formed.

Innovation is about looking at what we are doing from the outside and developing a new idea that will help us do our work in a new way. Thus, the goal of any innovation is to create a product or service that differs in quality, quantity, or both. Innovation



requires three major stages: the idea, the implementation, and the outcome that leads to positive change as a result of the implementation of the idea. Innovations in education can emerge as a new pedagogical theory, methodological approach, teaching technique, teaching tool, learning process, or institutional structure that leads students to learn better. Thus, innovations in education are aimed at increasing the effectiveness and quality of education.

**Conclusions and recommendations:** As a result of our research, in order to create and develop an innovative educational environment in higher education institutions, it is necessary to:

1) Strong integration between them for the continuous operation of the cycle "Innovative education-specialists with innovative potential-innovative production-market economy-innovative education" and, as a result, the creation of an innovative educational environment;

2) Ensuring that students during the study period conduct practical and practical training in modern production facilities, as well as the use of small-scale models of the production process in the educational process;

3) Ensuring that the subjects of each field of education are complementary in content, that is, to establish the mutual integration of the disciplines taught in the field of education, so that graduates of higher education institutions can become professionals who can fully meet the requirements of the times;

4) introduction of innovative educational technologies in the educational process, aimed at a single system of training students as mature innovative potential specialists, taking into account the ability of each student to think individually and similar individual characteristics;

5) organization of regular study of problems and shortcomings of enterprises and organizations with students, as well as the creation of an innovative educational environment aimed at finding innovative directions for their solutions;

6) creation of innovative teaching methods and technologies to form students who can express ideas or suggestions that allow them to find innovative solutions to current problems in the field;

7) creation of an educational environment aimed at stimulating new innovations of students and the introduction of innovative educational mechanisms for the implementation of their innovative ideas;

8) as a result of constant study of the needs and requirements of existing enterprises and organizations in the region for high-potential and innovative thinking personnel, the opening of new types of education in higher education institutions and their educational activities in an innovative educational environment;

9) creating a unique innovative educational environment by studying all the principles and peculiarities of innovative education in developed countries by making changes and additions to curricula, textbooks, manuals, science packages, educational technologies and methods to create an innovative educational environment in higher education institutions;

As a result of the formation of an innovative educational environment in higher education institutions, we can observe the emergence of competitive professionals as a result of students' innovative thinking skills, self-confidence, free and full scientific



activity, independent creative research. As a result, specialists who can think innovatively will create opportunities for the rapid development of enterprises and organizations, and as a result will serve to raise the position of our country in the world.

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## SCIENTIFIC AND THEORETICAL BASIS FOR THE DEVELOPMENT OF STUDENTS 'LOGICAL THINKING ABILITIES IN TEACHING MOTHER TONGUE

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**Annotatsiya.** Ushbu maqolada ona tili o`qitishda o`quvchilarning mantiqiy fikrlash qobiliyatlarini rivojlantirishning ilmiy-nazariy asoslari, o`quvchilarning mantiqiy fikrlash qobiliyatlarini rivojlantirish har tomonlama barkamol, komil insonni tarbiyalash uchun ona tili darslarini zamonaviy loyihalash, uni rejalashtirish, tashkil etish, nazorat qilish va boshqarish va bu jarayonning samaradorligini ta'minlovchi ta'lim sifatini tubdan o'zgartirish, zamonaviy pedagogik va axborot kommunikatsion texnologiyalardan foydalangan holda o'qitishning ilg`or metodlarini joriy etish orqali o'quvchilarda mantiqiy fikrlash mexanizmlarini takomillashtirish, jahon sivilizatsiyasi yutuqlari va axborot resurslaridan keng foydalanish, interfaol ta'limni rivojlantirish shart-sharoitlari, bu jarayonda o'qituvchining tutgan o'rnini va faoliyat mazmunini aniqlash masalalari yoritib berilgan.

**Kalit so`zlar:** o`quvchi, mantiqiy fikrlash, qobiliyat, rivojlanish, ilmiy-nazariy, barkamol, komil inson, tarbiya, zamonaviy pedagogik texnologiyalar, axborot kommunikatsion texnologiya, ilg`or metodlar, interfaol ta'lim, axborot resurslari.

**Аннотация.** В данной статье представлены научные и теоретические основы развития у учащихся навыков логического мышления при обучении на родном языке, современный дизайн, планирование, организация, контроль и управление уроками родного языка для развития у учащихся навыков логического мышления. И радикальные изменения качество образования для обеспечения эффективности этого процесса, совершенствования механизмов логического мышления у учащихся за счет внедрения передовых методов обучения с использованием современных педагогических и информационно-коммуникационных технологий, достижений мировой цивилизации и широкого использования информационных ресурсов, условий для развития интерактивного обучения роль учителя в этом процессе и определение содержания занятий.

**Ключевые слова:** студент, логическое мышление, способности, развитие, научно-теоретический, гармоничный, совершенный человек, образование, современные педагогические технологии, информационно-коммуникационные технологии, передовые методы, интерактивное образование, информационные ресурсы.



**Annotation.** This article presents the scientific and theoretical basis for the development of students' logical thinking skills in mother tongue teaching, the modern design, planning, organization, control and management of mother tongue lessons for the development of students' logical thinking skills. and radically change the quality of education to ensure the effectiveness of this process, improve the mechanisms of logical thinking in students through the introduction of advanced teaching methods using modern pedagogical and information and communication technologies, the achievements of world civilization and extensive use of information resources, the conditions for the development of interactive learning, the role of the teacher in this process and the definition of the content of the activity.

**Keywords:** student, logical thinking, ability, development, scientific-theoretical, harmonious, perfect person, education, modern pedagogical technologies, information and communication technologies, advanced methods, interactive education, information resources.

**Introduction.** The growing need for human capital in the world makes the categories of "mind and logic" to be considered as a necessary measure that monitors various cultural, educational and socio-economic relations, evaluates the activities of young people. Effective mechanisms for developing students' logical thinking skills through the teaching of sciences, the introduction of integrated interactive learning technologies, virtual and experimental projects are being established in the world's leading educational institutions to develop students' intelligence and outlook. [3]

Analysis of the concept of "mind" as a comprehensive concept in the world, the orientation of students to logical thinking in the teaching of natural and exact sciences, the expansion of the content of competence requirements of education on the basis of criteria, characteristics of the level of logical thinking attention is observed in communication. In the context of globalization and intensification of information, research aimed at the acquisition of knowledge of the native language in a critical and creative approach, the study of the basic functions of logical thinking in the laws of nature and the perception of existence. serves to strengthen. [7]

As a result of consistent reforms in our country to create conditions for the full development and well-being of man, the realization of his interests, to bring the quality and efficiency of education to a new level, students in general secondary schools in the educational process Opportunities for the widespread implementation of the idea of developing skills are increasing. There is also a need to expand the content of technologies for the development of students' logical thinking skills in the teaching of the Uzbek language. The Action Strategy for the further development of the Republic of Uzbekistan identifies priorities such as "further improvement of the system of continuing education, increasing access to quality educational services, support and realization of the creative and intellectual potential of the younger generation." In this regard, it is important to analyze the practice of developing students' logical thinking skills in the process of mother tongue teaching, to determine the criteria of logical thinking, to develop recommendations for students' intellectual development and acquisition of skills according to their abilities and inclinations. [2]

**Literature review.** The scientific and methodological basis of this article is the consistent views expressed in the works of IAKarimov, the author of a new stage of



state and society building in our country Sh.M.Mirziyoyev on the spiritual and moral values, understanding of national identity, further strengthening of independence. [8]

At the stage of modernization of mother tongue teaching in the Republic of Uzbekistan is determined by the development of scientific bases for the management of student learning, the need for competitive personnel with in-depth knowledge, logical observation, practical skills.

Research on the development of students' thinking in the education system and the increase of professional competence of teachers, pedagogical scientists R. Djuraev, B. Hodjaev, O. Gazman, E. Zeer, L. Tarita, E. Kazakova, E. Alexandrova, Performed by M.Pevzner, A.Maslow, A.Kombas and others.

Teachers-scientists A.Abdukadirov, R.Djuraev, U.Inoyatov, O.Musurmonova, H.Ibraimov, SH.Abdullayeva, D.Ruzieva, D.Sharipova and others studied various aspects of intellectual development of future specialists .

Scientific-pedagogical and practical-technological aspects of reflexive observation, improvement of communicative competence, preparation of students for effective communication technologies and techniques M.Abdullayeva, A.Nurmonov and others, problems of mental education and problems of their implementation in native language lessons B.Mirzahmedov, N Researched by Mamadiyorov, A.Abduvahobov. [6]

At the same time, the analysis of scientific sources shows that the problem of developing logical thinking skills in native language lessons in general secondary school students has not been fully studied in a market economy and has not been adequately addressed in today's world.

**Research methodology.** Comparative study and analysis of philosophical, sociological, pedagogical and psychological literature on the problem in the research process; Study of DTS, curricula and programs, textbooks and teaching aids; socio-pedagogical (observation, interview, questionnaire, survey, test); pedagogical experiment; monitoring; methods of mathematical statistical processing and qualimetric analysis of the results were used. [10]

**Analysis and results.** In today's world of globalization and information, the intensification of information attacks is driven by the ability of students to protect themselves from this information, to accept it directly, to consider it critically and creatively, and to think logically. it requires them to distinguish what is important and useful to them. This is in the process of logical thinking.

The fact that a clear definition of the concept of logical thinking has not yet been developed today requires a dialectical approach to the problem.

Thinking is a process of cognitive activity of the person, characterized by direct and generalized reflection of reality. Thinking combines interdisciplinary research, complex sciences. [4]

Logical thinking is one of the highest levels of thinking, which means the connection of ideas on the basis of consistency, sequence, and reflects an important aspect of a person's creative activity. In turn, the inclusion of these qualities in the individual allows to form an active member of a democratic and humane society. [9]





The formation of students' logical thinking as a whole system includes the purpose of education, teacher activities, student activities, learning outcomes, educational content, form, methods and tools.

The results of teacher and student activities for the development of logical thinking skills in mother tongue lessons depend on the purpose of the didactic process, the content of teaching materials, the correct and reasonable definition and selection of teaching forms, methods and tools. In order to be successful, the development of logical thinking skills requires the presence of active influencing factors. [5]

To date, research has identified key factors influencing the development of logical thinking skills in students. These are: physiological, psychological, social, pedagogical and methodological factors.

**Conclusion.** It is clear from the above considerations that the factors influencing the formation of logical thinking are holistic and have a gradual character. That is, the accumulation of productive factors influencing this process, their stratification, the scope of influence allows them to be summarized as common factors. Knowing the factors influencing the formation of logical thinking in mother tongue lessons and being able to assess the level of their impact requires creativity, special competencies from the teacher.

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## FORMATION OF STUDENT CARTOGRAPHIC COMPETENCE ON THE BASIS OF INDIVIDUAL EDUCATIONAL TECHNOLOGY

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**Аннотация:** Ушбу илмий мақолада жaxonда мавжуд илмий адабиётларни таҳлил қилиш ва эксперимент тадқиқотлар натижалари асосида олий таълим муассаси талабаларининг картографик фанлар бўйича ўқитишни педагогик асос сифатида ташкил этишда энг муҳим бўлган бир нечта тизим; компетентлик; шахсга йўналтирилган; контекстлик; технологик. ёндашувларнинг комбинациясидан фойдаланилган.

**Калит сўзлар:** тизим, компетентлик, шахсга йўналтирилган, контекстлик, технологик, ёндашув.

**Аннотация:** В данной научной статье анализируется существующая научная литература мира и по результатам экспериментальных исследований некоторые из важнейших систем в организации преподавания картографических дисциплин студентам высших учебных заведений как педагогической основы; компетентность; направлен на человека; контекстуальный; технологии. использовали комбинацию подходов.

**Ключевые слова:** система, компетентность, человеко-ориентированный, контекстный, технологический, подход.

**Abstract:** This scientific article analyzes the existing scientific literature of the world and, based on the results of experimental research, some of the most important systems in the organization of teaching cartographic subjects to students of higher education as a pedagogical basis; competence; directed at a person; contextual; technology. used a combination of approaches.

**Key words:** system, competence, person-centered, contextual, technological, approach.

**Introduction.** Based on the analysis of the world's scientific literature and the results of experimental research, a combination of several approaches that are most important in the organization of teaching cartographic subjects to students of higher education as a pedagogical basis is used: competence; directed at a person; contextual; consists of technological approaches.

In this study, the use of a systematic approach to pedagogy as a specific set of interrelated tools, methods and processes necessary for the organization of a pedagogical system and the creation of purposeful learning, the use of a systematic approach to cartographic disciplines associated with the need to exit. It is studied as a single system, taking into account the internal relationships between individual elements and external relationships with other systems and objects.[3]



**Literature review.** Competency-based approach is one of the most promising ways to assess the effectiveness of students' training, where the criteria for preparation for activity are competence and competence included in it.

Taking into account the individual characteristics of students, it is necessary to rely on the approach to the person based on recognition as an active subject in the learning process: and others.

In a traditional teaching system, a teacher's care is to shape certain characteristics of a mature person. These features are formed under the influence of the teacher, the whole teaching system. The task of student-centered education is to unlock the potential of the student, to develop his or her individuality and to create opportunities for personal growth.

Therefore, the approach to students in the process of teaching cartographic subjects provides attention to each individual student; development of his individuality, on the basis of which activities are carried out. Personal approach is cooperation, support, attention, joint activity.[10]

The result of this approach is a change in the position of the teacher and the student. It is more important for a student to work with a teacher and classmates than to get a grade. Conditions are created for students to actively acquire cartographic knowledge, skills and abilities, important professional features of the person are formed.

The features of this approach, listed above, help to develop cartographic competence, as students are interested in the form of the learning process, the relationship between them and the teacher, and the lack of authoritarianism in teaching.[2]

Contextual approach to the learning process allows students to personally participate in learning activities, to consistently model its content, forms and conditions of professional training. Contextual learning is based on the theory of activity, according to which the acquisition of social experience is carried out as a result of active, objective activity of the subject. Its application is due to the fact that it embodies the following principles: individual activity, problems, unity of education, consistent modeling of the content and conditions of professional activity of the specialist in the forms of student learning activities. The content of education is not developed as a subject, but as a subject of educational activity, which is gradually changed to the subject of professional activity.[6]

The contextual nature of education means that the process of teaching cartographic subjects, on the one hand, has clear goals that are of vital importance to each student, and on the other hand, their future professional activities, as well as space and space.

**Research Methodology.** It is proposed to use a technological approach as the main approach in the teaching of cartographic sciences. Its advantage is that it allows you to combine the most important advantages of previous approaches. All of this can be done on the basis of a technological approach. The most important aspect in the application of the technological approach is that it ensures the achievement of a guaranteed result - it forms the cartographic competence of university students. There is a need for career-oriented teaching technology that provides the ability and readiness



to mobilize society for the formation of cartographic knowledge, skills and the implementation of educational and professional activities among university students. [1]

Why is it recommended to use a technological approach, as it provides: to provide a real contribution of the subject to the methodological, theoretical, technological preparation of the graduate; the need and ability to use the scientific content of the topic in a holistic and focused format; to encourage the study of all disciplines; it is the development of the mind on the basis of a holistic approach to education.

**Analysis and results.** The technological approach to teaching includes the study of pedagogical facts, events, and laws, which creates the conditions for the effective acquisition of cartographic and topographic skills, the development of students in the field of cartography, topography, geodesy.[4]

In the technological approach, the process of acquiring knowledge is not repetitive, as students often do not understand what is being said and repeat the textbook by heart. Organizing the process of assimilation of knowledge with a technological approach includes various forms of mental activity, activating the process of learning and forcing students to approach the learning process in a different way.

With a technological approach, students strive to acquire knowledge independently, their learning is not limited to listening and recording information about the learning discipline received from the teacher. Independent learning leads to the formation of cartographic competence of university students.

The use of this approach in teaching, of course, is rich both in content and in the forms and methods of its organization.[9] This diversity contributes to the acquisition of information (knowledge, skills and competencies) of professional significance, which leads to the formation of cartographic competence.

This approach in many respects meets the requirements of training and formation of a competent person in higher educational institution.

As supporters of this approach, we consider it expedient to use it as a basis for the development of person-centered technology of teaching cartography, topography, geodesy in higher education to form the cartographic competence of students.

Given the importance of the technological approach in the organization of teaching cartographic subjects for university students, we define its essence, and then, based on the proposed rules, we justify the structure of the educational process and the composition of its elements.

At present, the search for new solutions to increase the effectiveness of the education system in the field of local pedagogy is intensifying, while scientists and practitioners pay more attention to the development and application of teaching technologies.[5]

Technology has become a field of psychological and pedagogical disciplines, studying the most rational methods of organizing education in certain conditions.

Recognize the need to revise the traditional disciplinary didactic teaching model, which has limited opportunities to form interdisciplinary knowledge among students, and open up new prospects for the introduction of teaching technology that will ensure guaranteed success as a result.[8]



**Conclusion.** The growing interest in educational technologies has a number of reasons for this research:

- The various tasks facing higher education institutions include not only theoretical research, but also the development of technological support of the educational process. In theoretical research, laws are formed, theories and concepts are formed, and in practical research, the pedagogical practice itself is analyzed, and scientific results are collected;

- Classical didactics with established patterns, tendencies, forms and styles does not always meet the scientific basis of new ideas, approaches, teaching methods;

- the need to introduce a systematic approach to pedagogy, to systematize teaching methods;

- Increasing the level of diagnostics (measurement) in setting educational goals, assessing learning outcomes;

- the transition from an extensive method of teaching to intensive organization, ie the achievement of high results on the basis of the use of the latest achievements in pedagogy, psychology, computer science;

- increase the scientific intensity of projects and models of educational activities based on the modeling of professional situations, the acquisition of professional experience in the learning process and, as a result, the formation of the student's professional thinking, activism and amateur activity;

- Organizational forms, methods of interaction between teachers and students, the possibility of expert design of the technological chain, ensuring guaranteed results and minimizing the negative consequences of the work of low-skilled professionals.

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## APPLICATION OF MATHEMATICAL MODELING IN SCHOOL COURSES (NATURAL) SUBJECTS

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**Annotatsiya.** Ushbu maqolada maktab kursidagi ( tabiiy) fanlarda matematik modellashtirishni qo`llanilishi haqida fikrlar bildirilgan. Inson hamma vaqt biror-bir jarayon, voqea yoki hodisani o`rganishda u yoki bu ko`rinishdagi modeldan foydalanadi. Matematik modellar yordamida tabiiy fanlar, iqtisodiy jarayonlar faqat chuqur tahlil qilinibgina qolmasdan, balki ularning o`rganilmagan yangi qonuniyatlarini ham ochish imkoni yaratiladi.

**Kalit so`zlar:** tabiiy fanlar, matematik modellashtirish, model, kompyuter, zamonaviy yondashuv, axborot, kommunikatsiya.

**Аннотация.** В данной статье рассматривается использование математического моделирования в школьных (естественных) предметах. Человек всегда использует модель в той или иной форме для изучения процесса, события или явления. С помощью математических моделей можно не только глубоко анализировать естественные науки и экономические процессы, но и открывать их неизученные новые законы.

**Ключевые слова:** естественные науки, математическое моделирование, модель, компьютер, современный подход, информация, коммуникация.

**Annotation.** This article discusses the use of mathematical modeling in school (natural) subjects. Man always uses a model in one form or another to study a process, event, or phenomenon. With the help of mathematical models, it is possible not only to analyze the natural sciences and economic processes in depth, but also to discover their unexplored new laws.

**Key words:** natural sciences, mathematical modeling, model, computer, modern approach, information, communication.

**Introduction.** At a time of rapid development of information and communication technologies in our country, globalization, increasing competition in the world market, educating an educated and intellectually developed generation is an important factor in achieving the goals of democratic development, modernization and renewal. Expressing his opinion that the "Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021" identifies specific mechanisms to improve the living standards of our people, this strategy should attract the attention not only of our people but also the world community. It should be noted that it has become an important document that attracts. As a result of the rapid development of society, the information environment and the situation in the labor market, the reproductive education system has fallen short of the requirements of the



times.[3] This requires the development of new approaches to teaching mathematics. In order to deepen the knowledge and talents of young people, to ensure their participation in the further development of Uzbekistan as qualified personnel, modern approaches to the educational process are being introduced, in response to which we focus on efficiency and effectiveness in implementing our knowledge and work. The prosperity and sustainable development of our country depends to some extent on the deep knowledge, strong beliefs and, in general, the perfection of young people. Our society needs people who are able to take an active part in solving problems, who understand the situation, who think comprehensively, who understand the daily and professional problems of life, who can analyze, compare, and solve practical problems. We all know that the science of mathematics cultivates the human mind, develops its attention, cultivates in itself the determination and will to achieve the intended (developed) goal, provides its own algorithmic discipline, and most importantly, his thinking expands. This means that a modern person must be able to make independent decisions, work in a team, be proactive, adapt to innovations, be able to withstand stressful and stressful situations, and be able to get out of these situations.[1] Man always uses a model in one form or another to study a process, event, or phenomenon. A well-built model is more convenient than a real object, because it is up to the specialist to change the model as he wishes. This work cannot be done on a real object. In addition, there are objects and phenomena in nature that can only be studied in a model. For example, conducting experiments on the scale of the biosphere, conducting experiments on the sun itself to study the physical processes in the sun, studying the Earth's climate, the dependence of the Earth on the trajectory of its rotation around the sun, and so on. k. Often, such experiments are not possible or are strictly prohibited due to irreversible processes. In such cases, it is only through modeling that certain information can be obtained. In a broad sense, a model is an image or pattern of an object or system of objects. For example, the model of the earth - the globe, the model of the sky and the stars - the planetarium, and so on. A model is a mathematical description of the important properties of an object, process, or event under study. The model reflects only the properties of the object to be searched, so the model does not have to reflect all the properties of the object. The model can replace a real object. [7] It is another object with a certain structure that is convenient for experimentation and research. Before starting any work, a person imagines the design, construction or structure of the work, that is, creates a copy (model). It follows that the model is often abstract. If we describe the imaginary copy, that is, the abstract model, "in its own language" - in accordance with mathematical symbols and the corresponding rules, then such a model is called a mathematical model.

**Literature review.** Modeling in scientific research has been used since ancient times and has gradually embraced new areas of scientific knowledge such as construction and architecture, astronomy, physics, chemistry, biology and, finally, the social sciences.[8]

To better explain the concept of a mathematical model, let's take a look at the definitions given by some experts to the mathematical model:

N. P. Buslenko - A mathematical model of a real system is an abstract object written in such a formal language that can only be studied through mathematical



models.

VM Glushkov, VI Ivanov and VM Yanenko - Mathematical model is generally understood as a set of mathematical symbols and the relationship between them.

A. A. Samarsky, A. P. Mikhailov - If any model of any object has reached the level of computer use, such a model can be considered as a mathematical model. Of course, this means explaining the basic principles of the real object under study in mathematical language.[6]

With the above in mind, a mathematical model can be described as follows: A mathematical model is an abstract representation of a real object in our imagination, which is represented by mathematical symbols and certain rules.

**Research Methodology.** In 1939, the Russian scientist LV Kantarovich published his scientific article "Application of mathematical models and methods in the planning and management of enterprise problems." This is not used in business planning. In 1947, the American scientist John Dansig used his work "Research of operations" in the planning of production in enterprises. [9] Many scientific papers on management and modeling have been written since the 1950s. As a result of this work, a new science - "Economic-mathematical models and methods" began to form in the 70s. Using these scientific methods, models are created and problems representing various economic and management processes of manufacturing enterprises are solved.[12]

**Analysis and results.** Nowadays, natural science and practice are making more and more use of the achievements of mathematics, making them an important tool for scientific research to effectively solve complex economic problems. The use of mathematics in the natural sciences allows us to distinguish and formally describe the most important, significant connections of changes and objects, to clearly and succinctly state the rules, concepts and conclusions of the theory of natural sciences. The use of mathematical modeling in the natural sciences and the in-depth teaching of technology to schoolchildren and the improvement of modeling techniques are among the most pressing issues of today.[5]

On the one hand, the models should be easy to learn, so they should not be too complicated - so they will definitely only be simplified copies. However, on the other hand, the conclusions drawn from the study of models must also be applied to real objects, which means that the model must reflect the important aspects of the real object under study.

Modeling is the process of building, studying, and applying models.

Since the 1960s, with the advent of computers, and later (since the 1980s) computers, mathematical modeling techniques have become more widely used. This, of course, could lead to repeated "inventions". This is due to the fact that the problem of classification is not sufficiently solved in mathematical modeling. It would not be a mistake to say that this issue has not been resolved at all.[10] This, of course, has a negative effect on mathematical modeling. One of these negative effects is blind mathematical modeling, misunderstanding of mathematical modeling, repetitive modeling, inefficient use of existing mathematical models in practice, and lack of strategic direction in mathematical modeling. In the second half of the twentieth century, control systems were created with the help of "big computers" with knowledge





of modeling, modeling methods and programming languages.

**Conclusion / Recommendations.** One of the requirements of the time is the fact that it is necessary and necessary for engineers trained in all areas to create mathematical, economic-mathematical models of processes in nature, society, firms, enterprises, to know mathematical methods. Material resources, labor and monetary resources are used rationally using mathematical methods. Mathematical methods and models are a leading tool in the development of economics and the natural sciences. Predictions made using mathematical methods and models can be corrected during the general implementation. Mathematical models allow not only an in-depth analysis of economic processes, but also the discovery of new laws that have not been studied. [2] They can also be used to predict the future development of the economy. Mathematical methods and models, along with mechanization and automation of computational work, facilitate mental labor and organize and manage the labor of economists on a scientific basis. The purpose of mathematical models is to describe the interconnection of processes, the definition of the laws of change, the solution of forecasting problems, control, decision-making and the creation of automated control systems.

Based on the results of the modeling, the development of measures for the protection of the environment is aimed at ensuring the factors of sustainable development and, ultimately, finding ways to achieve a balance between nature and man.

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## DEVELOPMENT OF EXPERIMENTAL COMPETENCE OF FUTURE PHYSICS TEACHERS

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**Annotatsiya.** Ushbu maqolada bo'lg'usi fizika o'qituvchilarini eksperimental kompetentligini shakillantirish imkoniyatlari ochib berilgan. Shuningdek o'quv jarayoniga innovatsion texnologiyalarni jalb etish orqali ta'lim sifatini oshirish nazarda tutilgan.

**Калит сўзлар.** Laboratoriya, mashg'ulot, talaba, tadqiqot, navatorlik, pedagogika, texnika, universitet, ta'lim, ixtiro, kashfiyot, ko'nikma, kompetentlik.

**Аннотация.** В статье рассмотрено развитие и формирование экспериментальной компетентности будущих учителей физики. Применение в учебном процессе инновационных технологии проведения лабораторных работ повышает эффективности обучения.

**Ключевые слова.** Лаборатория, обучение, студент, исследование, новаторство, педагогика, техника, ВУЗ, образование, изобретение, открытие, умение, компетентность.

**Annotation.** The article considers the development and formation of experimental competence of future physics teachers. The use of innovative technologies for conducting laboratory work in the educational process increases the effectiveness of training.

**Keywords:** Laboratory, training, student, research, innovation, pedagogy, technology, university, education, invention, discovery, skill, competence.

**Introduction.** Deep rooted reforms in the education system are based on the training competitive persons, as well as the formation of professional skills from an early age. Today, a new approach is required for the organizational works and conducting laboratory classes in the teaching process to physics in the secondary schools, academic lyceums and pedagogical higher education establishments. After all, there is wise Uzbek proverb "Knowledge that was gained in the youth is an ornament on the stone" that expresses necessity of special attention to the education from the early ages. If we thoroughly develop laboratory classes in physics for our students from an early age, we will be able to create a school of inventors and innovators that can be impulse for the technical development of the Republic in future.

The dissertation paper of the doctor M.Kurbanov is aimed at increasing the effectiveness of didactic functions of physical experiments in uninterrupted education and in his speech devoted to the didactic possibilities of using demonstration



experiment in Physics, he discusses possibilities of transmitting information in accordance with the professional peculiarities of students. [1,28-30 P].

In the dissertation paper of G.Karlibaev [2] “Methodological preparation improvement of future teachers on physics” methodological recommendations aimed at improving methodological training level of teachers of physics and the course on “Methodology of teaching physics” have been drafted. [2,17-21 P]

Didactic bases methods and content, form, means methods of using integrated media education system has been modernized in the dissertation of H.Juraev “The use of alternative energy sources in the creation of an integrated media education system”. [3,21-27 P]

But, innovational methods were not considered in conducting laboratory courses for future teachers of physics and prospects of competitive approach along with the development of competency in the process of preparation of future teachers of physics further improvement methods of education quality has not been investigated.

New models were presented, preferences were highlighted and the importance of inventive and rationalistic abilities of students were given.

Long lasting experiences on physics showed that students with the different preparation level of primary experimental knowledge on physics and mathematics were studying in the groups in which laboratory courses had been conducted.

Besides, it isn't impossible to find talented students for the experimental works and students without intension of participating in experiments.

Each teacher of the secondary schools and academic lyceums mustn't teach students only to the primary knowledge but also to the implementation of these knowledge's into a life and technological procedure by providing necessary conditions for the formation of professional overview. Taking responsibility for organizing and conducting laboratory courses on physics at the secondary schools, is very important approach. At the same age, their interests begin to flourish. If we to develop it, if it is supported by teachers, if youth competitions are conducted and skills are assessed positively, only then we will be able to lay foundations for the development of technical innovation. [4, 54-56 P]

Long lasting pedagogical researches depicted that now days it is impossible to be limited by training specialists in accordance with world standards and with a provision of all demands and requirements of pupils and students. Certain skills can be formed by receiving information on rapid development of technologies and coming to conclusion by the analysis of them. Approaches that take development dynamics into consideration play an important role in the modernization of physics. Our todays demand increases the effectiveness by using new models and rejecting the use of “old systems” in the laboratory analysis. At the same time, it is a key factor in the formation of sufficient skills and abilities of the students. It is not possible to develop the necessary professional skills in practice or by conducting virtual laboratories. It is an open secret that nowadays one of the factors that defines development of our country is to create a school of inventors with better knowledge and to lift it up to the level of world standards.

## **Analysis and results**



All above mentioned ideas about the problem of raising laboratory classes quality to the level of up-to-date requirements is one of the most pressing issues in teaching of physics.

We think, if it will be possible to form inventive and discovery skills and abilities of students during practical courses, it can naturally be appropriate stimulus to the development of science, technology and economy in the Republic.

Particularly, laboratory classes in all departments of physics are still taught and conducted on the basis of the old model. Today's development requires a new approach to all subjects. Because, conducted researches on scientific psychology and pedagogy showed rapid changes on the degree of student's spiritual development comparing with the 80-90s taking into account the science and technology and economic development, social studies. However, the structure of laboratory classes which has a negative impact on the modernization of the educational process remains unchanged. [5,106-109betlar]

It should be noted that we would like to show how to come general conclusion with a help of comparative analysis and virtual forms of practical training in the formation of innovative abilities in students. Therefore, intercalation of physics with the hours allocated for independent works and hours allocated for practical laboratory classes of the pedagogical universities has a special effect. That's why, there seemed to be a need for changes which includes modern educational technologies with the help of which it is possible to change the structure of laboratory exercises and correspond it with the spirit of modern life.

During the laboratory exercises students will get opportunities to achieve to the level of independent task execution and to choose the tasks independently and to find answers to the tests by using technologies, a focused database and mathematical honing. Thanks to these system, we be able adopt individual approach for students.

This kind of approach allows students to conduct independent laboratory works and reinforce them with test questions. It will be possible to conclude taking into account above mentioned in the report. All above mentioned ideas assure the rise of the laboratory exercises level on physics, that is included in standard curriculum, to the level of the modern requirements.

If it will be possible to form inventive and discovery skills and abilities of students during practical courses, it can naturally be appropriate stimulus to the development of science, technology and economy in the Republic.

That's why, there is seemed to be a need for changes which includes modern educational technologies with the help of which it is possible to change the structure of laboratory exercises and correspond it with the spirit of modern life.

It is our view that students need to pass theoretical tests before being allowed to do laboratory exercises. After the accomplishment of theoretical testing process, teacher checks student's preparation, then he or she will be allowed to do laboratory exercises. If students take laboratory process seriously by showing his or her awareness and keep equipment's safe, teacher can give them permission to take part in laboratory classes. And this serves to an improvement of the education quality. This approach not only encourages students to be sensitive, but also shapes their professional skills and abilities.[6,122-124 betlar].



It must be noted that, if laboratory exercises were conducted in accordance with the specializations they would serve to increase effectiveness of training.

Including;

1. If laboratory classes is carried out in accordance with manufacturing in higher educational establishments;
2. Pedagogical universities focus on methodological aspects of conducting laboratory classes (school physics laboratories) in an improved environment;
3. If the laboratory lessons at universities are focused on scientific aspects;
4. If it also is focused on laboratory works with a global character (in the field of non-specialized education).

From our point of view, undergraduates of universities must introduce up-to-date technological achievements into the education system and explore manufacturing problems.

If we take into account the fact that pedagogical universities train teachers for schools, academic lyceums and professional colleges, the laboratory classes are aimed at the formation of professional and pedagogical skills. [7,81-88 betlar].

If laboratory exercises at universities are focused on a wide range of scientific problems, it will give unique results and serves to increase the scientific potential of the staff.

It was found desirable if laboratory exercises that has universal feature were conducted in non-specialized fields such as medical universities because it is important to pay more attention to the physical properties of the operation of modern devices. [8,20-23 P].

This paper focuses on the methodological improvement of the theoretical basis for organizing and conducting laboratory classes at pedagogical universities.

### **Conclusion/Recommendations**

Effective use of hours that are allocated for laboratory classes in the educational plan that is designed for higher educational institutions in the field of "Physics and Astronomy" along with the development of their desire for the disclosure is considered as a key issue on the today's agenda.

Thanks to the rapid development of science and technologies a series of skills are formed by receiving and analyzing information. It is not secret that an individual approach is more effective than a complex approach for students. Therefore, it is important to take into account the dynamics of the development in the modernization of physics. This is a key factor in the formation of adequate skills and abilities of the student. It is not possible to develop the necessary professional skills by conducting virtual or ordinary laboratory lessons.

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## **SOCIO-PSYCHOLOGICAL FACTORS OF SPORTS PEDAGOGICAL ACTIVITY**

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**Аннотация:** Мазкур мақолада замонавий тренер-педагоглар касбий фаолиятининг самарадорлиги омиллари ҳамда замонавий тренер-педагогнинг спорт-педагогик фаолиятидаги касбий-муҳим қобилиятларнинг умумлаштирилган таснифи юзасидан ўтказилган тадқиқот натижалари хусусида фикр юритилган.



**Калит сўзлар:** замонавий теренер, спорт педагогик фаолият, қобилият, касбий фолият, ўз-ўзини ривожлантириш, такомиллаштириш қобилияти, касбий-муҳим сифатлар.

**Аннотация:** В данной статье обобщены результаты исследования факторов эффективности современных тренеров - педагогов, а также обобщена классификация профессиональных навыков в спортивно-педагогической деятельности современных тренеров - педагогов.

**Ключевые слова:** современный тренер, спортивно-педагогическая деятельность, способности, профессиональная деятельность, самосовершенствование, профессиональные качества.

**Abstract:** This article discusses the results of research on the factors of the effectiveness of the professional trainers of modern trainers and the generalized classification of professional skills in sports and pedagogical activities of the modern trainer-pedagogue.

**Key words:** modern trainer, sports pedagogical activity, ability, pedagogical activity, self-development, the ability to improve, professional-important qualities

**Introduction.** Approved by the Decree of the President of the Republic of Uzbekistan on February 7, 2017, the action strategy for the five priority areas of development of Uzbekistan for 2017-2021, entitled "Improving the state policy on youth, is based on the view that" The special recognition of the issue of educating young people, deepening democratic reforms and increasing their social activity in the process of developing civil society "[1] shows the importance of physical culture and sports at the level of public policy. In addition, practice shows that the quality of modern physical culture and sports, first of all, communication, interaction, influence, individual style and attitudes, includes a comprehensive range of social and psychological issues.

Creating and maintaining the necessary socio-psychological conditions that ensure the effective development of future sports and pedagogical abilities of students is, on the one hand, an important issue in the process of training, and on the other hand, a psychologist is a professional in the field of sports. It covers a wide range of topical issues of socio-psychological science, which are directly related to It is no secret that today in the field of physical culture and sports, one of the main factors in ensuring the high results of sports is the study of the professional and psychological abilities of modern coaches and teachers.

**Literature review.** The analysis of the scientific literature on this issue allowed to distinguish a generalized classification of important professional skills of a modern coach-teacher in sports and pedagogical activities. In order to develop an effective model in this area, the research process identified the relevance of these capabilities through expert evaluation. For this purpose, a special expert questionnaire was prepared, based on the following descriptions, which were formed in the process of distinguishing the generalized classification of abilities:

- Abilities in sports and pedagogical activity are a set of interrelated mental characteristics of the coach-teacher, which, on the one hand, reflect the structural components of sports and pedagogical activity, on the other hand, in accordance with its effectiveness and prospects;



- In essence, the abilities of sports and pedagogical activity are an important part of the subjective activity of all the internal conditions of mental activity, that is, these features are the ability to carry out the activity in general, as well as the effectiveness of sports and pedagogical activity. In addition, it is useful to examine in detail the content of each of the identified factors. Thus, the first important factor encompassed the following abilities.

**Number of participants in the experiment and gender differences Table №1**

	Women		men		total	
	total	%	total	%	total	%
Current trainers-teachers	54	45,4	65	54,6	119	20,3
Teachers	57	50,4	56	49,6	113	19,3
3rd and 4th year students	134	50,6	131	49,4	265	45,1
Athletes with athletic accomplishments	49	54,4	41	45,6	90	15,3
total	294	59,8	293	59,6	587	100,0

- ability to self-development, self-improvement - 0.92; ability to actively participate in sports and pedagogical activities, any problem of the trained athlete - 0.88; ability to work in different roles as a psychologist, leader and coach - 0.90; the ability of the trainee to be a personal embodiment of all the professionally important qualities of the athlete - 0.89; ability to strive for new goals - 0.86; sports results, the ability to express themselves through the achievements of trained athletes - 0.74. The content of this factor represents the professional-active sphere of the modern trainer-educator, which emerges as a necessary condition for efficiency, self-development, as well as professional self-expression. Activity emerges as a structural feature, providing real space-time movement, dynamics, development, and implementation. According to the results of the study, this important phenomenon has a socio-psychological nature and reflects the following characteristics:

- quantitative and qualitative characteristics of the process or the degree of intensity of any interaction;

- quantitative and qualitative characteristics of the subject's potential for interaction.

**Research Methodology.** In our view, the concept of activity itself is usually used in two semantic aspects: a) any manifestation of the psyche that goes beyond the boundaries of adaptive adaptive activity; b) the level of mental state as a specific quality is manifested in this plan through its contradictory-sluggish attitude; In this sense, activity is defined as a specific quality, the interaction of a subject with surrounding objects, in particular, a measure of activity, and a way for a person to express and understand himself in life, where his quality is achieved as a whole (or not) [2]. In addition, by its very nature, activism embodies the image of a motivated trainer-educator who seeks new achievements, new needs, goals, ideals. In this direction, according to L.E. Orban-Lembrick, activity should be studied not only as an abstract circle, but also as a set of personal characteristics, a form of specificity of professional specialization [3]. At the same time, with the development of the structure of professional activity, a complex structure of specialist activity also develops. The second factor of importance includes the following skills in sports and pedagogical





activities : - ability to quickly solve problem situations - 0.84; ability to know the results of activities in advance - 0.81; reflex ability - 0.80; willpower and logical confidence ability -0.79; ability to form a team of trained athletes - 0.78; ability to implement an athlete management strategy - 0.75.

- Search engine of sports ideas and the ability to implement them - 0.72; ability to take responsibility - 0.71; ability to organize training athletes - 0.70; ability to make quick decisions - 0.70; ability to adequately assess himself and other trained athletes - 0.69; ability to control his mental state - 0.68.

**Analysis and results.** In understanding the semantic nature of this factor, two main directions can be distinguished. One focuses on managerial skills and the other on organizational skills. In this regard, the analysis of scientific sources on our research shows that the relevance of management skills is associated with the availability of management methods in the sports and pedagogical activities of the coach-educator, focusing on the organization and management of training athletes. The problem lies. Thus, based on the semantic basis of statistically significant abilities, this factor was conditionally referred to as the organizational and managerial component. The third factor of importance included the following abilities in sports and pedagogical activity.

- Ability to be a model of stable and purposeful behavior - 0.81; ability to pedagogically influence positive emotions - 0.80; processing and formation of educational materials in an acceptable form for athletes - 0.77; ability to express one's opinion, educational material in a meaningful and understandable way - 0.77; ability to effectively influence trained athletes - 0.75; ability to effectively treat trained athletes with courtesy - 0.75; ability to connect educational material with sports life, etc. - 0.74; ability to influence trained athletes - 0.73; pedagogical design ability - 0.73; sports problem, ability to see current tasks - 0.72; ability to analyze the results of sports activities - 0.71. The above abilities, on the one hand, represent the various design functions in sports and pedagogical activities, on the other hand, the effective performance of didactic tasks.

**Conclusion/Recommendations.** The urgency of management skills requires the presence of a management method in the sports and pedagogical activities of the coach-educator and a deep attention to its socio-psychological aspects. At the same time, the study of the characteristics of the development of skills in sports and pedagogical activities allows to make the following recommendations: Analysis of scientific sources and empirical materials obtained as a result of research shows that the methodological It would be expedient to implement the approach:

1) The first direction involves the application of a systematic approach aimed at revealing the integrity of the subject of professional activity. When its individual, personal and subjective characteristics are studied as a whole, taking into account their interrelationships and interests, it is envisaged to identify the diversity of relationships and integrate them into a single system model in order to reach the highest level that a trainer-educator can achieve;

2) The second direction provides the basis for the selection of methodological conditions, taking into account its integrative nature;



3) The third direction includes a set of specific methods of research (survey, observation, interview, primary and secondary mathematical-statistical processing of the obtained data) (methods of obtaining empirical data).

After all, we achieve high results in sports through the factors of effectiveness of the professional activity of modern coaches and educators, as well as ways to develop the professional skills of a modern coach-teacher in sports and pedagogical activities.

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## THE IMPORTANCE OF USING NEW PEDAGOGICAL TECHNOLOGIES IN UZBEK LANGUAGE LESSONS IN MEDICAL UNIVERSITIES

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**Annotatsiya.** Ushbu maqolada tibbiyot oliy o'quv yurtlaridagi o'zbek tili darslarida yangi pedagogik texnologiyalardan foydalanishning ahamiyati haqida so'z



yuritilgan. Hozirgi vaqtda ta'lim jarayonida o'qitishning zamonaviy metodlari keng qo'llanilmoqda. Bugungi ta'lim jarayonini interfaol usullarsiz tasavvur etish qiyin. Ta'lim jarayonida qo'llaniladigan interfaol usullar muayyan guruhlarda o'qitiladigan o'quv fanining bosh maqsadiga yo'naltirilgan bo'lishi zarur. O'qitishning zamonaviy metodlarini qo'llash o'qitish jarayonida yuqori samaradorlikka erishishga olib keladi.

**Kalit so'zlar:** tibbiyot, interfaol usullar, o'zbek tili, tafakkur, muloqot, metod, keys-stadi, yangi pedagogik texnologiyalar.

**Аннотация.** В статье обсуждается важность использования новых педагогических технологий на уроках узбекского языка в медицинских вузах. Сегодня в образовании широко используются современные методы обучения. Сегодняшний учебный процесс сложно представить без интерактивных методов. Интерактивные методы, используемые в процессе обучения, должны быть ориентированы на основную цель изучаемого предмета в определенных группах. Использование современных методов обучения приводит к высокой эффективности учебного процесса.

**Ключевые слова:** медицина, интерактивные методы, узбекский язык, мышление, общение, метод, тематическое исследование, новые педагогические технологии.

**Annotation.** This article discusses the importance of using new pedagogical technologies in Uzbek language classes in medical universities. Today, modern teaching methods are widely used in education. It is difficult to imagine today's educational process without interactive methods. The interactive methods used in the teaching process should be focused on the main goal of the subject taught in certain groups. The use of modern teaching methods leads to high efficiency in the teaching process.

**Key words:** medicine, interactive methods, Uzbek language, thinking, communication, method, case study, new pedagogical technologies.

**Introduction.** In today's fast-paced world, the world is changing by the minute. The thinking and worldview of the younger generation is changing, and this process is increasing the need for teachers in today's education system to constantly search, apply new ideas, use innovative technologies in education.

It is known that the introduction of non-traditional lessons in the "Uzbek language" and its integration into the content of education, the discovery of new ways of teaching will create the basis for meeting the requirements of state educational standards.

There is a need to establish and reform teaching, learning, education in every field. To do this, it is necessary to use and apply new pedagogical technologies and innovations in education. Based on the implementation of new pedagogical technologies, the accumulation of innovations in education, the selection of the most relevant and necessary and most effective for our work, the teacher activates the student in the educational process, creates and improves ways, methods and techniques, forms of teaching, tools that are convenient for the learner.[6]

**Literature review.** It is difficult to imagine today's educational process without interactive methods. The interactive methods used in the teaching process should focus



on the main goal of the subject taught in certain groups. Otherwise, the interactive method used will be irrelevant. The method chosen by the teacher will ensure that the child is active during the lesson, able to communicate properly with adults and peers, is available in the language, but the learner to form the skills of understanding the meaning of new words and phrases that are unfamiliar to them, to try to remember, to apply in the process of communication. I. Y. Lerner, one of the well-known didactic scholars, wrote "Development of thinking skills" on the formation of creative thinking skills in students. (M.: Prosvesheniye, 1982): "Does thinking develop with the acquisition of knowledge?" and answers "No" to this question.[9] In the chain of knowledge, if there are no connections - connections, comparisons, cause-and-effect relationships, it cannot give thinking, that is, the person who has been brought up. There are different means, ways and means of acquiring knowledge, imparting knowledge to the learner, instilling in him / her skills, abilities, habits and shaping his / her nature [3,39].

**Research Methodology.** Today, modern teaching methods are widely used in education. The use of modern teaching methods leads to high efficiency in the teaching process. It is advisable to choose these methods based on the didactic task of each lesson. While maintaining the traditional form of teaching, enriching it with a variety of methods that activate the activities of learners leads to an increase in the level of mastery of learners. There is also a growing interest in the use of innovative technologies, pedagogical and information technologies in the educational process, one of the reasons for which is still the traditional teaching while the child is taught to acquire only ready-made knowledge, modern technology teaches them to search for, study and analyze independently, and even draw their own conclusions. In this process, the teacher creates conditions for the development, formation, education and upbringing of the individual, and at the same time performs the function of management, guidance.[10] The student becomes a key figure in the learning process. Knowledge, experience and interactive methods related to pedagogical technology and pedagogical skills ensure that students acquire knowledgeable, mature skills.

The use of a number of interactive methods in the teaching of the Uzbek language serves to increase the effectiveness of the lessons. For example, the case-study method.

"Case-study" is an English word ("case" - a real situation, event, "study" - to study, analyze) a method aimed at the study of specific situations, the implementation of teaching based on analysis is calculated. In Uzbek language classes, texts that are mainly educational are selected for case studies.

For example: One day Amir Temur attacked one of the distant tribes. Naturally, Timur's large and well-armed army easily conquered the tribe. They brought the chief of the tribe to the master. The chief of the tribe said to Amir Temur: "O Temur, if you are an executioner, take our lives, if you are a butcher, kill us, if you are....,...."

Case Study: Continue and summarize the text, replacing the dots with the appropriate words. Select a title that matches the completed text. Analyze the text according to the topic of the lesson.[4]

For example, if the topic of Morphemic Analysis is being studied according to the plan, the text will be subjected to morphemic analysis. Students can continue this case from their own perspective, relate it to the present, and conclude. The answer to the



task: - O Timur, if you are an executioner, take our lives, if you are a butcher, kill us, if you are a just king, show us your justice! When the great commander heard this, he thought. After all, isn't the motto "Power is in justice" his lifelong goal? Timur and his whole army left the tribe without any spoils. The elder's ingenuity and wisdom helped the tribe survive. The title is "Wise Elder"; It could be a "just king." Today, in world literature, as well as in Uzbek literature, there is an experiment in writing short stories that can affect anyone, consisting of only a few words. Such stories serve to sharpen thinking, to expand the scope of independent thinking of students.[5]

**Analysis and results.** A number of interactive methods can be used effectively in Uzbek language lessons. It is important to focus on developing students' thinking and independent work skills.

There are a number of teaching methods in the literature and articles on new pedagogical technologies. These methods are presented as innovative methods. Here are some of the methods that can be used in native language lessons.[8]

1. Modular educational technology. It is held in order to develop students' skills of independent work with textbooks, popular science and additional literature, creative and independent thinking. A distinctive feature of modular educational technology is the development of modular programs that allow students to work independently and creatively on the subject.

2. Collaborative learning technology, the main idea of which is to teach students to read collaboratively, not just to do assignments and work together, to create collaboration, mutual support and exchange of ideas between them. .

3. Problem-based learning technology. Creating a problem situation, asking questions, proposing issues and tasks, organizing a discussion to solve the problem situation, and confirming the correctness of the conclusions.

4. Interactive method technology. Rely on the creativity of students, create an atmosphere of free discussion in the classroom. To do this, the class is divided into small groups and work with these groups throughout the lesson.

5. Technology of didactic games. Use a variety of didactic games in the classroom and use them to stimulate, activate and interest in the lesson.

6. Test lessons. By changing and diversifying the forms and methods of teaching on the basis of new pedagogical technologies, the teacher turns the student into an active participant in the learning process. The teacher-student collaboration makes this lesson an interactive lesson.

New interactive forms of teaching are one of the ways to improve the educational process, aimed at effectively solving educational problems, strengthening the cognitive activity of students.[1]

**Conclusion.** The effective use of interactive types of lessons can have a significant impact on the development of educational activities, the development of students' ability to acquire knowledge independently, critical thinking skills and to develop as a well-rounded person. They should be friends. The main purpose of the use of interactive methods in education is to help the teacher to reconsider his pedagogical treasure, to create a desire for a higher quality methodological direction, to encourage further thinking, research, experimentation.[7]



Teachers have a big role to play in educating students to be perfect human beings. The teacher must present each lesson as a product of creativity, while ensuring the interest of students studying in Russian groups in the Uzbek language on the basis of the above modern pedagogical technologies. In this way, the student becomes an active and intelligent participant in each lesson. In addition to the meaningful and interesting organization of each lesson, the teacher teaches students to be well-rounded and have a sincere love for the Uzbek language.[2] Because the love for the Uzbek language is the love for this people, for the Motherland.

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## **INNOVATIVE METHODS OF CONDUCTING LABORATORY CLASSES AT PEDAGOGICAL UNIVERSITIES**

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**Аннотация.** Ушбу мақолада педагогика олий ўқув юртларида тайёрланаётган бўлғуси физика ўқитувчиларининг экспериментал компетентлигини шакиллантириш ва ривожлантириш услибиёти кўрсатиб ўтилган.

**Калит сўзлар:** лаборатория, педагогика, машғулот, практикум, жиҳоз, компетентлик, тест, ёзма, оғзаки, ҳаракат, жисм, фаолият, эффектив, компьютер.

**Аннотация.** В статье рассмотрено формирование и развитие экспериментальную компетентность будущих учителей физики педагогических вузов.

**Ключевые слова:** лаборатория, педагогика, обучение, практикум, оборудование, компетентность, тест, письменный, устный, движение, тело, активность, эффективный, компьютер.

**Annotation.** The article discusses the formation and development of the experimental competence of future physics teachers at pedagogical universities.

**Key words:** laboratory, pedagogy, training, workshop, equipment, competence, test, written, oral, movement, body, activity, effective, computer.

**Introduction.** Developing society requirements pose a challenge to higher education institutions to radically reform the system of training future professionals. The reason for this is that a modern specialist must not only study teaching skills, but also the ability to creatively direct their knowledge to the solution of old problems that arise in new conditions.

The current level of training of future specialists requires the formation of scientific research skills through the laboratory exercises in technical areas. It is physics that can demonstrate the ability of human brain in the analysis of various complex situations, in the determination and prediction of the qualitative and quantitative level of the fundamental process which is being studied and shows analytical aspects of the results. Therefore, in the study of physics, the consciousness of scientific thinking develops and this ensures the fairness of the results for the invention activities.

We have discussed the formation of experimental and professional competence of pedagogical university physics teachers in the researches of scientists such as Z.A.Skripko [1], N.D.Armetova [2], V.D.Shadrikov[3], L.A.Krasnova [4], Yu.A.Gengera [5]

Besides, in doctor J.E.Usarov's dissertation paper "Improving the content of education and developing students' competencies on the basis of basic and scientific competencies (on the example of teaching physics)" improving the content of physics in secondary schools on the basis of a competency-based approach and a methodology for developing students' competencies has been developed and also opportunities to improve the quality of education in its teaching are revealed.

In the dissertation of LA Krasnova [pages 7,18-21] "Technology of formation of professional competence of physics teachers at the pedagogical universities" the achievements and shortcomings of technologies in the formation of competence of the future teacher of physics, the organization of pedagogical process in pedagogical higher education institutions are considered.



N.Artyomova's [8, pages 121-127] research work "Formation of the teacher's professional readiness for the development of universal educational activities of schoolchildren (on the example of physics)" focuses on the universal learning actions of the secondary school students in the use of laboratory classes in teaching physics in the formation of professional training skills of physics teachers.

But, innovational methods were not considered in conducting laboratory courses for future teachers of physics and prospects of competitive approach along with the development of competency in the process of preparation of future teachers of physics further improvement methods of education quality has not been investigated.

In conclusion, analysis of the research shows that Establishment of student's competencies by changing the content of laboratory classes in training future teachers of physics and astronomy of pedagogical higher education institutions, the content and form of laboratory practicums of general physics courses at general secondary schools and at pedagogical universities has not been studied in accordance with the staff training issues

**Research Methodology.** The study of physics in higher pedagogical establishments is a complex and multifunction process that consists of lectures, practical classes and laboratory practicum. Laboratory courses are an important part of the educational process. The role of experimental research in understanding the laws of physics completely is important in the study of a physics course. Therefore, laboratory classes should be multifunctional activity that covers works of different levels and serves to solve educational and didactic problems of different complexity in higher education. Integration of theoretical, methodological knowledge and practical skills of students takes place in laboratory classes. In such classes, students possess the skills such as experimental research, working with measuring instruments, processing the results, drawing conclusions based on the results, working with the literature. This serves as the basis for deep independent study of theoretical knowledge.

Despite the prominence of the laboratory classes importance in studying physics, in many cases teacher faces a number of problems in these classes. These problems can include problems such as being passive in laboratory classes, lack of interest and reject to attend classes, considering laboratory classes as an activity with the secondary importance, reviewing the results, and avoiding from making a report. Of course, the problems with the necessary equipment of physics laboratories should not be excluded here.

Under the above mentioned it can be said that the revision of the methods of conducting laboratory classes and methods of activating (setting in motion) cognitive activities in increasing the students interest, which serves to increase the effectiveness of laboratory classes of physics must be designed in higher educational establishments.

Methodology of conducting laboratory classes leads to working with a bibliography by activating student's self-awareness during the semester and results in increasing student's skills.

	<b>Norms of conducting laboratory lessons</b>	<b>Content of laboratory lessons</b>	<b>Allocated hours to the laboratory lesson</b>
	1. Control tests;	1. 5 theoretical questions	5- 15 minutes 3-5 minutes





<b>Laboratory work from a general physics course</b>	2. Permission given to the laboratory lessons;	4. From 5 to 7 to get acquainted with the theoretical questions related to the laboratory work and the literature on the next work	30-40 minutes
	3. To do lab work		20-30 minutes
	4. Lab work defend;		

In this methodology laboratory lessons are conducted in the following levels:

1. Tests
2. Perform laboratory work
3. Preparation of a report on laboratory work
4. Protection of laboratory work

**At the beginning of the session**, a mock test will be taken and it will take 5-15 minutes. The purpose of this test is to determine the level of readiness of the student in performing laboratory works. Tests can light up the content of the laboratory lessons which covers whole process. Questions can be in oral or in written form. It is better to take tests with the help computer technology and achieved results must be subject to continuing examine by doing laboratory works.

**In the second stage**, the student is checked for the presence of a form (instruction) of laboratory work. This form will include the main outline (development), tables and graphs of laboratory work. A student who does not have a form will not be admitted to class.

**In the next stage students** are divided into 2-3 or 5 small groups. There are mustn't be more than 5 participants in each group because of this exceedance in the number the participants will be able to copy from each other and others will stay doing nothing. The laboratory work phase lasts 30-40 minutes.

Performing calculations based on experimental results, drawing up tables and graphs, writing conclusions based on the results are included in the formulation of laboratory work. We think 15 minutes will be enough for this phase.

**Concluding phase is** devoted to the defense of the laboratory work. This phase can be carried out by conducting individual conversation or taking tests.

At the end of the defense, the teacher concludes whether student has submitted the work or not. If the work is not presented, students should try to present it in the next lesson and student will not be allowed to a new laboratory work. The student who has presented laboratory work can get a new laboratory homework. The order of the new lab work for theoretical information will be given in the list of references of this task

**Analysis and results.** Of course, the approach in the proposed style forces teachers to feel responsibility because in a short period of time, it is required to work with students individually and assess their knowledge. We would like to give an example from the laboratory work which can be an example for the laboratory work structure change  
**MECHANICS: THE STUDY OF THE OBJECTS THROWN FROM HORIZONTAL, VERTICAL AND INCLINATION WITH THE HELP OF MODERN EQUIPMENTS.**

**The aim of the work:**

1. Connections of distance with the angle of shooting



## 2. The relations between the maximum lift height and the firing angle

**Necessary tools and equipment:**

Equipment parts	
1 large display device	
1 holding magnet	
Source provision	
1 low voltage transformer C	
1 metal measuring tape	
3 clamps	
1 a rod, 75 inches	

**Sophisticated action: comparison of inclined movement with a free-fall of the object****Purpose of the experience:**

Moving along a sloping trajectory can be considered as an assembly of vertically and horizontally movements

**Theoretical principles:**

In the research  $v_0$  the object with the initial speed (balloon) was thrown horizontally  $\alpha$  when it was at the constant end  $\tau=0$ . A coordinating system was set in order to identify object transition point, trajectory of the movement  $x$ -identifies flat areas and the initial position of the object coincides with the origin coordinates (look at the 1<sup>st</sup> picture). The organizers of the movement are as follows  $x_1$  and  $y_1$ .

$$x_1(t) = g_0 t \cos \alpha \quad (1)$$

$$y_1(t) = g_0 t \sin \alpha - \frac{1}{2} g t^2 \quad (2)$$

in this place  $g$ - denotes free fall acceleration.  $x_1$  denotes outscoring of the motion  $y_1$  also classifies motion  $v_0 \sin \alpha$  describes the vertical motion  $v_0 \cos \alpha$  the initial speed. In order to check (1) and (2) equations in practice the second ball which was set at  $(c, x)$  the center of coordinate (look at the 1<sup>st</sup> picture) will be released after after throwing the first object. The object falls freely. This transition is presented as follows ( $y_2$  shaper)

$$y_2(t) = h - \frac{1}{2} g t^2 \quad (3)$$

If the second pellet is placed at a distance equal to the length of the device in the direction of movement the ascent height and flight distance will be in relation to the

$$\frac{h}{S} = \tan \alpha \quad (4)$$

shooting angle as follows

In this case, the two pellets collide during flight. In order to cover  $C$  distance 1<sup>st</sup> pellet:

$$t_s = \frac{S}{g_0} \cos \alpha \quad (5)$$

it passes it in equal time.

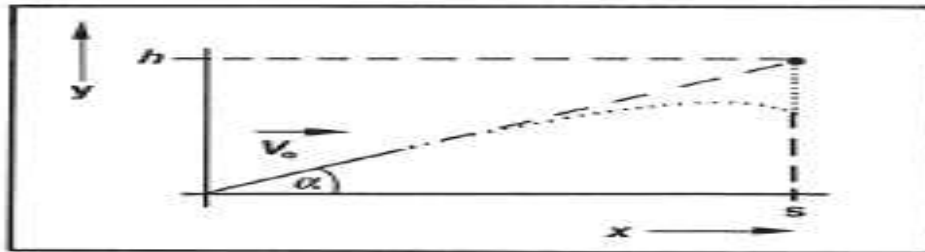
If we use  $t_c$  in the (2) equation we will be able to get equation that forms  $y_1$ :

$$y_1(t = t_s) = \frac{S \sin \alpha}{\cos \alpha} - \frac{1}{2} g t^2 = h - \frac{1}{2} g t^2 s \left( \frac{\sin \alpha}{\cos \alpha} = \tan \alpha \right) \quad (6)$$

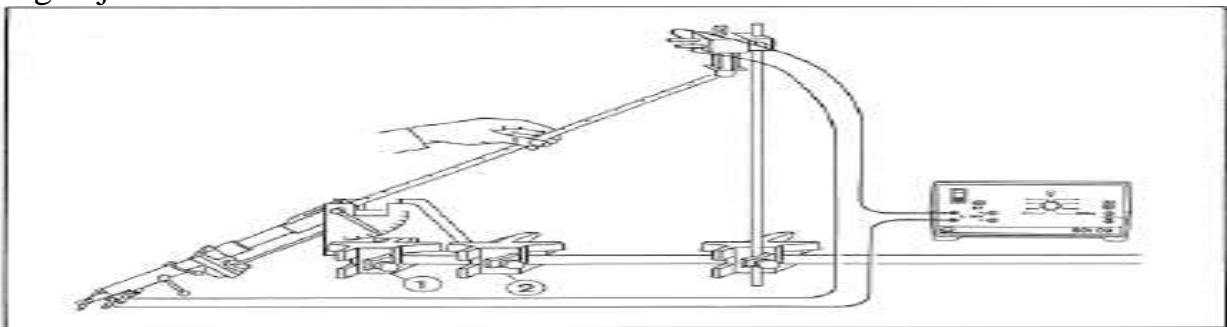
This equation corresponds well to the equation of motion of a second object that falls freely at time  $t_c$ . Experiments show that if assignment (4) is satisfied, both bubbles collide regardless of the velocity  $B_0$ .

If the movement is horizontal, the second pellet is placed on the surface of the projection device and  $x=0$  at free fall from height  $h$  is equal to:

$$y_2(t) = -\frac{1}{2}gt^2 \quad (7)$$



1-picture: Comparison of the movement of a sloping object with the motion of a free-falling object.



2- picture. Installation of slope motion study device and slope angle.

**The order of the experiment:**

Press the mechanism to release the tightly compressed spring to start the projection device and observe the trajectory of the balloons. Reset the projection device if necessary.

If the balls collide, change the compression level of the spring and repeat the experiment.

**The task execution order**

2. point recording of the relations of shooting angle and speed point with trajectory in the parabolic shape.

**The aim of the experiment:**

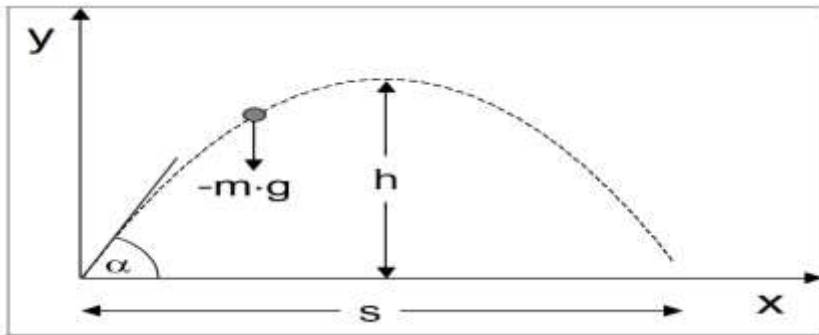
- Determining flight distance as a function of shooting angle.
- Determining the ascent height as a function of shooting angle.

**Theoretical principle:**

In the experiment, a steel ball of mass  $m$  is shot at an initial angle  $B_0$  to the horizon at an angle  $\alpha$ . The plane projection of the motion of the steel in the gravitational field (Pic. 1) is described by the following equation:

$$m \frac{d^2 \vec{r}}{dt^2} = m \begin{pmatrix} 0 \\ -g \end{pmatrix} \quad \vec{r} = \begin{pmatrix} x \\ y \end{pmatrix} \text{ radius vector}$$

M-The weight of a steel ball  $\vec{F} = m \begin{pmatrix} 0 \\ -g \end{pmatrix}$ : force acting on a steel ball



**3-picture:** The motion of a material point in the gravitational field. A description of the motion based on the (8) equation in the selected coordinate system.

$$r(\vec{0}) = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

Based on the following initial conditions

$$\vec{v}(0) = \begin{pmatrix} v_0 \cos \alpha \\ v_0 \sin \alpha \end{pmatrix} \quad (8)$$

The solution of the equation is expressed as the time function  $t$  of the coordinates of the steel sphere:

$$x(t) = v_0 \cos \alpha \cdot t$$

$$y(t) = v_0 \sin \alpha \cdot t - \frac{1}{2} g t^2$$

These can be expressed as the equations for the flight speed  $\alpha$  and the angle  $h$  of the maximum ascent height  $a$  and  $B_0$  depending on the initial velocity:

$$s = \frac{v_0^2}{g} \sin 2\alpha, \quad h = \frac{v_0^2}{2g} \sin^2 \alpha \quad (9)$$

In this experiment distance of flight  $s$  and  $h$  maximal climbing height  $\alpha$  as a function of deflection angle  $x_0$  is defined for three different magnitudes of the initial velocity.

**Devices and accessories:** A large projection device. Vertical scale, 1 m, Steel measuring tape 2 m, saddle base, laboratory bottom, tube, 552 x 197 x 48 mm, Quartz power 1 kg.

### Technical safety:

Read the safety instructions on the label of the projection device.

Do not allow your fingers to be in danger zones during installation or operation.

Avoid injuring your hand.

### **Devices**

- Install the projection device on the table as shown in Picture 2.
- Install the tube on the laboratory bottom.
- The surface of the sand cover or a sheet of copy paper must be at the same level with the level of the pellet on the device
- Set the scale on a branched base in order to measure the maximum elevation height  $h$  of the trajectory,

### **Order of experiment conducting**

**a) Setting connections between flight distance and flight starting point.**



- Measure the correlations of flight distance  $c$  with a starting point  $\alpha$  in the given initial velocity  $B_0$ .
- Repeat the experiment for the other two states of the projection device spring, i.e., for two more values of the initial velocity  $B_0$ .

**Caution:** Landing point of the pellet can be pointed out in two ways by putting sand cover (simple method) or putting a sheet of copy paper. In the second method it is advised to fasten copy paper with adhesive tape. Put numbers to every point. (look at the manual of the object under №336 56).

#### 6) Determine the connections of the ascent height with a firing angle.

- Measure connections between maximum ascent height and firing angle in the given initial speed  $v_0$ .
- Repeat the experiment for the other two states of the projection device spring, i.e., for two more values of the initial velocity.

**Note:** The maximum elevation height  $x$  of the trajectory can be easily and accurately determined with a vertical scale moving ruler. For more information, see 336 56 Device Manual

#### Measurement sample

Table 1. The dependence of the flight distance at different starting speeds on the shooting angle  $\alpha$ .

$\alpha$ gradus	$s_1$ m	$s_2$ m	$s_3$ m
10	0.130	0.330	0.630
15	0.210	0.430	0.900
20	0.265	0.580	1.180
25	0.320	0.715	1.390
30	0.365	0.825	1.545
35	0.390	0.900	1.670
40	0.410	0.930	1.705
45	0.420	0.940	1.760
50	0.400	0.910	1.710
55	0.375	0.860	1.565
60	0.345	0.800	1.450
65	0.310	0.735	1.320
70	0.245	0.610	1.120
75	0.225	0.470	0.800
80	0.155	0.330	0.540
85	0.085	0.200	0.225

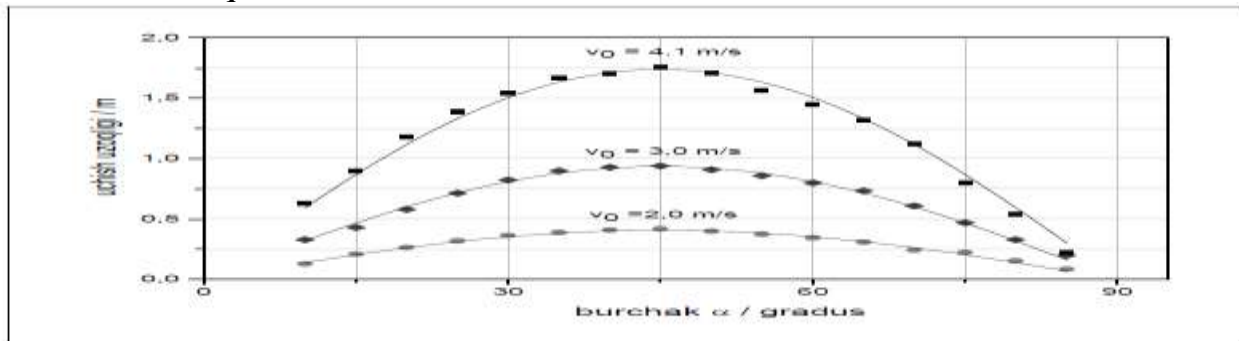
#### b) Determine whether the height depends on the angle of the shot.

Table 2: The dependence of the maximum ascent height  $x$  on the firing angle for three different starting velocities.

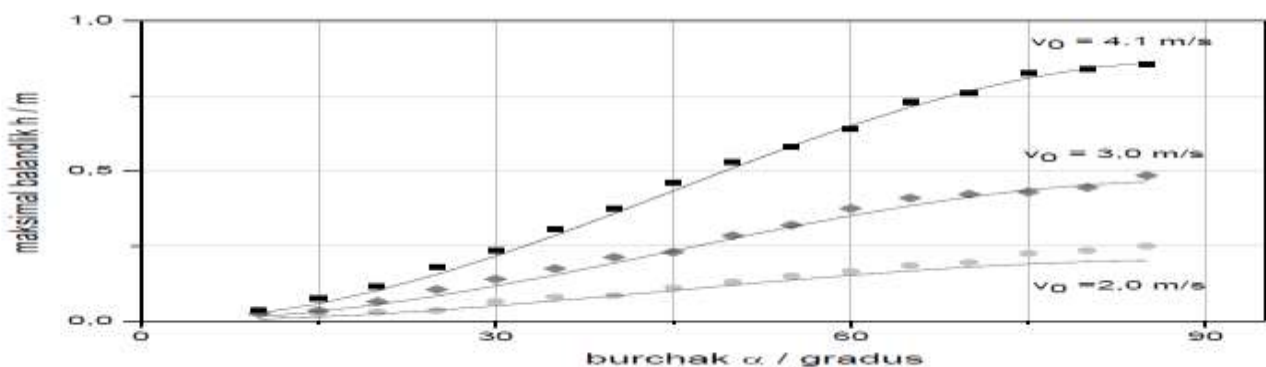
$\alpha$ gradus	$h_1$ m	$h_2$ m	$h_3$ m
10	-	0.025	0.035
15	0.0250	0.035	0.075
20	0.030	0.065	0.115
25	0.035	0.105	0.180
30	0.065	0.140	0.235
35	0.080	0.175	0.305
40	0.085	0.213	0.375
45	0.110	0.230	0.460
50	0.130	0.285	0.530
55	0.150	0.320	0.580
60	0.165	0.375	0.640
65	0.185	0.410	0.730
70	0.195	0.422	0.760
75	0.225	0.430	0.825
80	0.235	0.445	0.840
85	0.250	0.485	0.855

#### Evaluation and results

3-picture: Correlations between traveled distance value  $s$  and angle of inclination  $\alpha$  in the three velocities value  $v_0$ . Continuous lines correspond to values calculated by the small squares method which is based on the equation.



In the 3 picture, the initial velocity  $V_0$  is determined from the equation for the angle  $\alpha$



$$= 45^\circ$$

$$v_1 = 2.0 \frac{m}{s}$$

$$v_2 = 3.0 \frac{m}{s}$$

$$v_0 = 4.1 \frac{m}{s}$$

4-picture:  $V_0$  is the dependence of the maximum ascent angle  $\alpha$  on the angle of deflection at three different values of the initial velocity. The continuous lines correspond to the values determined by the method of small squares on the basis of the equation. Deviation from the parabolic law may be the result of air resistance. Graphs in the 3<sup>rd</sup> and 4<sup>th</sup> pictures fully confirm the laws expressed in the equations if it is assumed that there is no resistance in vertical free fall and horizontal motion. The width and height of the steel pellet trajectory is a parabola that depends on the value of the firing angle and the initial velocity.

#### Additional information

$v_0$  a light sensor installed to the initial speed device (337 46) can measure. Manual №336 56 can provide full information about the experiment device. Measured values can straightly a) can be compared with the value found in the least squares method according to the experimental results in the section. Look at the sample which is given in the picture №3.

Table 3: A) Comparison of the measured  $v_0$  initial velocity value with the experimental results.



	a) tajriba	o'lchangan (yorug' datchigi)
$\frac{v_1}{m/s}$	2.0	2.1
$\frac{v_2}{m/s}$	3.0	3.1
$\frac{v_3}{m/s}$	4.1	4.0

Measurement of velocity  $v_0$  with a light sensor shows that the value of the initial velocity  $v_0$  does not depend on the angle  $a$ .

### Estimates and results:

If the device is set correctly (the pellets collide during the leveling process of the throwing spring device), the pellets will collide during free fall, regardless of the level of firing force.

Thus, equations (1) and (2) were indirectly confirmed.

. Particularly the motion along the slope can be thought of as the sum of the forwarded motions along the vertical and horizontal axes.

### Test questions

1. How is the velocity and flight distance of an object shot at an angle determined?
2. On what does the flight distance of an object shot at an angle depend?
3. How can initial velocity and ascent height of a vertically shot object be find?
4. Identify the physical meaning of the acceleration of free fall
5. On what does the acceleration of free fall depend?
6. Explain the task execution procedure.
7. Give conclusion to the accomplished work.

### Achievements of the updated laboratory work:

First off all measurement accuracy is very high in this experiment. Table 1 shows the dependence of the flight distance at different starting speeds on the shooting angle  $a$  as a reference. For three different starting velocities, the dependence of the maximum ascent height  $h$  on the firing angle is given in tabular form. There is given opportunity to compare the measured  $v_0$  initial velocity value with the a) experimental results and also the dependence of the speed and range of flight of an object shot at an angle is studied along with the dependence of the initial speed and height of rise of a vertical object on the acceleration of gravity

**Conclusion.** Conducted scientific research works in ensuring the harmony between theory and practice in the formation and development of experimental competence of future physics teachers at pedagogical universities allowed us to come following conclusion:

1. Long lasting researches showed that standards based on modern requirements for organizing and conducting laboratory classes in general courses on physics at pedagogical universities have not been developed and execution methods of these experiments are not enriched with organizational methods and modern pedagogical technologies. Now days insufficient attention has been paid to the solution of these problems.

2. Need for organizing and conducting advanced laboratory works in the formation of experimental competence in future teachers of the physics is detected. A competent approach in teaching general physics ensures cooperation between teacher



and students, and also they are acquired not only theoretical knowledge but also practical skills.

3. Laboratory practicum has a great impact on the acquisition of competencies that strengthen the theoretical knowledge of students in practical works and it effects to the preparation level and characteristics of pedagogical activities. Laboratory practicum acts as a bridge between theory and practice and it can be a key factor in the formation and acquisition of competency by students.

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## **RESEARCH OF THE FOUNDATIONS OF COLLEGIAL MANAGEMENT IN EDUCATIONAL INSTITUTIONS OF HIGHER EDUCATION**

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**Аннотация.** Ижтимоий-иқтисодий ривожланишнинг замонавий шароитида олий таълим тизимида талаблар тобора ортиб бормоқда, шу муносабат билан олий ўқув юртлари учун самарали бошқарув тизимини яратиш зарурати туғилади. Мақолада фаолияти менежмент жараёнлари, асосий бизнес жараёнлари, ресурсларни бошқариш, мониторинг тартибларини такомиллаштиришга қаратилган университетлардаги коллегиял бошқарув органларининг шакллари ўрганиб чиқилган.

**Таянч сўзлар:** коллегиял бошқарув органлари, таълим тизими, олий таълим ташкилотлари, университет раҳбарияти.

**Аннотация.** В современных условиях социально-экономического развития все более возрастают требования к системе высшего образования, в связи с чем появляется необходимость выстраивания эффективной системы управления высшими учебными заведениями. В статье рассмотрены формы органов коллегияльного управления в вузах, деятельность которых направлена на совершенствование процессов управления, основных бизнес-процессов, менеджмента ресурсов, мониторинговых процедур.

**Ключевые слова:** коллегияльные органы управления, система образования, организации высшего образования, управление вузом.



**Annotation.** In modern conditions of socio-economic development, the requirements for the higher education system are increasing, in connection with which there is a need to build an effective management system for higher educational institutions. The article discusses the forms of collegial management bodies in universities, whose activities are aimed at improving management processes, basic business processes, resource management, and monitoring procedures.

**Key words:** collegial governing bodies, education system, higher education organizations, university management.

**Introduction.** Institutions of higher education belong to complex management structures, which are characterized by a high level of human potential, great social significance of the results of activities, a long life cycle of products and services, historically established independence and isolation of the activities of teaching staff, freedom of the teacher in choosing teaching methods [1,25].

In the management of a university, one should take into account the dynamics of ongoing changes and offer solutions adequate to the emerging development needs of the country, as well as be able to use any favorable opportunities to improve the management process. The increasing requirements for management systems initiate the need to study the forms of collegial management of the university as a complexly structured socio-economic system. In the process of increasing the efficiency of university management, it is necessary to build a management system, starting from the lowest level and taking into account the interests of all participants in the scientific and educational process.

**Literature Review.** Analysis of the development programs of Russian universities in terms of improving (or modernizing) organizational management models made it possible to form the following main directions of their development:

- 1) democratization and decentralization of management through the creation and improvement of collegial structures, including representatives of students, graduates, members of public and professional associations [1,56];
- 2) introduction of state and public forms of government, including through the creation of boards of trustees;
- 3) modernization of the structure of the financial management vertical with the introduction of promising financial management tools (performance-based budgeting), monitoring mechanisms, management by key performance indicators;
- 4) creation of autonomous structures, implementation of models of corporate education based on structure data.

The main feature of the university management process at the present time is the desire for innovation and a change in the management paradigm, without which no university can survive in the conditions of the market and social uncertainty [2,127]. However, unlike Russian universities, foreign universities have been following the path of innovative development for several decades. Around the mid-80s of the last century, a period of reforming European universities began in connection with the development of an economy based on knowledge, a market component appeared in the education system, the role of the state in the educational sphere changed [3,105].

The system of higher education that developed in the Soviet Union and the socialist countries existed in parallel with the production sphere, universities were a



closed system that did not interact with the external environment. The main collegial governing body was the Academic Council, and all entrances and exits of universities were controlled by the Ministry of Education.

By the 1980s. In connection with the expansion of democratic principles of management, independence and creative initiative of universities, it became necessary to reorganize collegial forms of management, which consists in the redistribution of functions and powers between central, regional and local government bodies, universities received more freedom in decision-making.

1990s became a turning point for the Russian education system, since the reform of the political, economic and social systems of Russian society required a restructuring of the educational sphere in organizational and substantive terms. In this regard, an interest arose in the European experience of educational systems. The processes related to the comprehension of the European experience took into account the provisions of the Magna Charta Universitatum, signed in Bologna in 1988. This document reflected the ideas about the social and historical role of universities on the threshold of the third millennium. Since 1999, having joined this convention, Russia has been actively participating in the Bologna process, one of the key tasks of which is to build a common European educational space, make the education system more open and compare national quality control systems based on international standards.

After the collapse of the Soviet system, the universities of the post-Soviet countries are forced to work under new requirements and rather tough competition. In this regard, an urgent need arose for fundamental transformations, consisting in the modernization of the content and organization of the educational process, as well as the research process and innovation; development of human resources and the formation of a high-quality contingent of students; modernization of the infrastructure of universities; improving the organizational structure of universities and increasing management efficiency.

**Research Methodology.** The modernization of higher education acts as the next stage of its reform, the purpose of which is to create a mechanism for the sustainable development of the education system in the changed social conditions, and the main task of the Russian educational policy is to ensure the modern quality of education based on maintaining its fundamentality and compliance with the current and future needs of the individual and society. and states [4, 242].

With the adoption on November 3, 2006 of the Federal Law "On Autonomous Institutions" [5,46], along with the previously existing structure of the institution, a new type of institution was introduced - an autonomous one, whose civil status is distinguished by a number of features. This law differs from other acts of civil legislation of the Russian Federation by the method of legal regulation - it is dominated by mandatory norms [6, 87].

The governing bodies of this type of institution include the rector, the president, the academic council, and the board of trustees. In addition, according to the Federal Law "On Autonomous Institutions", at least one more governing body of a federal university should be a supervisory board, consisting of representatives of the founder, executive government bodies, other government bodies, the public and employees of the autonomous institution.



The supervisory board of the autonomous institution considers the proposals of the founder or the head on specific issues of activity and makes its recommendations; gives an opinion on the draft plan for the financial and economic activities of the autonomous institution and on the proposal of the head on the choice of credit institutions in which the autonomous institution can open bank accounts; approves draft reports on the activities of the autonomous institution and on the use of its property, on the implementation of the plan of its financial and economic activities, and the annual financial statements of the autonomous institution.

The influence of the supervisory board on the head and on the activities of an autonomous institution as a whole is manifested only in cases when proposals are received from the head to conclude a major transaction or an interested-party transaction, and it also becomes necessary to audit the annual financial statements of the autonomous institution. The creation of this collegial body is associated with the provision of financial and economic independence to autonomous institutions, the absence of subsidiary liability of the owner of the institution and the need to control the disposal of extra-budgetary funds [7,152].

The Boards of Trustees are created in order to facilitate the solution of current and future tasks of the development of higher educational institutions, to attract additional financial resources to ensure their activities in priority areas of development and to monitor their use.

The administrative principles of the model of one-man management (rector) and collegiality (academic council) adopted in Russian higher education establish the balance of power spheres of these bodies, the essence of their powers. At the same time, this makes it possible to single out the principle of "separation of powers", which ensures greater democratization in the management of the university, its openness. This is also the manifestation of autonomy, a new form of power and management.[8, 54].

Meanwhile, among the problems of the development of universities of different scale and profile of activity were considered inadapted management structures of universities to the changed conditions, the dominance of operational management tasks, the absence of a system for making managerial decisions ahead of schedule, a slow response to changes in the external environment, unclear management procedures, etc. [9, 129].

History and traditions, modern management practice in universities confirm the importance of implementing the function of the head of a university through the presence of other forms of managerial decision-making (for example, the university administration), as well as the development of public participation in the management of an educational institution. [10, 135].

Currently, the Uzbek universities are tasked with "entering by 2021 at least five Uzbek universities in the first hundred of the world's leading universities according to the world university ranking." This Decree clearly formulates the main criterion by which one can judge the degree of approximation to the set goal: "by 2015, an increase in the share of publications by Uzbek researchers in the total number of publications in world scientific journals indexed in the "Network of Science" database (WEB of Science) , up to 2.44 percent. " A SWOT analysis of a possible strategy for SFedU's entry into the top hundred world universities, carried out by experts from the Ministry



of Economic Development and Trade, the Higher School of Economics, NES and PricewaterhouseCoopers, leads to the conclusion that the main influence on the growth of the ranking, like all other leading universities, is provided by science-intensive units. Ultimately, the level of education provided by the university and the demand for its graduates depend on the state and level of development of university science.

**Conclusion.** One of the directions for solving the tasks set for Uzbek universities is the creation of expert councils on science within universities, the activities of which consist in a qualified expert assessment of the prospects for the development of scientific areas that have developed at the university, stimulation of new multidisciplinary research and educational programs that meet the needs of the time, support and consolidation at the university of talented scientific youth.

Effective management of educational institutions of higher education is achieved through the functioning of collegial bodies, whose activities are aimed at improving management processes, main business processes, resource management, and monitoring procedures.

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## HEROES OF THE NOVELS “ARROWSMITH” AND “THE THREE ROOTS” IN TERMS OF VALUES

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**Annotatsiya.** Ushbu maqolada ideal qahramon kategoriyasi muallif estetik ideallarining ifodasi sifatida e'tibor markazida bo'ldi. Sinkler Lyuisning “Erousmit” va Pirimqul Qodirovning “Uch ildiz” romanlarining qahramonlari mualliflarning haqiqat, go'zallik va ezgulik haqidagi qarashlarini aks ettiradilar. Mazkur romanlarda kasb axloqi yuksak qadriyat sifatida tasvirlangan. Har ikki asar qahramonlari komil insonga xos xislatlarni namoyon etadilar.

**Kalit so'zlar:** Estetik ideal, ideal qahramon, realistic roman, ijobiy qahramon, qadriyat.

**Аннотация.** В данной статье в исследовательских целях внимание было уделено выделению категории идеального героя как выражения эстетических взглядов автора. В “Эроусмит” Синклера Льюиса и “Три корня” Пиримкула Кодирова главные герои художественно отражают взгляды авторов на истину, добродетель и красоту. В этих романах профессиональная этика описывается как высокая благородная ценность. Главные герои обоих романов представляются прекрасными личностями.

**Ключевые слова:** эстетический идеал, идеальный герой, реалистический роман, протагонист, ценность.

**Annotation.** For research purposes, attention was paid to highlighting the category of the ideal hero as an expression of the author's aesthetic views. In Sinclair Lewis's “Arrowsmith” and Pirimkul Kodirov's “The Three Roots”, the protagonists artistically reflect the authors' views on truth, virtue, and beauty. In these novels, professional ethics is described as a high noble value. The protagonists of both novels appear to the writers as beautiful individuals.

**Key words:** English, Uzbek, proverb, parema, meaning, daughter, lexeme, component, thematic group, English people, Uzbek people.

**Introduction.** Each society has its own ideals based on the essence of historical and social development, the system of national and cultural values, and the geographical environment. The ideals of two social communities, of course, cannot be the same. There are such universal values that unite different peoples, and when they switch to artistic images, typologically similar literary phenomena appear. While universal values such as truth, goodness, and beauty are the basis of typological similarity in the images of ideal heroes in the analyzed novels, the reflection of national values through characters creates distinctive aspects.



**Literature analysis.** A number of philosophers, N.G.Chernyshevskiy, V.S.Solovyov, A. F. Losev, E. Ilenkov, D.I. Dubrovsky acknowledged that the ideal is closely related to concepts such as truth, beauty and virtue. A.Dremov, V.Kozhenikov, L.Gotthem[2], N.Muhammadiev[5], T.Boboiev [1], E.P.Savchenko. researchers emphasize the connection of the notion with the ideal of an artist. In the article we gave a similar definition: an ideal hero is not an image devoid of flaws, but the image of a protagonist who brightly expresses the author's ideals. The ideal hero reflects the author's thoughts on the truth, beauty and good.

As is known based on national mentality and individual worldview a particular value is stressed by the author. The ideal hero of a writer appears as a product of views, values, and influences formed over the years. In the analyzed novels, there are different approaches when the authors emphasize certain noble qualities in the image of the characters. According to researcher E.P. Savchenko [6], " the linguistic and cultural image of the ideal hero is closely related to the following concepts: the national-linguistic landscape of the world and the author's individual linguistic view of the world». According to the scholar, " the influence of the national mentality on the artistic image, as well as the stereotypes that arise from this, are very strong." Agreeing with the theoretical views of the researcher, we can say that national values are clearly manifested in the image of the ideal hero. In this sense, it is noted that the analyzed novels also focus on national values, which are considered noble.

**Research methodology.** According to the modern principles of comparative literature, the influence of literature and the reception are considered as equal components of the creative process. Taking into account the socio-historical environment of American and Uzbek literature of the first half of the XX century, it is not accidental that the main characters of Sinclair Lewis's "Arrowsmith" and Pirimkul Kodirov's "The Three Roots" were chosen as ideal heroes. Common features in the analyzed works can be explained by these two types of literary connections. While the category of the image of the ideal hero is studied using the example of two realistic novels, the similarity between them cannot be explained by one type of typological connection. The reason was that when creating these works, Uzbek literature had the opportunity to enjoy the masterpieces of world literature. It is well known that the more open national literature is to cultural dialogue, the higher the attractiveness of the works created in it. History shows that no national literature can develop in isolation from the world's artistic thinking. Interacting with many other cultures, the national one becomes more universal.

**Analysis and results.** The plot of both novels built on the opposition of the two poles: in "Arrowsmith" idealism is put forward against sprawling materialism, whereas "The Three Roots" describes the conflict between totalitarian pressure and humane values. Both S.Lewis and P.Kodirov glorify idealistic values against prevailing social ailments.

The factors that shaped these ideals in the minds of the two novelists have a socio-historical basis. The 1920s in the United States, when "Arrowsmith" was written, the time characterized by the rise of materialism, the rapid commercialization of all fields, including medicine, and the leadership of the consumer mood over spiritual and moral values [7]. These factors caused great change in people's minds and actions. In the



1950s, when the novel "The Three Roots" was written, totalitarian politics and the tragic consequences of cult of personality allowed slander, libel, and selfishness to take root in society. Both novelists saw the way out of the socio-spiritual crisis in the glorification of high spiritual values, the qualities of a harmoniously developed person. It is at this point that the aesthetic ideals of the two novelists coincide.

S.Lewis grew up in a conservative family based on puritan values typical of the first American pioneers [9]. Since childhood, he had read stories about them with a great interest. In the United States, the image of brave pioneers traveling to the West, to the wilderness untouched by human feet formed a delicate feeling in S.Lewis's heart. For the writer, the image of pioneers moving to the West is captured in his artistic thinking as a symbol of a free man striving for a new life. Even in the prologue part of the work, it is hinted that the courage, independence and thirst for discoveries of the first American pioneers were embodied in the image of Martin Arrowsmith.

In the novel "Arrowsmith" individual freedom which has a special meaning for Americans, is reflected in the character of Martin [8]. There is a good reason to interpret the image of Arrowsmith by S.Lewis as one of the most liberal heroes of American literature. The fact that freedom in Martin's image becomes a fateful matter brings him closer to a more romantic hero than to a realistic one. Martin is, first of all, the artistic embodiment of a scientist, a writer of news, discoveries. It is no secret that freedom is a unique "raw material" for a creator; without it, there can be no novelty. So, if a creative person like Martin is in a social and spiritual captivity, will he be able to fulfill his original task, his scientific work? When a true scientist follows the thoughts and desires of the mass, he becomes one of "the men of measured merriment". According to S.Lewis, social relations, even family relations, should not bind the hands of a scientist. At the end of the conversation with his wife, Martin says: *The answer is that very few ever do, under any condition, willingly leave a soft bed for a shanty bunk in order to be pure, as you very properly call it, and those of us that are **pioneers** — Oh, this debate could go on forever! We could prove that I'm a hero or a fool or a deserter or anything you like, but the fact is I've suddenly seen I must go! I want my freedom to work, and I herewith quit whining about it and grab it* [4].

After the argument mentioned in the above passage, Martin deliberately left his wife and child. Some critics called his departure "completely irresponsible" [3]. This episode in the novel showed how great, in our opinion, Martin's desire for freedom was. The hero's departure to the forest is motivated by the search for salvation from nature, characteristic of romantics. In our opinion, the forest served as a symbolic detail.

The novel "The Three Roots" [10] emphasizes the priority values of the Uzbek national mentality. As is known, the concept of community is one of the main concepts of our mentality. Solidarity, team work, and community service have always been valued in all areas of our lives. Therefore, the responsibility of the leader is an important factor that determines the future of the community. The author of the novel in the personages of Akbarov and Mahkam spoke about the ideal leader. The end of both novels clearly show the influence of national and cultural factors on the characters of ideal heroes.





In creating the image of the ideal hero, the theme of interpersonal love is evaluated differently by two writers. For S.Lewis, not only in “Arrowsmith”, but also in other novels, the theme of love is mentioned, but not covered as a leading, integral part of the process of human self-realization. In the novel “Arrowsmith”, the author also addresses the theme of passion, but for Martin and for other characters (Gottlieb, Sandelius), his vocation and professional enthusiasm are depicted in the foreground. P.Kodirov, on the other hand, expresses love between a young fellow and a girl with subtle emotional details as an integral part of a person's self-awareness. Obviously it is connected with Eastern literature in which the idea of the concept “komil inson” (ideal person) has long been understood in close connection with love and is reflected in our national literary traditions. Thus, the image of the ideal hero shows the national and cultural values and views of the writer. The aesthetic ideals on which the author is relying when creating a character have deep roots and require taking into account the factors that shape the writer as a person.

**Conclusion.** A literary image is a means to realize this ideal. A brighter reflection of the author's ideal in a particular hero does not contradict the laws of art. For research purposes, attention was paid to highlighting the category of the ideal hero as an expression of the author's aesthetic views. In Sinclair Lewis's “Arrowsmith” and Pirimkul Kodirov's “The Three Roots”, the protagonists artistically reflect the authors' views on truth, virtue, and beauty. In these novels, professional ethics is described as a high noble value.

Thus, the ideal hero is a product of a certain socio-historical reality. In the example of the protagonists of the works analyzed in the research, the writers glorify high spirituality, high human values against certain social vices. The protagonists of the novels “Arrowsmith” and “The Three Roots” are created out of the gleams of such an artistic intention. Thus, the process of reflection of the author's aesthetic ideal in an artistic image begins to take place at the stage of creative intention. S.Lewis's intention was to expand the ranks of these Martin Arrowsmiths, Gottliebs, and Sandelius. P.Kodirov, in his turn, started the novel “The Three Roots” with the intention of increasing the number of young men like Mahkam, Ochil, and dedicated scholars such as Akbarov and Toshev.

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## PROBLEMS OF TEACHING GRAMMAR FOR SECONDARY AND INTERMEDIATE LEVEL STUDENTS.

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**Annotation:** Grammar seems to be something which is hovering like a threatening cloud below the classroom ceiling. If the teacher accidentally let slip out that today’s lesson will consist of grammar instructions, a murmur would be heard in the classroom which would be likely to express boredom or lack of interest. That is one reason why applied linguists and teachers alike are trying to find a way in which grammar could be taught both effectively and interestingly. This article will discuss some methods of teaching grammar in the English classes.

**Annotatsiya:** Grammatika ko’pchilik talabalar nazarida tilning eng zerikarli aspekti deb hisoblanadi. Agar o’qituvchi tasodifan bugungi dars grammatik ko’rsatmalardan iborat bo’lishini aytgan bo’lsa, sinfda zerikish yoki qiziqishning yo’qligini ifoda etadigan g’uvillash eshitiladi. Amaliy tilshunoslar va o’qituvchilar bir xilda grammatikani samarali va qiziqarli tarzda o’qitish usulini topishga harakat qilishining bir sababi shu. Ushbu maqolada ingliz tili darslarida grammatikani o’qitishning ba’zi usullari muhokama qilinadi.

**Аннотация:** Грамматика кажется самым трудным и скучным аспектом лингвистики. Если учитель случайно скажет, что сегодняшний урок будет состоять из инструкций по грамматике, в классе будет слышен шепот, который, вероятно, будет выражать скуку или отсутствие интереса. Это одна из причин, почему прикладные лингвисты и учителя в равной степени пытаются найти способ, которым можно было бы преподавать грамматику эффективно и интересно. В этой статье будут рассмотрены некоторые методы обучения грамматике на уроках английского языка.

**Key words:** system of the language, grammatical English, traditional grammar, structural grammar, linguistic description.



**Kalit so'zlar:** til tizimi, grammatik ingliz tili, an'anaviy grammatika, tarkibiy grammatika, lingvistik tavsif.

**Ключевые слова:** система языка, грамматический английский, традиционная грамматика, структурная грамматика, лингвистическое описание.

**Introduction.** The actuality of this article has been undertaken in line with the grammar mechanism of the language. In order to understand a language and to express oneself correctly one must assimilate the grammar mechanism of the language studied. Indeed, one may know all the words in a sentence and yet fail to understand it, if one does not see the relation between the words in the given sentence. And vice versa, a sentence may contain one, two, and more unknown words but if one has a good knowledge of the structure of the language one can easily guess the meaning of these words or at least find them in a dictionary.

No speaking is possible without the knowledge of grammar, without the forming of a grammar mechanism.

If learner has acquired such a mechanism, he can produce correct sentences in a foreign language. Paul Roberts writes: "Grammar is something that produces the sentences of a language. By something we mean a speaker of English. If you speak English natively, you have built into you rules of English grammar. In a sense, you are an English grammar. You possess, as an essential part of your being, a very complicated apparatus which enables you to produce infinitely many sentences, all English ones, including many that you have never specifically learned. Furthermore by applying you rule you can easily tell whether a sentence that you hear a grammatical English sentence or not."

A command of English as is envisaged by the school syllabus cannot be ensured without the study of grammar. Pupils need grammar to be able to aud, speak, read, and write in the target language.

**Literature review.** This "grammar" functions without the individual's awareness of technical nomenclature; in other words, he has no idea of the system of the language, and to use all the word-endings for singular and plural, for tense, and all the other grammar rules without special grammar lessons only due to the abundance of auding and speaking. His young mind grasps the facts and "makes simple grammar rules" for arranging the words to express carious thoughts and feelings. This is true because sometimes little children make mistakes by using a common rule for words to which that rule cannot be applied. For example, a little English child might be heard to say Two mans comed instead of Two men come, because the child is using the plural "s" rule for man to which the rule does not apply, and the past tense ed rule for come which does not obey the ordinary rule for the past tense formation. A little Russian child can say ножов instead of ножей using the case-ending "ов" for ножи to which it does not apply. Such mistakes are corrected as the child grows older and learns more of his language.

By "grammar" we also mean the system of the language, the discovery and description of the nature of language itself. It is not a natural grammar, but a constructed one. There are several constructed grammars: traditional, structural, and transformational grammars. Traditional grammar studies the forms of words (morphology) and how they are put together in sentences (syntax); structural grammar



studies structures of various levels of the language (morpheme level) and syntactic level; transformational grammar studies basic structures and transformation rules.

What we need is simplest and shortest grammar that meets the requirements of the school syllabus in foreign languages. This grammar must be simple enough to be grasped and held by any pupil. We cannot say that this problem has been solved.

**Research methodology.** Since graduates are expected to acquire language proficiency in aural comprehension, speaking and reading grammar material should be selected for the purpose. There exist principles of selecting grammar material both for teaching speaking knowledge (active minimum) and for teaching reading knowledge (passive minimum), the main one is the principle of frequency, i.e., how frequently this or that grammar item occurs. For example, the Present Simple (Indefinite) is frequently used both in conversation and in various texts. Therefore it should be included in the grammar minimum.

For selecting grammar material for reading the principle of polysemia, for instance, is of great importance.

Pupils should be taught to distinguish such grammar items which serve to express different meanings.

For example, -s (es)

The selection of grammar material involves choosing the appropriate kind of linguistic description, i.e., the grammar which constitutes the best base for developing speech habits. Thus the school syllabus reflect a traditional approach to determining grammar material for foreign language teaching, pupils are given sentences patterns or structures, and through these structures they assimilate the English language, acquire grammar mechanisms of speech.

The content of grammar teaching is disputable among teachers and methodologists, and there are various approaches to the problem, pupils should, whatever the content of the course, assimilate the ways of fitting words together to form sentences and be able to easily recognize grammar forms and structures while hearing and reading, to reproduce phrases and sentences stored up in their memory and say or write sentences of their own, using grammar items appropriate to the situation.

### **3.2. Principles of presenting the material on voice forms.**

The teacher should realize difficulties the sentence pattern presents for his pupils. Comparative analysis of the grammar item in English and in Russian or within the English language may be helpful. He should think of the shortest and simplest way for presentation of the new grammar item. The teacher should remember the more he speaks about the language the less time is left to practice. The more the teacher explains the less his pupils understand what he is trying to explain, this leads to the teacher giving more information than is necessary, which does not help the pupils in the usage of this particular grammar item, only hinders them.

It means that pupils learn those grammar items which they need for immediate use either in oral or written language. For example, from the first steps of language learning pupils need the Possessive Case for objects which belong to different people, namely, Mike's textbook, Ann's mother, the girl's doll, the boys' room, etc. The teacher masters grammar through performing various exercises in using a given grammar item.



**Analysis and results.** Grammar items are introduced and drilled in structures or sentence patterns. It has been proved and accepted by the majority of teachers and methodologists that whenever the aim to teach pupils the command of the language, and speaking in particular, the structural approach meets the requirements. Pupils are taught to understand English when spoken to and to speak it from the very beginning. This is possible provided they have learned sentence patterns and words as a pattern and they know how to adjust them to them to the situations they are given.

In our country the structural approach to the teaching of grammar attracted the attention of many teachers. As a result structural approach to grammar teaching has been adopted by our schools since it allows the pupil to make up sentences by analogy, to use the same pattern for various situations. Pupils learn sentence patterns and how to use them in oral and written language.

**Conclusion:** The teacher should furnish pupils with words to change the lexical (semantic) meaning of the sentence pattern so that pupils will be able to use it in different situations. He should assimilate the grammar mechanism involved in sentence pattern and not the sentence itself.

Pupils learn a grammar item used in situations. For example, the Possessive Case may be effectively introduced in classroom situations. The teacher takes or simply touches various things and says this is Nina's pen; that is Sasha's exercise-book, and so on.

The teacher should select the situations for the particular grammar item he is going to present. He should look through the textbook and other teaching materials and find those situations which can ensure comprehension and the usage of the item.

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**THE DEVELOPMENT OF INCUBATOR FOR EGGS BASED ON ARDUINO MICROCONTROLLER: ANALYSIS ABOUT OPTIMIZATION OF HATCHING POULTRY**

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**Annotatsiya:** maqolaning maqsadi tuxum uchun mo'ljallangan avtomatlashtirilgan inkubatorlar uchun tayyorlangan loyihalardan ma'lumot to'plash va ularni ikki parametr bo'yicha tahlil qilish: samaradorlik va moliya jihatidan. Tahlil har bir loyihani chuqur tadqiq qilish orqali o'tkazildi. Maqola kirish qismi bilan boshlanadi, bu yerda vazifani shakllantirish amalga oshiriladi. Moliyaviy tahlil loyihalarning moliya jihatidan tahlil qilishdan iborat bo'lib, bu tahlil turi, maqolada, samaradorlik tahlilidan keyin o'z o'rnini egallagan. Maqola oxirida tahlil natijalari oddiy ko'rinishda namoyish etilgan jadval orqali ko'rsatiladi.

**Kalit so'zlar.** Inkubatsiyalash, Arduino, mikrokontroller, parrandachilik, lyuk, sensorlar, display moduli

**Аннотация:** целью данной статьи является сбор информации из проектов автоматизированных инкубаторов, предназначенных для производства яиц, и анализ их по двум параметрам: с точки зрения эффективности и финансирования. Анализ проводился путем углубленного исследования каждого проекта. Статья начинается с введения, где происходит постановка задачи. Финансовые моменты учитываются для сравнения всех проектов, за которым следует анализ эффективности, который проводится путем определения аспектов эффективности документов. В конце статьи результаты анализа приведены в таблице, представленной в простом виде.

**Ключевые слова** Инкубация, Ардуино, микроконтроллер, домашняя птица, вылупиться, сенсоры, модуль дисплея

**Annotation:** The purpose of the pare is to collect information from the projects which are about automated incubators designed for eggs and analyze them according to two parameters: in terms of efficiency and finance. The analysis was conducted by



in-depth research of each project. The paper begins with the introduction, where the formulation of the task takes place. Then financial points are taken into account to compare all projects which is followed by an efficiency analysis that is conducted by stating efficiency aspects of the papers. In the end of the paper, the results of analysis are indicated by the table demonstrated in a simple view.

**Keywords.** Incubation, Arduino, microcontroller, poultry, hatch, sensors, display module.

**Introduction.** Incubation is the process by which certain oviparous (egg-laying) animals hatch their eggs; it also refers to the development of the embryo within the egg under favorable environmental condition [1]. An incubator is a device simulating avian incubation by keeping eggs warm and in the correct humidity, and if needed to turn them, to hatch them. Modern incubators are electrically heated with a thermostat [2]. In fact, sitting on eggs to make them incubated is called brooding. There are different incubators specified to various species of animals. In the paper, we specialize in the incubators designed for all types of animals. In Uzbekistan, the need for different kind of eggs is increasing in a huge manner due to its significant consumption. The constant delivery is important since eggs require to get temperature to be developed biologically [8]. In the meantime, humidity is also critical, because eggs cannot proceed to reach to the final stage of hatching at all. So, as mentioned above, two aspects of incubation process should be taken into account strictly, and all incubators should meet the requirements as main ones.

Two types of incubators exist:

1. Still Air Incubators
2. Circulating Air Incubators

The temperature in the first mentioned type of incubator must maintain a stable  $38.9^{\circ}\text{C}$  while the second one has to contain the temperature which is in the interval of  $37$  to  $38.5^{\circ}\text{C}$ .

In the next paragraphs, first, each projects` structures and methodology is shown to understand the whole systems shortly. Then, each of them is put on analysis to discuss them in terms of efficiency and finances separately. In the final paragraph, the overall table indicates plus and minus points of each project.

**Literature Review.** This paper is formulated with help of literatures of the projects used in the analysis. Moreover, internet resources are also involved to shape the project in a good form. The main ones are those which are chosen for analyzing purpose. Each of them is reviewed in the following paragraphs.

The first project is “Design and Implementation of a Fully Automated Egg Incubator” designed by K. Radhakrishnan, Noble Jose, Sanjay S. G., Thomas Cherian, Vishnu K. R. This project proposes the methodology of using ATMEGA16A which in turn, controls the whole system to maintain the environment which is optimum for embryo growth.

The second project, “Development of Smart Egg Incubator System Using Arduino”, performs SEIS methodology which is built with the help of three parts: mechanical design, electronic design and software design. Arduino microcontroller is used for software development in this project.



The third one, “Design of a Semi-Automatic Artificial Incubator”, is mainly based on Artificial Intelligence technology [6]. This gave opportunity to adjust the whole system taking into account various facts like external influence by nature, egg`s weight, height, type and so on.

All in all, this paper intends to have ideal system which will be more beneficial than three ones. Such results will be gained by detail analysis in terms of efficiency and finances. The following paragraph provide an explanation on how and why the analysis is taken place in this paper.

**Research methodology.** Our research methodology commences with analysis of three actual projects regarding Incubation. In the first two paragraphs we get to know with first project called “Design and Construction of an Arduino Microcontroller-based EGG Incubator”. Further, discussed the efficiency of the project.

Next two overviews of two left projects “Design and Implementation of a Fully Automated Egg Incubator” and “Development of Smart Egg Incubator System Using Arduino” are also about the efficiency, which means the plus points of each project. Financial side is also discussed in small paragraph, as the cost is almost the same.

In the next step the table is illustrated to make up the advantages and drawbacks of projects. We took 4 parameters as major to estimate three figures. Appearance, Compactness, the use with different types of eggs and Availability of display are considered as main due to necessity of people. Mostly, people require the portability and flexibility, since it has become standard among customers, thus these 4 points are describing people`s requirements. To show the better demonstration we colored items in red and yellow colors.

After table the results take place. Analyzing all factors of all projects, we got some summary, in which obviously seen what should be done next, consequently, suggestions, about rectifying some mistakes and adjusting the system as a whole, are given in the last paragraph.

**Analysis and Results.** The first article which we took as a main is an article called “Design and Construction of an Arduino Microcontroller-based EGG Incubator”. The main objective of their article is to construct a huge-capacity poultry for hatching day old chicks from eggs. They made an accent on efficiency and affordability in order to provide such system for people who are in in the industry of poultry [3].

The main factors of the hatching system are humidity and temperature range, to reach the maximum efficiency, the deep analysis of things affecting main factors was done. With the help of French model for finding the temperature of egg they could provide sufficient range of temperature for developing embryo in incubator. To have more effective system they employed temperature microcontroller and humidifier system to define accurate measures. The second and another factor is that eggs are needed to be turned every 3 hours [10], thus they created turned subsystem which can handle this.

Three years earlier in International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering was published an article “Design and Implementation of a Fully Automated Egg Incubator” in which was demonstrated the whole process of making an egg incubator system similarly to article mentioned above. Here, they used extended version of Arduino microcontroller - ATmega, which is also





prevalent platform to create such systems [9]. They also focused on providing suitable temperature for normal growth of eggs.

Using Temperature Sensor LM 35, user do not have to do some calculating to transform values into Celsius [7], consequently can save time and provide convenience. System also provides demonstration of the process of incubator system and give an opportunity to control the temperature inside and outside.

In third article we also could find positive points to show the efficiency of the project. Article called “Development of Smart Egg Incubator System Using Arduino” accounted for one essential point which is hatching different poultry eggs [5]. Other parameters are almost the same in comparison with two mentioned projects earlier.

In terms of budget spent on each of three projects, sum is approximately at the same price, looking at their materials they used, we can be sure that the average cost variates from 15 to 20\$ which is extremely profitable for farmers. We created a table which illustrates the main parameters by which all three projects are measured:

**Table 1**

Name of projects	Appearance	Compactness	The use with different types of eggs	Availability of display
Design and Construction of an Arduino Microcontroller-based EGG Incubator	Cool	Cool	Only Japanese	Yes
Design and Implementation of a Fully Automated Egg Incubator	Bad, many cables	Not merged in box	Only with one type	Yes
Development of Smart Egg Incubator System Using Arduino	Normal	Not merged in box	All types	Yes

By four parameters, which we considered as vital for incubation, we got some summary. First of all, all projects were made in different ways and years, which means constructed and written further. Used materials and components are all in a good quality which provide roughly the same accuracy, thus accuracy is not mentioned in the table.

As well as we colored some parameters to show demonstrably pluses and minuses of the projects.

- Red color - bad condition
- Default - reliable
- Yellow - needed to be fixed

The first project has many good points, however it does not feed third parameter “The use with different types of eggs”, consequently, it does not feed us. Coming to third project, we realized that it feeds third parameter as well as fourth, whereas second



project is needed to be fixed as a whole. The major problem of second and third project is not having a box which can provide compactness and portability. To sum up, considering all this, to construct new and reliable project feeding all parameters, we should focus on new methodology to reach maximum efficiency and profit from incubation.

**Conclusion and Recommendations.** To sum up, above paragraphs helped us to detect advantage and disadvantages side of each project. After reviewing all aspects of them, we came up to the decision of building the table where plus and minus points of analyzed papers are clearly demonstrated.

After comparing them all, we came to the opinion that the project “Design and Construction of an Arduino Microcontroller-based EGG Incubator” is considered as best one. Since it has more plus points comparing to others. However, it should be adapted to all kind of eggs to great extent. It means that new project should take into account other kind of egg`s development conditions like temperature, humidity percentage. All in all, first, we should adapt that project to serve all other types of eggs too. It might be done by analyzing the whole process of all eggs, find best approach which can suit all types. Next step would be analyzing development conditions of every type of eggs.

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## DESIGN OF INTEGRATED MECHATRONIC MACHINES

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**Annotatsiya:** Ushbu maqolada integrallashgan mexatronik tizimlarni mashinalarni loyihalash jarayonlarida foydalaniladigan oraliq o'zgartirgichlarni olib tashlash usullari va ularning abzalliklari, qo'llash jarayonida yuzaga keladigan muammolar hamda ularni bartaraf etish usullari haqida bayon qilinadi.

**Kalit so'zlar:** Integratsiya, agregat, interfeys, harakat dasturi, mexatron modul, blok-sxema, analog-raqamli o'zgartirgich.

**Аннотация:** В статье описаны методы удаления промежуточных преобразователей, используемых при проектировании машин интегрированных мехатронных систем, их преимущества, проблемы в процессе применения и способы их решения.

**Ключевые слова:** интеграция, агрегат, интерфейс, программа движения, мехатронный модуль, структурная схема, аналого-цифровой преобразователь.

**Abstract:** This article describes the methods of removal of intermediate transducers used in the design of machines of integrated mechatronic systems and their advantages, problems in the application process and ways to overcome them.

**Key words:** integration, aggregate, interface, motion program, mechatron module, block diagram, analog-to-digital converter.

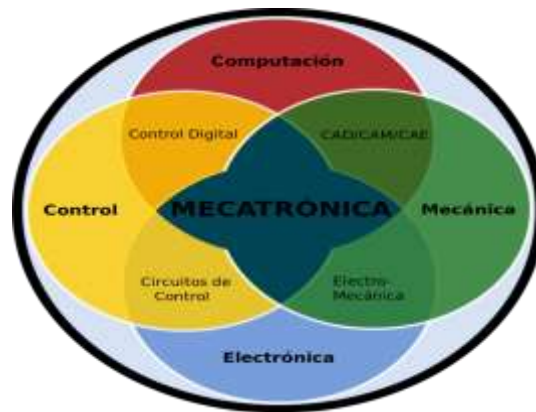
**Introduction.** It is a field of engineering dedicated to multidisciplinary research on the creation of mechatronic, electrical and mechanical systems. For the search for solutions, combinations of different industries are mixed into criteria that can implement high-quality combined processes.[7]

When innovative projects are implemented where different professional alternatives are mixed in the search for a solution, we can say that mechatronic engineering exists. It is a concept based on a combination of occupations that work together.

These areas are achieved in the fields of information technology, electronics, telecommunications and engineering. The idea is to look for faster and more efficient solutions in industries in which the actions of products, services and systems are involved.[6]

Consequently, the term can be defined as a science that performs the processes by which complex machines and equipment are created, serving to simplify and facilitate human life in practice. The combination of different professional directions determines the level of work and the results are optimal.

Mechatronics is one of the brightest examples of directing science, knowledge and experience to the service of common goals. However, in order to achieve the practical development of the concept, it is necessary to harmonize and shed its parts.



**Literature review.** The development and current state of the history of mechanical electronics, which dates back to earlier investigations of mechatronics in 1936, has since begun to bear its first fruits. Thanks to Alan Turing, an engineer who started implementing cybernetic type projects.

Various methods of integration have been developed in the design of integrated aggregates of mechatronics. This article discusses how to remove intermediate modifiers and interfaces. These methods can be used alone or in combination with other methods, as they are used at different stages of design. Of course, synergy is widely used in mechatronics. The use of synergy contributes to the rapid development of mechatron modules and their penetration into many areas. Below we will look at ways to remove intermediate converters and interfaces in the design of mechatronic systems.[8]

**How to remove intermediate converters and interfaces.** The goal of this integration method is to minimize the structural complexity of mechatronic modules by removing intermediate variables. In the design, at least one intermediate block and the corresponding interfaces are removed from the traditional structure. At the same time, its input and output parameters and the functional changes made by the mechatronic module in general are preserved. This goal can be achieved in the second stage of the design of mechatronic systems, ie in the synthesis of modules.

To design methodologically correct, it is necessary to consider the functional structure of the mechatronic system (MT). A functional view of the MT with certain input and output parameters (as a black box model) is shown. The main functional function of the mechatronic system is to translate information about the movement program into the targeted controlled movement of its final link.[2]

**Research Methodology.** The motion program can be provided by a high-level computer or by a human operator in the remote control. Controlled movement is performed using the links of the mechanical device, and the final link - the working body interacts with the external environment. During movement, the mechanical link is affected by external forces from the objects being machined (for example, shear forces during grinding and milling operations, contact forces and torques during robot assembly). Feedback is required to assess the state of the system and the external environment in real time.

Additional functions such as reconfiguring the system, signaling and data exchange with other process equipment, and self-diagnostics must also be performed for its efficient and reliable operation. But it is precisely in the external environment



that the main task that determines the behavior of the mechatronic system is the precise execution of a given functional movement.

The functional appearance of the mechatronic module in the form of a "black box" includes two data inputs (motion program and feedback), additional mechanical input (reaction forces of the external environment) and one output - targeted mechanical motion. Therefore, in general, the functional scheme of the mechatronic module can be built as an information-mechanical transducer.

An external energy source is required to make mechatronic information-mechanical changes. At the current stage of development of mechatronics, mainly electricity sources are used.[9]

Electricity is only a form of intermediate energy between input data and output mechanical motion. Thus, electricity is not the only energy source to perform its primary function. Of course, other types of energy sources can be used in mechatronic systems for intermediate transformations and should be considered as an alternative at the conceptual design stage.

**Analysis and results.** The choice of the physical nature of the intermediate variables is determined by the technical feasibility of the variables, the basic requirements and application characteristics.[4]

The following converters are widely used in mechatronic modules:

- The most efficient hydraulic converters in machines designed to operate under heavy loads, primarily due to their high relative capacity;
- very simple, reliable and high-speed pneumatic converters;
- Chemical modifiers are used mainly in the bioregulations, similar to the muscles of living organisms;
- Combined converters based on energy processes of different physical nature.

Of the seven basic converters mentioned above, three are monoenergetic (information, electrical, and mechanical converters), and their input and output variables are of the same physical nature. The other four have a dual nature because the input and output parameters have different physical natures. [1] This group includes information-electrical and electromechanical transducers located in the direct chain of the functional model, as well as electrical-information and mechanical-information transducers located in the feedback chain.

The structural model of a mechatronic module (MM) should reflect the composition of its elements and the relationship between them. In the theory of automatic control, it is accepted to create structural models in the form of block diagrams. The links are usually rectangular in shape, indicating the input and output parameters as well as the transmission functions.[5]

The structural model of the electric drive includes the following elements:

- computer motion control device, the functional function of which is to change information (digital signal processing, digital tuning, calculation of control movements, exchange of information with external devices);
- digital-to-analog converter (DAC) that performs the information-electrical conversion function;
- Power converter, usually consisting of a power amplifier, pulse width modulator (PWM) and a three-phase inverter (for asynchronous motors);



- a controlled electric motor (AC or DC) that implements an electromechanical converter;
- a mechanical device that performs a given controlled action and a working body that interacts with an external object;
- feedback device that provides information on voltage and current in the converter;
- feedback sensors (status, speed) that perform the function of mechanical-information exchange; [10]
- Interface devices shown in the block diagram as I 0-I 8.

Depending on the physical nature of the input and output parameters, the interface units can be a mechanical or intelligent converter. Examples of mechanical interfaces are transmissions and transmissions that connect to a mechanical device motor (I4 interface) and feedback sensors (I7, I8).

**Conclusion.** Comparing the functional model of the mechatronic module and the structural model of the traditional electric drive, we can conclude that the total number of basic and interface units in the electric drive is significantly higher than the number of functional changes. In other words, there are many structural elements in traditional electric drive. [3] The presence of redundant blocks leads to a decrease in the reliability and accuracy of the technical system, an increase in its overall size and mass, as well as cost performance. This method can significantly reduce the cost of the product and increase the reliability of the work, radically simplify the mechanical design of the module by loading the feedback function on electronic and computer devices. In fact, in this case, the method of eliminating intermediate converters is combined with the third integration method, which aims to expand the functions of smart devices in mechatronics.

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## **ISSUES OF COMING OUT THE ART OF AWARD BADGES AND MEDALS**

**(On the example of European countries)**

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**Abstract:** Мазкур мақолада мукофот белгилари ва орденлар санъатининг юзага келиши масалалари хусусида сўз юритилади. Европа давлатларининг антик, илк ва ўрта асрлар даврида мукофот орденларининг таъсис этилиши, жамият ҳаётида уларга бўлган эҳтиёжнинг юзага келиши келиши сабаблари, шунингдек, антик даврда юнон ва рим давлатида, ўрта асрларда Англия, Франция, Испания, Италия ҳамда Россия мамлакатлари тарихида яратилган орденлар тарихи баёни акс этган. Европа мукофотлаш тажрибаси асосида Шарқ мукофотлаш тизимини ўрганишда керакли тажрибалар олинган.

**Key words:** мукофотлар, орден, фалеристика, декоратив санъат, антик давр, ўрта асрлар даври, салиб юришлари, «Муралис тожи», Фалера, Пётр I, Феёдор Головин, «Фил», «Лазар», «Андрей», «Иосиф Тоскания» орденлари

**Abstract:** This article expresses and highlights about the origins of the art of award badges and orders. Description of the establishment of award medals in ancient, early and medieval European countries, the reasons for their need in society, as well as the history of medals created in ancient Greece, Rome, England, France, Spain, Italy and Russia in the Middle Ages reflected. Based on the European awarding experience, the vital and needful experiences have been gained in the study of the Eastern awarding system.

**Key words:** awards, medals, faleristics, decorative arts, antiquity, medieval period, crusades, medals "Crown of Muralis", Falera, Peter I, Feyodor Golovin, "Elephant", "Lazarus", "Andrei", "Joseph of Tuscany"

**Introduction.** If we overlook at the history of mankind, the achievements made by people play an important role in achieving a certain achievement and succeed in a higher civilization. The importance of rewarding people with new material and moral incentives, such as awards, badges and medals, orders are immeasurable. Indeed, we discuss the issues of the emergence of award badges and the art of orders in this article.

**Literature review.** The issues of coverage and analysis of the topicality and level of study of the topic are becoming increasingly important. For example, in the study of the origin, order and changes in the system of rewards in the East, it is important to study the history and current experience of countries around the world,



especially in Europe. In this regard, we will consider this article on the example of the world, the description of the award and its symbols in ancient countries, the history of the creation of medals in medieval European countries I.V.Vsevolodov [2], V.G. Burkov [1], R Scholars such as V. Shein [12], A.I. Korsak [7], V.G. Kolbin [11], T.N. Karsakova [5], E.P. Mikheev [9] have expressed their ideas and views.

**Research Methodology.** In addition, as a result of the introduction of the subject "Assistant History sciences" in the higher education system of the world, a number of textbooks, manuals have prepared separate topics and practical guidelines on the field of faleristics and its objects of award [3]. There are many issues that need to be addressed, and we have tried to aim to explore some aspects of them.

**Analysis and results.** In ancient Greece, brave warriors were awarded special badges for their bravery in the military field. There the term 'falera' originated, originally applied to round insignia attached to a horse's bridle, and the custom of awarding the winner with laurel crowns also originated in Ancient Greece. But the system of rewards there was not clear and firm, for in Hellas (the Greeks called their country by this name) always remained divided into several small states, and, most importantly, a professional army was not formed there. Unlike the Greeks, the Romans built an empire, emphasized a strong, professional army, and modeled on a compact system based on Greek awards. The first appearance of the Roman award was a wreath crown. The crowns of Rome were distinguished by an appearance marked by a clear hierarchy and rules. The upper crown of the Roman Empire was called the Triumphalis Crown.

Originally the wreaths were made of bay leaves, later the leaves were made of gold and were given the name 'Aurea crown'. This crown was handed over to the victorious commanders and served as a prototype of the crowns of kings and princes in later civilizations. There are also a number of types of rewards offered for various services in the empire. For example, the "Tsivika (civilian) crown" made of oak leaves was given to those who saved their friend in battle. The "Muralis crown" in the form of a castle tower was presented to the first soldier to cross the wall of the enemy city. The "Crown of Vallaris" is intended for those who conquer the enemy camp. The Navalis Rostrat Crown was awarded for bravery in naval battles. The teeth of this crown represented the ends of the vessels - the rosters. There were also wreaths of Mirtali and Olive for civil services in the Roman Empire.

These are the ribbons that indicate the level of the crowns. Those who wore the crowns only on the head, sometimes it was possible to wear them on a gold chain, around the neck. The crowns were also presented to commanders and warriors, and the crown could be received by an entire legion or centurion, the "sign (symbol of the Roman legions)." Exactly on the sign were crowns, falera, and other rewards of the legion, but the highest reward for the legion was a red square of matter hanging from a pillar barrier represented by a Roman eagle. In addition to the crowns, there were award chains, bracelets of honor, spears, and falcons representing a ten-centimeter-diameter round badge. They are usually cast in bronze or gold-plated silver. The fala depicts the head of the goddess Mars, sometimes the head of Minerva or Jupiter. Sometimes with sphinxes or other animal heads, falera with the image of a legion.





Several types of falera have been identified in excavations. They can often be found in images of statues or tombstones of soldiers [8].

In the early Middle Ages, as the number of military campaigns in European countries increased, many social links emerged in the life of society, and religious ideology rose to the stage of leadership. Only in the early eleventh century began to create Christian orders. After the conquest of Jerusalem, many knights could not find work. Power in the new kingdom was seized by the barons and those around them. These knights could not get rich and sought training for themselves. Some of them joined the monk-hospitals, serving the sick and the pilgrims visiting Jerusalem. In 1118, a serious change took place in the life of the hospital, and noble knights were admitted to the military branches.

In order to distinguish and encourage them, a special order - the order (award) of hospitals (ioannites) was established. It should be noted that belonging to this or that award, its features have led to the distinction of individuals in clothing. For example, the Franciscans, who were considered helpless, wore brown robes with mandatory belts, the Sylvesters wore wide air-colored mounts, the Palestinians wore black belts over white robes, and the Carmelites wore caps with stripes along with arrests. Also in the early Middle Ages in Kievan Russian was awarded a gold hryvnia, a weapon, a chain with a cross. In the 16th century, the Russian tsar Ivan the Terrible introduced the custom of rewarding those who showed courage in battle with small gold or silver coins. From those times, the prizes were sewn on hats or coats. At that time, it served as a sign of special courage, courage. In the fourteenth century, the process of the emergence of secular medals began in many European countries. For example, in England - the Order of Podvyazka, in France - the Order of the Star.

Among other orders established in the 15th and 16th centuries, the Danish Order of the Elephant is the most famous, first appearing during the Crusades and featuring a white elephant with a battle tower, commemorating the encounter with the monster during the Crusades. The emergence of the first secular knightly orders in Russia is associated with the name of Peter the Great. In medieval Spain, the Order of Saints Montezskaya was created in honor of the castle of Monteza in Valencia, which belonged to the heir to the Spanish throne. Also, the Order of Malta, which is part of the Spanish awards network, was the basis for the creation of the special royal order of John in 1802, while retaining its traditional symbol. In 1811, during the reign of the Cortes in Spain, they established the military order of St. Ferdinand, with which the government awarded those who had shown courage in the struggle for Spanish independence.

In France, the Order of St. Hubert was founded in 1416, and in 1786 became the Order of the King. The Order of St. Michael was founded by Louis XI in 1469 and served as an award for services to science and art. The Orders of Saint Karmelskaya and Saint Lazarus were established in 1607 by Henry IV to be presented to the royal bodyguards. The Order of St. Louis was founded in 1693. In the corners of its obverse there is a white cross with a lotus flower and the image of the Saint, as well as the date of its establishment.



Originating in Scotland and Ireland in medieval England, the Orders of St. Andrew and Patrick were of great importance. The Order of Andrew, mentioned in legends, was founded in 787. It was rebuilt in 1787 during the Reformation. The Patrick Order was founded in 1783.

The Order of St. George of Konstantinovsk, named after a representative of the Duchy of Parma in Italy, is also famous for its antiquity. The Order of St. Louis Parmask, founded by the Spanish heir Louis Bourbon in 1836, was proclaimed in the Duchy of Luc. The Order of St. Joseph of Tuscany, which some sources date to the 16th century, was created during Napoleon's redistribution of Europe. In 1859, the Order of Saint Marin, belonging to the Republic of San Marino, which was preserved during the unification of Italy, was established. It was also founded by Pius IV in 1560 with the Order of St. John the Lateransky.

. In 1698, Peter I established the first Order of Andrei Pervozvanny in Russia (Figure 9). On March 10, 1699, the first owner of this order was awarded Fyodor Golovin. This nobleman accompanied Peter I abroad and was responsible for Russian "students" and for inviting qualified foreigners to serve in Russia. After his return to Russia, Golovin was appointed head of the mint and all foreigners who served in the navy, and in March 1699, after the death of the first admiral of the Russian fleet, Franz Lefort, Golovin took his place. Golovin later became the head of the Navigatsky School, where the first Russian naval officers were trained, and was responsible for embassy orders until 1706, the end of his life[5].

In the reward system of European countries, especially the stones in the orders - small diamonds carved in roses, are almost obscured by the caste of the uneven upper part (the method of strengthening the precious stones used in items of the Renaissance). The lower part of the casts is made on the basis of a German art pattern with embossed belts with edge-toothed teeth.

When it comes to the above-mentioned awards, orders have gradually gained a secular character, gained popularity and become part of the system of incentives in society. In the XV-XVII centuries, the rulers themselves began to pay special attention to the development of orders, introducing new "specialized" orders and establishing the old ones in a new form. As a result, the Central Rewards Institutions have taken the lead in government activities related to the voluntary order and award areas, as well as in legal and financial matters.

**Conclusion/Recommendations.** It should be noted, that the scientist IV Vsevolodov compares faleristics (assistant historical science studying the system of rewards) [6]: "Its existence, which serves as a source of modern rewards, is its roots. Ancient Greek Variety falera and crowns, badges and chest chains - the first root. The second root is the military award of the first medieval military units, united by an oath of allegiance to the prince or ruler, enjoying common privileges and sharing common responsibilities. The third root is the orders of the clergy, which appeared in medieval Europe during the struggles of the popes with the secular feudal lords, and their logical development - the orders of military spirituality and chivalry during the Crusades. [2]

Of course, it should be noted that in Western countries, awards have emerged not only as a state award, but also as an important incentive in the life of secular society,



created and presented mainly for religious ideology, military relations and social and economic initiatives. Thus, the system of state awards has served as a mechanism for educating and encouraging the military, intellectuals, and categories of science that have existed for centuries. In the countries of the world, state awards are given in the field of state building, economics, science, culture, arts and enlightenment, strengthening legislation, protection of health and life, protection of citizens' rights and freedoms, education, development of sports, contribution to national defense and national security. has been the highest form of incentive for its citizens for other services before it, and this tradition continues to this day. The most important thing is that the person who received the state award should have a sense of spiritual union and feeling with him.

The above-mentioned views on the orders and medals of European countries play an important role in the study and comparative analysis of the history of the reward system of Eastern countries. Also, the analysis of the scientific literature and sources studied in this regard shows that we were able to put forward a number of proposals based on a number of tasks to be performed:

To determine the interrelationships and periodic boundaries of the beginning of the history of the reward system of Western and Eastern countries;

To study the process of emergence and formation of the field of faleristics in the countries of the East, including Central Asia, the stages of development;

To study the growth, importance and role of number of types of incentives and rewards in the ancient and medieval period of the Central Asian region;

In the analysis during the period of formation with the tradition of awarding orders and medals in Central Asia and the nature of awards, it is expedient to study and categorize the factors of internal and external influence.

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## SOCIAL JUSTICE TRENDS IN SOCIETY

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**Аннотация.** Жамиятда ижтимоий адолатнинг мавжудлиги кишиларнинг ўзларини идентификациялашнинг давомийлигига ва улар фаолият кўрсатаётган атрофдаги ижтимоий ва моддий дунёнинг барқарорлигига ишончини кучайтиради. Ижтимоий адолат тамойиллари давлатнинг инновацион ислоҳоти учун консенсус асоси бўлиб хизмат қилади. Замонавий кўп миллатли ва турли маданиятларга эга жамиятнинг барқарор шаклланишини, турли даражадаги маданиятлар, этник ва диний гуруҳлар ва халқлар ўртасида оқилона мулоқот майдонини таъминлайди.

**Kalit so'zlar:** Ижтимоий адолат, жамият, иқтисодий-ижтимоий жараёнлар, фуқаролик жамияти, ижтимоий ҳимоя.

**Аннотация.** Существование социальной справедливости в обществе укрепляет уверенность людей в устойчивости своей самоидентификации и стабильности социального и материального мира, в котором они действуют. Принципы социальной справедливости служат основой консенсуса для инновационной реформы государства. Он обеспечивает устойчивое формирование современного многоэтнического и многокультурного общества, рационального пространства для общения между разными уровнями культур, этническими и религиозными группами и народами.

**Ключевые слова:** Социальная справедливость, общество, социально-экономические процессы, гражданское общество, социальная защита.

**Annotation.** The existence of social justice in society strengthens people's confidence in the stability of their self-identification and the stability of the social and material world in which they operate. The principles of social justice serve as the basis



of consensus for innovative government reform. It ensures the sustainable formation of a modern multi-ethnic and multicultural society, a rational space for communication between different levels of cultures, ethnic and religious groups and peoples

**Key words:** Social justice, society, socio-economic processes, civil society, social protection.

**Introduction.** In the historical development of mankind, social justice has played an important role in improving the spiritual-moral, administrative-legal mechanisms that organize, manage and control socio-political relations. For this reason, the laws that are the regulatory basis for the development of social justice, the activities of socio-political institutions had a specific meaning.

**Literature Review.** In particular, Abu Nasr al-Farabi, the founder of Islamic philosophy in his time, writes about the peculiarities of social justice: A civilized society or a cultural city (or country) is such that everyone in this country is free in his profession, everyone is equal, there will be no social difference, everyone will pursue a profession of their choice. People will be truly free ... But there will be some cities (or countries) in which the thoughts of the whole nation will be focused on the accumulation of wealth. Leaders who come from them also see leadership as multiplying the wealth world. That is why sooner or later they will be in the process of collecting the world of goods. In the peoples of the city, who work under the leadership of such leaders, various perverted habits, lusts, envy, quarrels, enmity, quarrels arise. From such urban peoples are born a generation with different characteristics and inclinations.[1.190-191] In this context, it is important to analyze the historical genesis of the category of social justice, the philosophical content of the stages of development in the context of socio-political relations.

The existence of social justice in a society enhances people's confidence in the "continuity of their self-identification" and in the stability of the social and material world in which they operate. The principles of social justice serve as the basis for consensus for innovative reform of the state. It ensures the sustainable formation of a modern multi-ethnic and multi-cultural society, a rational space for communication between different levels of cultures, ethnic and religious groups and people. The system of social justice, along with the creation of decent living conditions for citizens, ensures the priority of universal principles in the management of society. Only a human and just society can provide adequate living conditions for the protection of socially vulnerable and sponsored groups, overcoming the difficulties of life, the solidarity of citizens and the preservation of the full life of the people.

That is why Hussein Waz Kashifi, in his book Ahlaqi Muhsini, urged people to live a just life: If justice is not protected, weak and powerless people will disappear. As long as the weak perish, the strong will not survive, because human life is interconnected. In short, the condition of the people will not improve without justice.[2.3020] In general, Preacher Kashfi urged people to adhere strictly to the principles of justice for the sustainable development of society. Indeed, even today, the scholar's philosophical, moral views on social justice are of great importance. Indeed, the effective interaction of an active civil society and a strong state is the most important condition for strengthening the foundations of a just society, the formation



of legal consciousness, civic and patriotic feelings in people. Although social policy in industrialized countries is multidisciplinary, in all cases it implies the implementation of the principles of social justice. Their implementation will help create a modern multicultural, productive and harmonious society, an equal platform of interaction between civilizations, cultures, nations and states.

Social justice ensures social stability and innovative development. In addition, in some regions they differ in ethnic-cultural and confessional characteristics. The development of social justice contributes to scientific, economic and cultural development, the strengthening of private property institutions and civil society, and the further development of market reforms in the economy. Such tasks increase the need for a systematic socio-philosophical study of the principles of social justice. It also helps to theoretically understand the functions and factors of justice, the specifics of the reflection of justice issues in the public consciousness, the role and importance of social justice in the formation and development of regional society. That is why our great ancestor Amir Temur in his "Statutes" said: "... I also did good to the good people of every country, expelled the wicked, corrupt and immoral people from my country. I have raised their careers out of respect for the great and the honorable. I have opened the door of justice in every country and blocked the path of oppression.[3.118]

**Research Methodology.** The main problem in the system of modern social and philosophical sciences the achievement of social justice in society is generally seen as an important result of the cultural and historical conditions that exist in the state, but in part justice is the result of ideological choices made by state leaders and their socio-political decisions. For this reason, Munis Khorezmi wrote about it: "Only in countries where justice is celebrated can there be trust, respect and harmony between the ruler and the people"[4.33].

Social justice is the nature of the creation, accumulation and distribution of economic and social benefits in a society, as well as the specific features of the relationship between civil society, people, business and government, the values determined by the historical and cultural characteristics of human development. is a system of ideas. In his book "Explanatory Dictionary of the Uzbek language"[5.632] he wrote: "Justice is justice, fairness, truthfulness, correctness. It has been explained that to stand for justice means to stand on the side of truth, to be just, to act justly. An unjust, unjust, perverted, unjust, unjust person [6.632]. Indeed, justice acquires social significance in the form of specific norms and laws.

Social justice stabilizes unstable economic, cultural and political relations in society, provides all social entities, regardless of their individual differences, sufficiently equal shares or individually distributed benefits embodied in economic redistributions provided by public authorities, as well as state ideology, cultural security. Because "Justice is expressed in the concept of social consciousness, which characterizes the norms and opportunities of individuals and social groups, the norms of rights and welfare, the attitude of different classes and social groups to socio-economic, political, spiritual and cultural events" [7.15].

The essential foundations of social justice are manifested in its subjective, everyday, and complex nature. In this process, subjectivity is related to the need for socially vulnerable groups and individuals to take active measures to obtain or increase



their share in the distribution of national wealth. The complexity of social justice is distinguished by how important it is in ensuring the stability of society. It is also characterized by a systemic influence on the development of economic, political, spiritual and cultural spheres of society. Social justice is based on meeting the basic interests and daily needs of all social strata, including guardians and marginalized groups. The Universal Declaration of Human Rights states: "Everyone has the right to a fair and public hearing by an independent and impartial tribunal, in the determination of his rights and obligations and of any criminal charge against him." [8.185]

The existence of social justice in society softens the sharpness of existing socio-economic, political contradictions and the essence of the gaps between the rich and the poor, between all major political and economic groups. Social justice contributes to the ideological strengthening of citizenship, the development of moral and ethical foundations in the relationship between government agencies, business and civil society within the modern social system. In his time, Amir Temur's work "Temur's Statutes" also covered in detail the issues of fair work and remuneration: "Sayyids, scholars, mashayiks, fuzaro, akobir and nobles should be cherished. Let the Kadhudas, the kalontars, the farmers, and the cultivators of the fields rejoice and turn to themselves. Let them keep the people between hope and fear. Let them be punished according to their sins and deeds. Let the sayyids, scholars, sheikhs, nobles, dervishes of the countries subordinate to me reward the one who sits in solitude with exile, duty and salary (alimony). Let the poor and needy, the blind and the lame, be given a provision. Let them give a task to their teachers and sheikhs. [9.97]

Social justice depends on the cultural context of social development and, above all, the level of development of legal culture in society, which is based on transparency, willingness to compromise, partnership and respect for human social and economic rights. This gives government agencies ample opportunity to work with business and civil society organizations to develop coordinated decisions on major economic, political and social issues. Social justice is formed as a result of the settlement of acute conflicts between major political, ethnic and social groups on the basis of consensus in a period of radical historical change. Citizens perception of society as just or unjust depends on the building of a conscious state and the recognition of national ideology. "If it's a national idea, the goal is clear," he said. Virtuous goals, on the other hand, encourage everyone to mobilize and further unite society. A state with its own national idea, national ideology will be strong, powerful and prosperous [10.473].

The ideology serves to develop the spiritual and moral basis for the effective targeted solution of major social problems, both by the state, which implements social, economic, political and cultural initiatives, and by non-governmental entities and local communities. "The ideology of national independence, based on the ancient traditions, customs, language, heart and psyche of our people, creates opportunities to instill in our minds a sense of confidence in the future, kindness, honesty, patience, justice, enlightenment" [11.203]. After all, the common object of ideology is man and his conscious, intelligent, perceptive behavior, attitudes, lifestyle, behavior, morals, customs, which are reflected in certain concepts. Such a socio-mental, spiritual process, in turn, is the main criterion of a just social system, which respects every person as an individual, regardless of nationality, race, lineage, religion, beliefs. Such a just social



life is a free, liberated condition created not only for one nation or people, but also for the people of the world. This, in turn, suggests that in the process of building civil society, the national mentality should be viewed in an integral dialectical connection with universal values.

In order to strengthen social justice in modern society, it is necessary to overcome high levels of corruption. This will ensure effective economic competition and socio-economic modernization in the context of the global pandemic. State anti-corruption measures include strengthening property rights and contractual obligations in legislation, clearly defining the functional roles of owners, shareholders and managers, increasing information transparency, ideological and moral and moral stability, as well as the investment attractiveness of the economic system in society. Resolving regional conflicts arising as a result of modernization processes in the socio-political and socio-economic spheres will not be possible without building a just society, which depends on coordinated and constructive public action by all regional actors on the basis of compromise, tolerance, partnership and compromise. Therefore, in the process of building a just, human society, one of the most urgent tasks is to educate citizens in the spirit of respect for national and universal values. This is a fact that stems from the objective laws of development of human society. The shortage of equality at the regional level should be addressed by improving the quality of management systems, socio-economic support, as well as increasing the economic efficiency of manufacturing sectors. Social justice is further strengthened not only at the level of individual denominations or ethnic groups, but also at the level of all subjects by increasing the level of social protection of people, as well as the development of spiritual and moral ideas about social justice existing in social consciousness.

**Conclusion.** Thus, the need to carry out socio-economic and socio-political reforms in the country and the formation of sustainable institutions in the form of a developed civil society and the rule of law is directly related to the need to develop and effectively implement the principles of social justice. Social justice ensures social stability and innovative development of society. At the same time, social justice is important not in how to equate all social subjects, but in how to link the economic differences between income and property belonging to people with their abilities, individual actions, and professional outcomes. In this sense, social justice means that people get what they deserve based on the evaluation and application of some generally accepted principles in society that conform to spirituality and morality.

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## **SOCIO-PSYCHOLOGICAL APPROACH IN THE SCIENTIFIC STUDY OF THE PROBLEMS OF CHILDREN WITH DISABILITIES**

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**Аннотация:** Мақолада имконияти чекланган болалар муаммоларининг илмий ўрганилишида социо-психологик ёндашувлар таҳлили келтирилган. Унда “ногиронлик”, “имконияти чекланганлик”, “ақли заифлик” тушунчалари тавсифланган. Имконияти чекланган инсонлар муаммоларининг назарий-методологик ўрганилишининг миллий ва хорижий тажрибаси ёритилган. Ушбу муаммо борасида социология фани ютуқлари саналган илмий ишлар ва мавзуга дахлдор адабиётлар шарҳланган. Муаллиф томонидан ногиронлик моделларининг концептуал ва амалий асослари таҳлил қилиниб, унинг ижтимоий модели замонавий жамиятдаги ижтимоий тенденцияларига мос эканлиги кўрсатилган. Имконияти чекланган кишилар муаммоларини илмий-амалий ўрганишда институционал тизим яратиш зарурати илгари сурилган.

**Калит сўзлар:** ногиронлик, ногиронлик моделлари, имконияти чекланган болалар, ижтимоий инклюзия, ижтимоий сиёсат, ижтимоий ҳимоя, ижтимоий иш.

**Аннотация:** В статье был сделан обзор научной литературы отечественных и зарубежных исследователей по вопросам инвалидности, проблем людей с задержкой умственного развития. Также в статье были



проанализированы различные модели инвалидности и был обоснован тезис, что наилучшей моделью инвалидности на сегодняшний день является социальная модель понимания инвалидности. В данной статье также даются предложения о необходимости создания институциональных основ изучения феномена инвалидности.

**Ключевые слова:** инвалидность, модели инвалидности, дети с ограниченными возможностями, умственная отсталость, социальная инклюзия, социальная политика, социальная защита, социальная работа.

**Annotation:** The article presents an analysis of socio-psychological approaches in the scientific study of the problems of children with disabilities. It describes the concepts of "disability", "limited capacity", "mental retardation". National and foreign experience of theoretical and methodological study of the problems of people with disabilities is covered. On this problem, scientific works and literature on the subject, which are considered achievements of the science of sociology, were reviewed. The author analyzes the conceptual and practical basis of the models of disability, indicating that its social model corresponds to the social trends in modern society. The need to create an institutional system has been put forward in the scientific and practical study of the problems of people with disabilities.

**Keywords:** disability, disability models, disabled children, social inclusion, social policy, social protection, social work.

**Introduction.** According to the World Health Organization's World Disability Report, about 15% of the world's population suffers from some form of disability, of which more than 100 million are children [1].

Practical work is underway in Uzbekistan to radically reform the field of social support for people with disabilities. Decree of the President of the Republic of Uzbekistan № D-5006 of August 1, 2017 "On measures to further improve the system of state support of persons with disabilities" and the Decree of the President of the Republic of Uzbekistan of December 1, 2017 "On measures to radically improve the system of state support of persons with disabilities" Decree № PD-5270 was adopted. It identifies key areas for further improvement of the state social support system for persons with disabilities [2].

**Literature review.** In sociology, the integration of children with disabilities in society, the problems of their socialization are considered one of the topics studied in detail. In particular, the classical manifestation of sociology E.Dyurkgeym connects the social problems encountered in the vital activity of people with disabilities with the institutional social norms formed in society. The Dyurkgeym advocated for such people to be in a humanistic relationship, without limiting themselves to scientific reasoning on the problems of people with disabilities. In accordance with his ideas, the term "notypical person" was first used by the sociologist scientist in relation to persons with disabilities [3].

M.Weber analyzed the characteristics of personality behavior, the possibility of on this occasion stood apart from the problem of limitations[4]. E.Fromm scientific work, this problem is studied within the framework of the social character of the individual and interprets the possibility of restriction as a product of social life[5]. E.Fromm in proportion to the work of R.Merton addressed the problem of incompetent



individuals in his concept of anomaly and saw it as a consequence of the conflict formed between the purpose and direction of activity of existing social institutions in the society[6].

In the CIS countries, this problem was analyzed in the context of socio-cultural factors. In particular, E.R.Yarskaya-Smirnova clarified the socio-cultural factors of the possibility of deprivation or nonpublicity. Also, E.R Yarskaya-Smirnova in cooperation with E.K. Naberushkina, P.V.Romanov, he studied in detail the issues of social work with disabled people, social policy on disability and social inclusion [7]. In the scientific research of N.I.Skok, however, individuals with disabilities were studied as a layer in need of social support of the state, and the concepts of "disability", "limited capacity" were described from a sociological point of view[8]. It is noteworthy that these scientists laid the foundation for the tradition of studying and analyzing the problem of disability among scientists from the CIS countries. Also, in the scientific-theoretical approach to the problem of disability, the features of the social model of disability were revealed. Due to the peculiarity of this model, the social essence of the limitation of opportunities, the social protection of a disabled person, rehabilitation and adaptation, the processes of adaptation to society were interpreted.

At present, the problems of disability are studied in the sphere of sociology, philosophy, pedagogy, psychology, law, medical sciences, a certain base of scientific and theoretical approaches is formed on this issue. Taking into account the fact that certain currents are formed in these approaches, it is possible to categorize the trends of scientific study of the problems of capacity constraints. In Particular, M.N.Reut explains the socialization characteristics of vulnerable hearing youth, and V.G.Sukhanov rehabilitation of people with disabilities. D.V.Ilichev complex illuminates the social status of individuals with physiological defects[9]. In the following years, a differentiated approach to the issues of limited opportunities in World Science is being promoted. Within these approaches, scientific research on social aspects of children's problems with mental development is paramount importance.

The following Uzbek scientists M. Bekmurodov, Sh. Sodikova, A. Umarov, M. Ganieva, N. Latipova [10], H. Khusanova, H. Khalikulova, A. Abdukhalilov, Z. Uzakova, E. Zaitov [11] the role of the community in protection, the policy of social protection of persons with disabilities, the socialization of children and youth, the social protection of graduates of institutional institutions.

**Research methodology.** There are various scientific and theoretical approaches to the definition of the concept of "disability" in modern sociological literature, the study and analysis of the problem of disability. Scientists have also done a lot of research on the concept of "disability" and the problem of disability. In particular, in the context of the development of society, theories focused on the social aspects of personality development analyze the problems of disability. There is a general situation that is unique to all sociological theories on the problem of disability: the recognition of disability as a social phenomenon that affects society. However, differences in the content of the main theoretical and methodological constructions underlying sociological models of disability lead to different understandings of the nature of disability. Defining the concept of "disability" is much more difficult. Historically, the



emergence and definition of this concept has been repeatedly changed and updated. In ancient times, a person with anatomical defects (defects in body parts) was considered unsuitable. The first step in institutionalizing the concept of "disability" was the adoption in 1975 of the UN Declaration on the Rights of Persons with Disabilities. The Declaration first provides a standardized definition of disability, ie. "Disabled" means any person who is unable, independently or partially, to meet his or her needs for normal personal and social life due to innate or insufficient physical or mental abilities[12]. Recently, along with the term "disabled", the terms "person with disabilities", "child with special needs", "person with disabilities", "mentally retarded children" are used in international legal documents, correctional pedagogy, special psychology, social work, sociology. The introduction of this term into science is associated with the gradual assimilation of the social model of disability in society, which focuses on the need for a person to actively participate in social relations in modern society, and not on a passive level. In our opinion, the sociocultural model of the period is one of the most promising. This model has its own views on the concept of "disability". According to it, these body structures, body functions or environmental conditions can make it difficult for a person to perform their activities or organs functionally or to such an extent that they cannot be performed at all. The inconvenience of the environment, deficiencies in educational programs, medical and social services that are important to children, or their imperfections can serve as reasons for limited opportunities. This definition adequately reflects the state of the situation and all the obstacles that prevent people with disabilities from leading a free and independent life. This theory is based on the idea that atypical people need to expand their role abilities so that they not only become recipients of social benefits, but "... equal members of society, not only with their rights, but also with others. their duties and responsibilities to society". It is important to create conditions for providing [13].

**Analysis and results.** We conducted a sociological study among parents of children with disabilities based on focus group methods and content analysis in Tashkent, Fergana and Samarkand regions. A total of 32 parents took part in the study. In the focus group, parental feedback and concerns were examined using questions based on the child's developmental needs.

*Problems identified in the area of social security and financial assistance:*

30 of the parents who participated said that their children were granted disability benefits, and 2 said that they did not want to receive disability benefits from family members. All parents noted that the disability pension provided by the state is insufficient to meet the basic life needs of the child.

*Only special expenses for a child with a disability:*

– Babies porridge, baby diapers, medical examinations and analyzes, medicines, pedagogical and psychological services, transportation costs, technical means of rehabilitation (cochlear implant, wheelchair)

– Relatives and parents provide support in covering the costs of the child's needs

*Health and rehabilitation problems;*

– Regional doctors do not have a systematic approach to the diagnosis, treatment and rehabilitation of children with pathological symptoms and symptoms of disability; therefore, parents are forced to travel to city centers, the capital and foreign countries



for the treatment and rehabilitation of their children. Rehabilitation centers for the systematic work with such children and the provision of comprehensive services in the regions have not been created.

*Problems in education;*

– difficulties with placement in preschool educational institutions on their territory, preschool educational institutions for this category of children are located in the city, more in the center, do not have the opportunity to participate every day;

– Such children study education only in specialized schools and boarding schools, and there is no opportunity to study in public schools like ordinary children.

– Special vocational colleges and vocational schools are not enough for children with disabilities to get a profession after finishing general secondary education.

*Social consequences of disability in children and barriers in society;*

– In the neighborhood, on the street, when they travel on public transport, they feel that they are being cared for by people with eyes of compassion and pity;

– Relatives and people around them advise to transfer the child to a specialized institution, which has a very strong impact on them and reduces their confidence in life.

**Conclusion/Recommendations.** The study of the social problems of children with disabilities in the study of the problems of the disabled is a special object of sociology research. At the same time, the scientific problems of social problems of disabled children were studied and the following conclusions were made;

– Creation of an institutional system to study the issues of "disability", "mental retardation", "children with special needs", "social protection", "social work with children with disabilities" in Uzbekistan;

– Perception of disability not as a social problem, but as a social phenomenon.

– a differentiated approach to the scientific study of the problems associated with disability;

– Transition from a medical model of disability to a social model, that is, focusing social protection on human rights rather than on charity;

– strengthening the participation of public, non-governmental non-profit organizations and charitable foundations in the social protection of children with disabilities;

– Creation of information technologies in the field of social protection of children with disabilities.

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**THE ECOLOGICAL IMPORTANCE OF THE DEVELOPMENT OF UNDERGROUND PARTS OF EUPHRATES POPLAR (*POPULUS EUPHRATICA OLIVIER*).**

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**Annotatsiya:** Ushbu maqolada Quyil Amudaryo mintaqasida o'sadigan mahalliy turanga (*Populus euphratica olivier*) daraxtining ildiz qismining tarqalish kengligi, chuqurligi va rivojlanishi o'rganilgan.

**Kalit so'zlar:** daraxt, ildiz, tuproq, mikroorganizm, tajriba, laboratoriya.

**Аннотация:** В данной статье рассматриваются ширина, глубина и развитие корневой части туранга (*Populus euphratica olivier*), обитающего в Нижнем Амударье.

**Ключевые слова:** дерево, корень, почва, микроорганизм, эксперимент, лаборатория.

**Abstract:** This article studies the width, depth and development of the root part of the Euphrates poplar (*Populus euphratica olivier*), which grows in the Lower Amu Darya territory.

**Key words:** tree, root, soil, microorganism, experiment, laboratory.

**Introduction.** Great number of studies in Uzbekistan have shown that local tree species can be used in degraded soils. In this sphere, previous studies have been directed towards identifying salt-tolerant tree species in saline soils, and these studies are based on studying the biological parameters of trees. In these studies, the root was extracted from the soil and its horizontal development was studied, but the study of the underground biomass has not been carried out yet. Conducted studies have focused on growing *Salicornia*, *Halostachys*, and saxaul (*Haloxydon*) trees in saline soils, and the results have shown that they do not grow well in degraded soils.

Our study on the Euphrates poplar (*Populus euphratica olivier*) showed good that they grow and develop well in saline and degraded soils near the groundwater. Moreover, they showed accelerated growth process and good development of the underground part. The experiments examined the width, depth and development of the root part of the Euphrates poplar (*Populus euphratica olivier*). Furthermore, the biomass of the underground part of the tree was also studied.

**Literature Review.** Salinity, high groundwater levels, soil fineness, and susceptibility to erosion are soil conditions that increase the susceptibility to degradatio. Among them, salinity and alkalinity are the most dangerous types,



threatening half of the available crop area (FAO, 2000). Khorezm region is one of the most remote regions of Uzbekistan, located in the lower reaches of the Amu Darya. Its soil is greatly affected by secondary salinization (Uzgiplomeliiovodkhoz, 2003). The low location of Khorezm soils increases their salinity and weakens the drainage system.

Soil degradation is defined as a temporary or permanent decrease in soil fertility that occurs under the influence of geological, geomorphological, and human factors (Katyal and Vlek, 2000). According to the data obtained, soil degradation indicates that 21% of existing soils have become unusable (FAO, 2000). In Uzbekistan, 24% of soil is physically and chemically degraded as a result of agricultural activities. 13% of them have been irreversibly degraded over the past 40 years. Desertification is one of the main problems in Uzbekistan due to the impact of habitat on nature or misuse of land. Approximately 90% of Uzbekistan's total land area is at risk of desertification (FAO, 2000).

The republic of Uzbekistan developed its own National Program of Measures to Combat Desertification in 1999 (UNEP and General Hydromet Data, 1999). Various measures in the program include the conversion of the dried bottom of the Aral Sea and surrounding lands into forests to protect agricultural lands from wind erosion and sand accumulation (Khanazarov and Novitsky, 1990). It is planned to establish protective trees in the irrigated areas to protect the adjacent crop areas. The results of previous studies in the territory of Uzbekistan on the positive effect of protective trees on the increase of productivity of adjacent agricultural lands by 15-20% are given in the literature (Botman, 1988; Kayumov, 1986; Kayumov, 1993). At the same time, although various studies in Uzbekistan have identified the use of salt water in afforestation and the salinity of various tree species (Fimkin, 1972), little attention has been paid to the conversion of degraded lands to deforestation. To turn dry low-yielding lands into orchards, it is necessary to apply the selection of species on the basis of carefully selected sorting. However, in previous species study studies, mainly limited height / diameter conditional measurements were used to assess tree productivity (Fimkin, 1983; Makhno, 1962). In a few cases, less information was collected on root biomass, structure and size, which measured the occurrence of surface dry wood material and was an important physiological parameter for assessing the suitability of tree species for land conversion (Xanazarov and Kayumov, 1993; Hyuperman et al., 2002).

The rapid development of roots and biomass is important, but this does not mean that all indicators are consistent. Considerations could be made for determining salt resistance, suitability for groundwater, facilitating tree recommendation for each area, and normalizing soil water regime through bio-drainage (Huperman et al., 2002). However, at present, there is insufficient information on evaporation (transpiration) standards for trees in the agro-climatic conditions of Khorezm region. To date, some studies have used the gravimetric method to study evaporation, a method that has a number of limitations. In a directly growing tree, measuring it using a porometer gives accurate indications (Huperman et al., 2002).

**Research Methodology.** In order to determine the change of biomass, 3 trees out of every 5 trees were selected at 7 and 19 months of the experiment and their new branches, roots and leaf weight were measured. It was found that in the first year of





growth, the subsurface biomass developed more than the surface mass. The main reason for this process is that the tree adapts better in the first year, striving to strengthen the root system to get more nutrients from the groundwater. Therefore, we have chosen the development of root as the basis for determining the adaptation factor of trees. At the end of the season, the roots were studied again and the extent to which the tree developed was determined accordingly. In order to apply this, the roots were cleaned of soil and microorganisms; they were washed, weighed and dried in a drying oven (thermostat). The length of the root was measured using a soft tape. The roots were dried in a drying oven (thermostat) at 103 °C to a constant mass.

Coarse roots of trees play an important role in maintaining the surface, while fine roots play a crucial role in nourishing the soil with micronutrients. Tree roots also play a biodegradable role in lowering groundwater. Good development of the root system is important in the development of all parts of the aboveground part, trunk, branches, leaves.

The better the leaf of the trees, which are the main producers of oxygen in the atmosphere, develops, the faster the processes of transpiration and photosynthesis. Given the abovementioned details, the study of the development of the root system of trees is of great ecological importance.

With this in mind, in our scientific experiment we studied the length of the coarse and fine roots, the maximum radius and length of the root system of the Euphrates poplar (*Populus euphratica olivier*).

Table 1

Total length, maximum radius and depth of coarse roots, cm						
Plot	Species	<2cm	>2cm	Total length of coarse roots, cm	MAX Radius, cm	MAX Depth, cm
16	P	9870	964	10834	402	140
17	P	16965	2416	19381	950	155
31	P	5350	3452	8802	1400	120

When measuring the length of a coarse root, we divided it into two parts, which are smaller and larger than 2 cm, to make it easier to calculate, and the results showed that roots smaller than 2 cm were longer than roots larger than 2 cm. In general, the coarse roots of the poplar (*Populus euphratica olivier*) can grow up to 200 meters in length. The radius and depth occupied by the root were also determined during the experiment. This value is important to us when choosing their spacing when planting trees (Table 1).

Fine roots are the main nutrient-supplying part of plants, and their abundance and large area increase the ability of plants to feed, resulting in good growth of the aboveground part of plants and a decrease in groundwater (Graph 1 and Table 2).

Graph 1

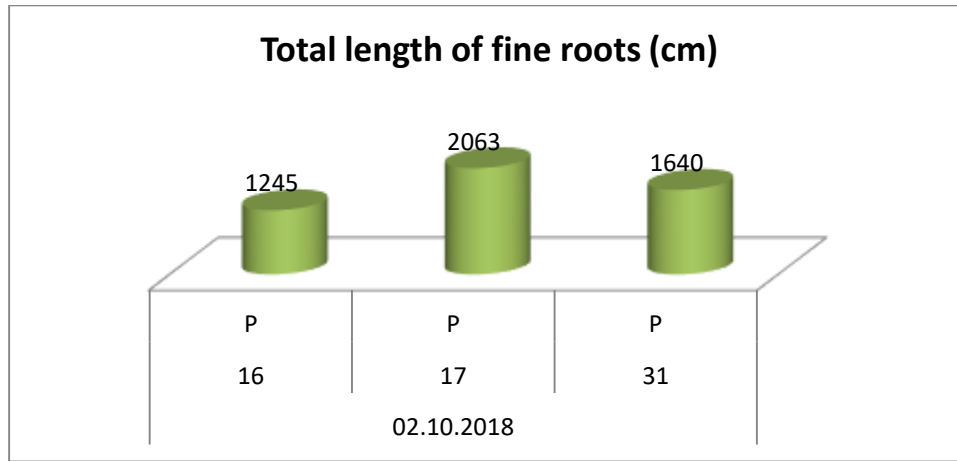


Table 2

Date	Plot	Species	Total length (cm)
02.10.2018	16	P	1245
	17	P	2063
	31	P	1640

**Conclusion.** To sum up, the role of local trees in the rehabilitation of degraded or degrading areas of Khorezm region is significant. The development of the root part of the tree plays an important role, the development of the root part of the poplar (*Populus euphratica olivier*) tree has shown that coarse roots can grow from 100 meters to 200 meters in length, depending on soil type, moisture level and other factors, the radius of penetration can go up to 15 meters. The penetration of the root to a depth can be as deep as 1.5 meters. The total length of fine roots can reach up to 20 meters, which is very important in the nutrition of plants.

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**UDK: 631.812**

## **MEDICAL PROPERTIES OF CORNUS MAS L.**

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**Annotatsiya.** Kizil yoki cornus mas L. (Cornaceae) oilasiga kiradi. Dekorativ o'simlik, qishga bardoshli buta hisoblanadi. Tabiiy sharoitda u Kavkaz, Qrim, Ukrainaning janubida, Janubiy Yevropa va Kichik Osiyoda tog'li o'rmonlarning pastki qismida o'sadi. Bu balandligi 5-6 m dan ortiq bo'lgan buta yoki past daraxt. Xalq tabobatida ko'p ishlatiladigan noyob xususiyatlarga ega o'simlik. Ko'p yillardan beri xalq tabobatida ishlatilagan noyob xususiyatlarga ega o'simlik "Cornus mas" deb nomlanadi. Ushbu o'simlikning foydali xususiyatlari bilan nafaqat xalq tabobatida balki zamonaviy tibbiyotda shifokorlar tomonidan ham o'rganilgan. Kizil eng qimmatli qismi S vitamini bilan to'yingan yorqin qizil mevalarga ega shifobaxsh o'simlik.

**Kalit so'zlar:** Kornel, profilaktika, immunitet tizimi, daraxtlar, virusli infeksiyalar, gemoglobin, rezavorlar, retseptlar, antioksidant moddalar.

**Аннотация:** В семействе дёреновые, или кизилловые (*Cornaceae*), кроме многих декоративных зимостойких кустарников, имеется дёрен мужской (*Cornus mas L.*) со съедобными плодами, известный под названием кизил. В естественных условиях он встречается в подлеске горных лесов Кавказа, Крыма, на юге Украины, в Южной Европе и Малой Азии. Это кустарник или невысокое деревце, высотой более 5-6 м. Растение с уникальными свойствами, которые используются в народной медицине не один десяток лет, известно под названием кизил. Полезные свойства и противопоказания этого растения изучены не только народными целителями, но и врачами официальной медицины. Наиболее ценная часть растения - ярко-красные ягоды, насыщенные витамином С, появляются лишь через пятнадцать лет после посадки растени

**Ключевые слова:** Кизил, профилактика, иммунную систему, деревья, ягоды, рецепты, вирусных инфекциях, гемоглобин, витамины, антиоксидантным веществам



**Summary.** To many decorative winter-hardy shrubs, there is a male Kizil (*Cornus mas L.*) with extra fruits, known as Kizil. Under natural conditions, it is found in the undergrowth of the mountain forests of the Caucasus, Crimea, in the south of Ukraine, in South Europe and Asia Minor. This is a shrub or a low tree, more than 5-6 m in height. A plant with unique properties that are used in folk. A plant with unique properties that have been used in folk medicine for more than a dozen years is known as Kizil. The useful properties and contraindications of this plant have been studied not only by traditional healers, but also by doctors of official medicine. The most valuable part of the plant is bright red berries, saturated with vitamin C, appear only 15 years after planting.

**Key words:** Cornel, prevention, immune system, trees, viral infections, hemoglobin, berries, recipes, antioxidant substances.

**Introduction.** Cornel is a very tasty berry and no less useful, so it can and should be introduced into the diet of both children and adults. Of course, with existing diseases of a chronic nature, you need to consult with your doctor - it is quite possible that the product in question will be on the list of contraindications. Cornel is a shrub or small tree, a species of the genus (*Cornus.mas L.*) of the Cornel family. Ovate shiny whole-edged leaves - up to 10 cm long. Before the leaves bloom, small yellow flowers with yellow bracts, collected in bunches, appear. The fruits are juicy, shiny, oblong, about 3 cm long. The Kizil plant today has lost its popularity in the use of folk methods, but in vain. Berries are incredibly healthy, fortified, high in calories, filled with all the necessary substances.[7] Cornel fruits contain vitamin C in a much higher concentration than citrus fruits. And the ease of cultivation and ease of care are incomparable. However, in many parts of the country, gardeners grow this useful crop. The fruit of this tree has many nutrients and vitamins that are essential for human health. The composition contains:

- citric, malic, tartaric, gallic and succinic acids;
- iron, calcium, magnesium, sulfur and potassium;
- pectin and tannins;
- flavonoids - substances of natural origin with powerful antioxidant properties;
- phytoncides - active elements that suppress the development of pathogenic microbes.
- essential oils;
- vitamin C (cornelian cherry exceeds black currant and lemon in its quantity).

**Literature review.** The calorie content of berries is 44 kcal per 100 g. In addition to them, all parts of this medicinal plant can be used with health benefits: leaves, bark, roots. Kizil fruits can be eaten fresh and dried. They are used to prepare seed and seedless jams, marinades and sauces, they are used as seasonings for various dishes. The juice from the fruits of this plant is added to concentrates that astronauts and long-distance sailors eat.[2] These foods help prevent scurvy. A tonic drink is prepared from dried berries, the effectiveness of which is no less than real coffee. Having studied the list of the main diseases that can be prevented and even cured with the help of this plant, it will become clear how useful the Kizil is. For problems with the digestive system, the berries of this plant will help eliminate diarrhea and indigestion. [10]



This natural medicine helps the secretion of gastric juice, which allows the body to process food better, increases appetite, and relieves heartburn. Kizil fruits are used for the prevention and treatment of gastritis. The pectin present in the fruit helps to eliminate toxins and harmful substances from the body. Anti-inflammatory and astringent effects are noted due to tannins. Kizil berries strengthen blood vessels and normalize blood composition.[8] The plant is an excellent helper for the treatment of anemia and anemia, as it contains substances that increase hemoglobin. Thanks to Kizil, pressure normalizes, swelling of the legs and inflammation of the veins decreases, and blood supply to the brain improves. Kizil fruits lower blood sugar and improve metabolism, so the plant is useful for obesity and diabetes. For infectious diseases and colds, tincture or Kizil jam will help alleviate the patient's condition. The plant is used to reduce fever and improve immunity. Thanks to the antioxidant substances contained in Kizil berries, a natural medicine can fight severe intoxication of the body, for example, poisoning with lead or mercury fumes. [9]

**Research Methodology.** The unique properties of Kizil are used in cosmetology. Cleansing and toning masks are made from the pulp of the fruit. Due to the antiseptic qualities of berries, the plant is in demand in the treatment of various skin diseases. The benefits of Kizil for the human body are beyond doubt. Not only the berries of this unique plant benefit humans. Leaves and roots also have miraculous powers. The leaves of the plant contain a large amount of tannins - tannins that have astringent, bactericidal and antifungal properties. From this natural raw material, infusions and decoctions are prepared, which normalize metabolism, have a diuretic and choleric effect. For inflammatory processes, such as conjunctivitis, Kizil leaves will help. It is enough to squeeze out the juice and drip 2-3 drops into the eye. [6]

Kizil is very useful for pregnant women. The plant contains a lot of potassium, which helps to normalize the cardiovascular system and remove water from the body. In addition, thanks to this medicine, the walls of blood vessels are strengthened, the level of hemoglobin increases and the risk of premature birth is reduced. Cornel is recommended to be introduced into the children's diet because of the huge set of vitamins and minerals necessary for the rapid growth and strengthening of the child's body. This medicinal plant will prevent cancer, increase immunity and improve the intestinal microflora. It is no secret that any berry is especially good fresh, and during processing it certainly loses some of its beneficial properties.[3] Drying is the simplest and most affordable way to maximize the beneficial properties of Kizil. Dried Kizil retains minerals and vitamins due to the fact that the berries are not heat-treated. Dried fruits have a higher calorie content than fresh berries and are less acidic. To dry the fruits at home, you need to spread the ripe berries with a stone in a ventilated shady place and turn over periodically.

**Analysis and results.** With the onset of dusk, it is better to clean the workpiece indoors. When the berries are completely dry, they can be poured into linen bags and stored in a dry place. Compotes and jelly are prepared from dried Kizil or eaten instead of sweets, replenishing the supply of vitamins that was wasted during the winter. Dried berries are saturated with sugars, softer in consistency and do not lose their medicinal properties.[1] Useful properties and contraindications of dried Kizil are important for lovers of this berry. Kizil, to the delight of dieters, is fat-free. But the caloric content



of dried Kizil is many times greater than in a fresh berry, since with the loss of water, the concentration of substances in the fruits increases significantly. The calorie content of dried Kizil is 209 kcal. For 100 g of fruit, there are 4.6 g of protein and 46.3 g of carbohydrates. Dried Kizil has the same indicators. 100 g of fresh fruit contains up to 85 g of water, about 9 g of mono - and disaccharides, 0.9 g of protein, 1.4 g of fiber. Dried Kizil will help improve digestion, increase appetite, stop heartburn, and normalize some metabolic processes. [5]

**Conclusion.** The phytoncides in the composition relieve inflammation and, due to the antibacterial effect, protect against infections. A number of other beneficial effects can be added to this: expectorant, diuretic, diaphoretic, choleric. The benefits of Kizil berries have been noted for pain in the back and knee joints. Traditional medicine uses dried Kizil for dizziness and tinnitus. Compotes are prepared from healthy dried fruits with Kizil, which tone the body, increase appetite and strengthen the immune system. They help in the digestion and absorption of fatty, smoked and spicy foods. Cornel is a garden crop, belongs to medicinal plants, is a raw material for the canning processing and pharmaceutical industries. Cornel (*Cornus mas L.*) - strengthens the immune system, adds strength. It will help keep the body in good shape when needed.[4] An inconspicuous, small berry boasts a huge potential for impact and bring real benefits to humans without compromising health.

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## SYNTHESIS OF COPPER AND SILVER NANOPARTICLES USING HYDROLYZED FIBROIN

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**Annotation:** This paper provides information on obtaining hydrolyzed fibroin (“HF”) under the influence of high-frequency rays (510W) from fibroin fibers obtained based on silk waste fibers and using it to synthesize metal nanoparticles.

**Key words:** Copper nanoparticles, High-frequency rays, Hydrolyzed fibroin (“HF”), Silk fibroin, Silver nanoparticles

**Аннотация:** В данной статье представлена информация о получении гидролизованного фиброина (“ГФ”) под действием высокочастотных лучей (510 Вт) из фиброиновых волокон, полученных на основе отходов волокон шелка, и использования его для синтеза металлических наночастиц.

**Ключевые слова:** Наночастицы меди, высокочастотные лучи, гидролизированный фиброин (“ГФ”), фиброин шелка, наночастицы серебра.

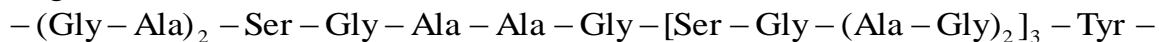
**Annotatsiya:** Ushbu maqolada ipak tolasi chiqindilaridan olinadigan fibroin tolalaridan yuqori chastotali nurlar (510 Vt) ta’sirida gidrolizlangan fibroin (“GF”) olish va undan metall nanozarralarni sintez qilish uchun foydalanish to’g’risida ma’lumotlar keltirilgan.

**Kalit soʻzlar:** Mis nanozarralari, yuqori chastotali nurlar, gidrolizlangan fibroin (“GF”), ipak fibroin, kumush nanozarralar.

**Introduction.** Fibroin is a fibrillar protein that forms the polymer basis of natural silk. The macromolecule of silk fibroin is characterized by a conformational variety, that is, it consists of  $\alpha$ -spiral (amorphous) and  $\beta$ -structural (crystalline) parts, in which the polymer chain is located consecutively [1]. The sequence of amino acid



groups in the crystal parts of the Fibroin macromolecules is structured in the following order [2].



The composition of amino acids in the amorphous part is determined in the following order.



The fiber in the silk of the silkworm (*Bombyx mori*) consists of three chains: a heavy chain, a light chain, and a glycoprotein P-25. Light chain (26 kDa) and heavy chain (390 kDa (heavy chain can be up to 500 kDa)) are available in a 1:1 ratio, connected by a disulfide chemical bond. Glycoprotein (25 kDa), called P-25, is not associated with covalent bonds with heavy and light chain proteins [3]. The structure and weight of the molecule of silk fibroin are also associated with the feeding conditions of the silkworm, the region in which silk is grown.

From the silkworm plumage, not all silk fibers are obtained; 10-15% of the silkworm plumage fiber remains together with the plumage. This is a fiber waste of silk. Also, if the silkworm butterfly comes out of the cocoon, such a cocoon becomes unsuitable for pulling a thread and becomes a waste. There are options for the preparation of promising materials through the extraction of silk fibroin from such fiber waste.

Today, preparations from silk fiber are used in pharmacology, medicine, cosmetics, and other fields. From silk fibroin, skin resurfacing materials are obtained [4-5].

“HF” obtained as a result of the hydrolysis of silk fibroin fibers, has a high sorption capacity and is used in cosmetics and pharmacology. Applied in cosmetics, “HF” positively affects and restores the skin, nails, and hair. Thanks to this, the aging process in the skin slows down. The chemical composition of HF is similar to the composition of proteins of the skin and nails, hair [6].

Simple thermal methods in acidic and alkaline environments have been studied in the open bath mode of obtaining powder-coated fibroin from natural silk fibroin [7-10]. But the methods of obtaining powder-coated fibroin from silk fibroin under the influence of extremely high-frequency rays in the open bath mode have not been studied. For the first time, we have developed a method of obtaining powder “HF” from silk fibroin under the influence of extremely high-frequency rays. We studied the sorption properties of “HF”.

Various scientific researchers synthesized Au and Ag nanoparticles with silk fibroin. Most of the experiments on the synthesis of Au and Ag nanoparticles with the participation of silk fibroin were carried out under the influence of various rays (UV-, electron rays) [11-13]. But to date, there are no reports of the chemical synthesis of copper nanoparticles with the participation of silk fibroin in the existing literature. For the first time, we synthesized copper nanoparticles from the copper-“HF” complex.

### **Experimental section**

Provide sufficient detail to allow the work to be reproduced, which may include Materials, Instrumentation, and Procedure.

**Materials.** Fibrous waste of silk (Cleaned of additives. Khorezmipagi LLC, Urgench, Uzbekistan), Sodium carbonate (purity 99,9%), HCl (chemically pure) was





purchased from Chimreaktivinvest (Uzbekistan). Calcium chloride and ethyl alcohol(98%) were purchased from Fortek company (Uzbekistan) . Copper(II) sulfate pentahydrate(purity 99,99%, Missouri, USA), Copper(II) sulfate pentahydrate(purity 99,99%, Missouri, USA),Silver nitrate (purity 99,99%, Missouri, USA), Copper(II) sulfate pentahydrate(purity 99,99%, Missouri, USA), ammonia (w=37%, Chimreaktivinvest, Navoi, Uzbekistan), ascorbic acid(purity 99,99%, Missouri, USA).

**Instrumentation.** Bidistilled water is obtained from the “GFL 2104 Double distillation water still” device (Germany). The experiments used UV-1800 Shimadzu spectrometer, high-speed microcentrifuge(D2012 PLUS-DLAB Scientific Co-“Fortek” Company), optical microscope("Optika\_B-150 DBR").

### Procedure

**Obtaining “HF” from Natural Silk.** As a result of our research, we developed methods for obtaining “HF” from the fiber waste of silk coming out at the silk manufacturing enterprises. To obtain “HF” from the fiber waste of silk, we used a method of irradiation under the influence of extremely high-frequency rays.

We obtained “HF” from silk fibroin fibers in a thermally heated temperature of 363 K in acidic and alkaline conditions. We determined the optimal conditions for taking “HF” powder at extremely high-frequency rays action. Under the influence of extremely high-frequency rays, rays with a capacity of 510W were exposed to obtain “HF” powder. The “HF” powder obtained as a result of the process was washed with bidistilled water and dried in a dryer [14]. We mowed the resulting “HF” particles with the help of an optical microscope ("Optika\_B-150 DBR").

**Synthesis of copper nanoparticles using “HF”.** We used an aqueous solution of “HF” as a stabilizer in the synthesis of copper nanoparticles. We used an aqueous-alcoholic solution of calcium chloride to obtain an aqueous solution[15] of “HF”. We poured 50 ml of 0.001 g / ml “HF” solution into a 250 ml volumetric conical flask. We added 5 ml of 0.005 M copper (II) sulphate solution to the solution by stirring the solution in the flask for 10 min at 500 rpm using a magnetic stirrer. The solution was then added from an alkaline solution until the solution temperature was 363 K and the solution medium was pH=11–14. Once the pH had reached the specified value, 2 ml of the solution in a 0.5 M solution of ascorbic acid was added dropwise to the mixture in the flask and held at 800 rpm for 30 min. As a result of the process, the solution turned red.

A similar experiment was performed at a temperature of 333-353K. But at the end of the process, the solution turned yellow.We analyzed the solution by UV-spectroscopy.

**Synthesis of silver nanoparticles with the participation of “HF”.** We used a solution and powder of "HF" to synthesize silver nanoparticles. To obtain silver nanoparticles, we formed  $[\text{Ag}(\text{NH}_3)_2]\text{OH}$  by influencing ammonia into the salt  $\text{AgNO}_3$ .

We poured 5 ml of a 0,05 M concentration solution of  $[\text{Ag}(\text{NH}_3)_2]\text{OH}$  into 100 ml of a solution of “HF” with a concentration of 0.001 g/ml and mixed at 300 rpm until the temperature reached 323K.

After the temperature reached 323 K, we increased the mixing speed to 500 rpm. In the next step, we poured a 0,5M solution of ascorbic acid into the solution. As a result, the solution turned yellowish-brown. We analyzed the solution by UV-

spectroscopy. In the next experiment, we used “HF” powder to synthesize silver nanoparticles.

In the composition, the powder "HF", which holds the ions  $[Ag(NH_3)_2]^+$ , was put in a solution with 0,1M of glucose and heated to a temperature of 369-371K. As a result, the powder entered a brownish-yellow color. During the process, the powder "HF" did not dissolve. The powder in the resulting solution was filtered and washed off with bidistilled water.

### Results and discussion

**Average size of “HF” particles.** “HF” was obtained from natural silk under the influence of extremely high-frequency rays of different powers. The average size of the obtained “HF” particles was determined under the microscope "Optika\_B-150 DBR".

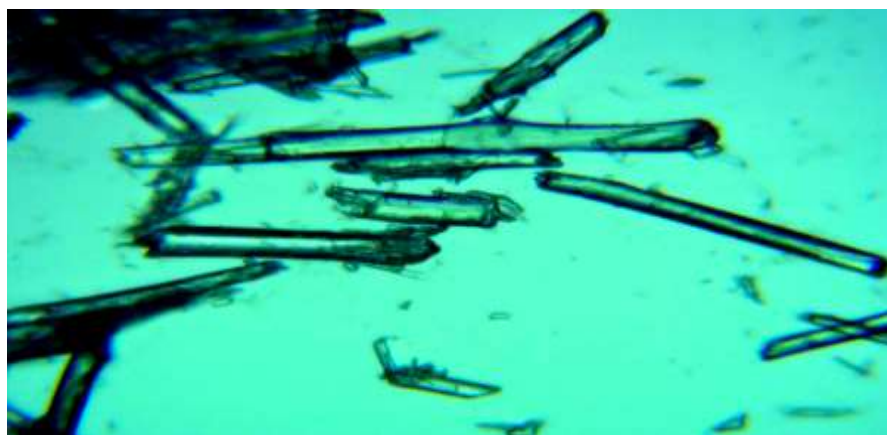


Fig.1. “HF” particles image obtained under the influence of extremely high-frequency rays with a power of 510 W (X1000)

**Table 1.** Dependence of time and yield on obtaining “HF” powder under the influence of extremely high-frequency rays

No.	Power (W)	Hydrolyzing reagent	Time spent on the process	Product yield (%)
1	340	3%	20 min	75
2	510	3%	15 min	72
3	850	3%	10 min	60

**Table 2.** Changes in the average size of particles of “HF” under the influence of extremely high-frequency rays

No.	Power (W)	The smallest particle size (μm)	The largest particle size (μm)	The average size of the particles (μm)	Product yield (%)
1	340	22,89	179	90	75
2	510	20	214	81	72
3	850	18	207,5	80	60

We selected 510 W as the optimal extremely high-frequency rays power, taking into account the “HF” formation time and process efficiency.

The smallest size of “HF” particles obtained in the extremely high-frequency rays effect with a power of 510W was 20 μm, while the largest one was 214 μm and the average size of the particles was 81 μm. Due to the transition of silk fibroin from the fibrous state to the powder-like state of “HF”, on the surface of the particles of

“HF”, there is an increase in the active polyfunctional micro and nano-sized pores. Due to the presence of active polyfunctional porosity, we will be able to use “HF” as a polyampholyte sorbent.

**Analysis of copper nanoparticles.** As a result of the research conducted, we synthesized copper nanoparticles in an “HF” solution containing  $\text{Cu}^{2+}$  ions. To synthesize copper nanoparticles, we formed a copper-“HF” complex. To obtain copper-“HF” complex the ambient alkalinity should be  $\text{pH}=11-14$ .

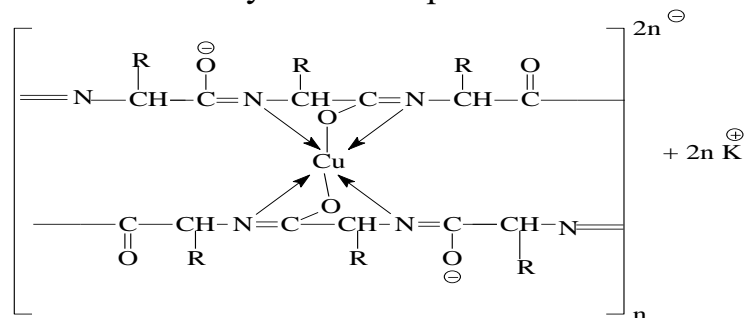


Fig.2. The structure of copper-“HF” complex

As a result of the process, a red-violet solution was formed and its UV-spectroscopy was analyzed. The maximum light absorption wavelength of the copper-“HF” complex from the analysis of UV-spectroscopy is 541-543 nm.

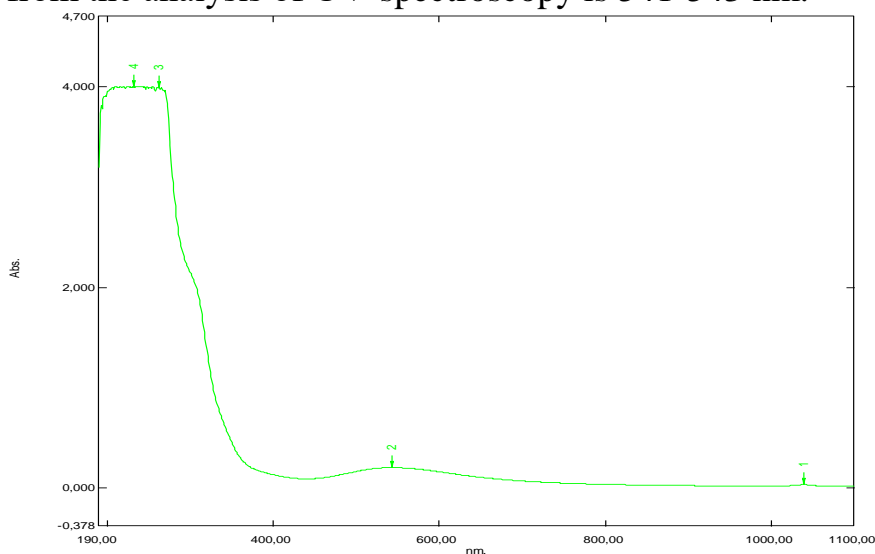
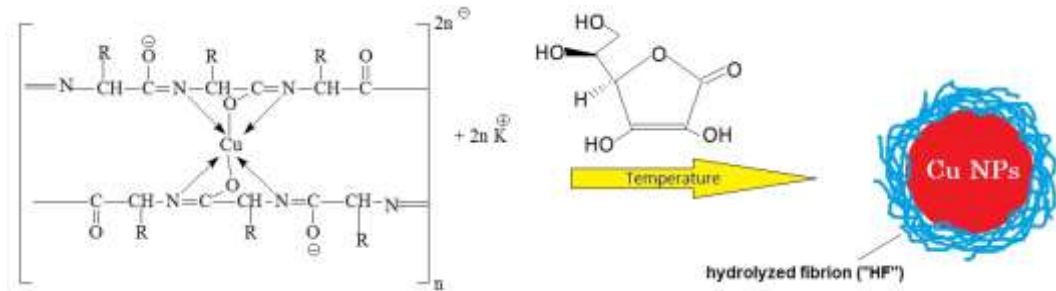


Fig.3. UV-spectrum of copper-“HF” complex

From the synthesis of the copper-“HF” complex compound, our max is to make the synthesized copper nanoparticles fast and fully stable with “HF”. Because copper is surrounded by a protein molecule while compound with “HF”. When copper is returned, the formed copper nanoparticles are rapidly stabilized by “HF” molecules.

We have been able to influence the concentration solution of ascorbic acid 0,5M at a temperature of 363K to copper-“HF” complex to obtain copper nanoparticles. As a result, we were able to obtain stabilized copper nanoparticles with “HF” molecules. The solution holding the copper nanoparticles was red.



Scheme 1. Synthesis of copper nanoparticles from copper-HF complex

UV-spectrum of synthesized copper nanoparticles were obtained and analyzed. By analyzing the UV-spectrum, we found that the maximum light absorption wavelength of copper nanoparticles is 518 nm.

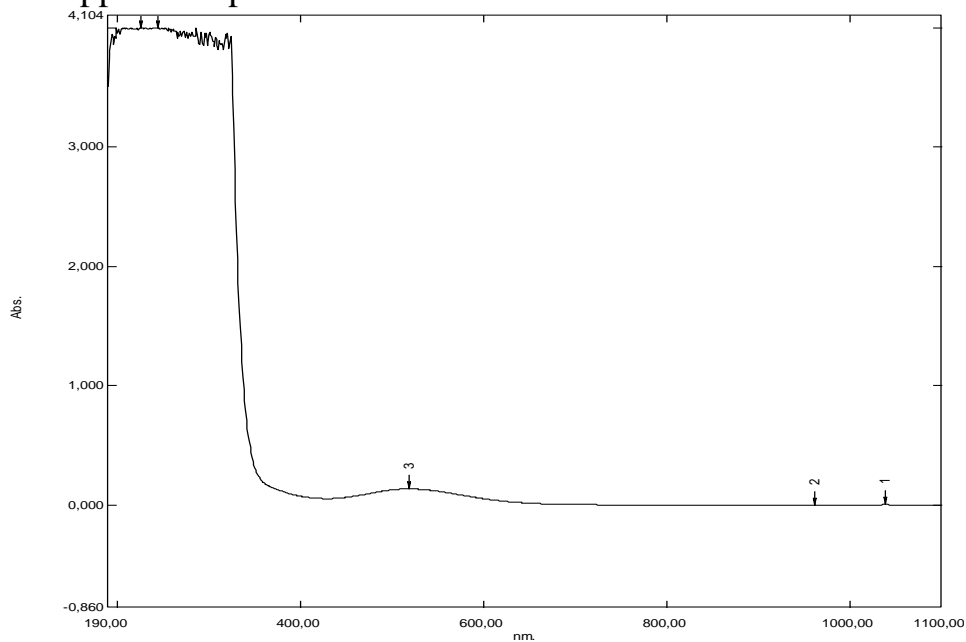
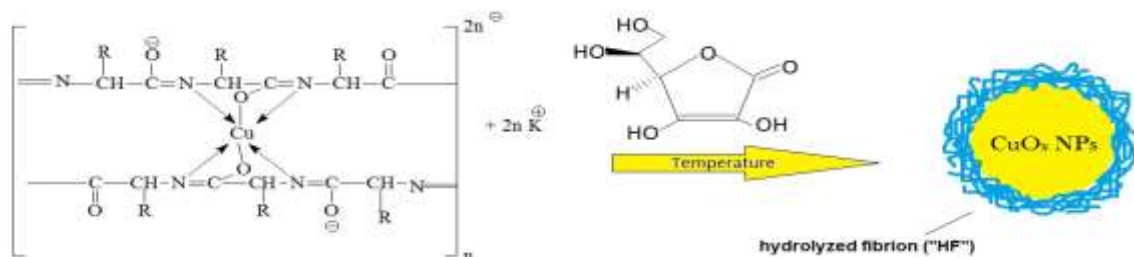


Fig. 4. UV-spectrum of stabilized copper nanoparticles with “HF”

At a temperature of 333-353K, the color of the solution changed from purple to yellow, when we were affected by ascorbic acid with a concentration of 0,5 M to copper-“HF” complex. When analyzing the UV-spectroscopy of the resulting solution, copper oxide nanoparticles are has 380-385 nm. maximum light absorption at wavelength was observed.



Scheme 2. Synthesis of copper oxide nanoparticles from copper-“HF” complex

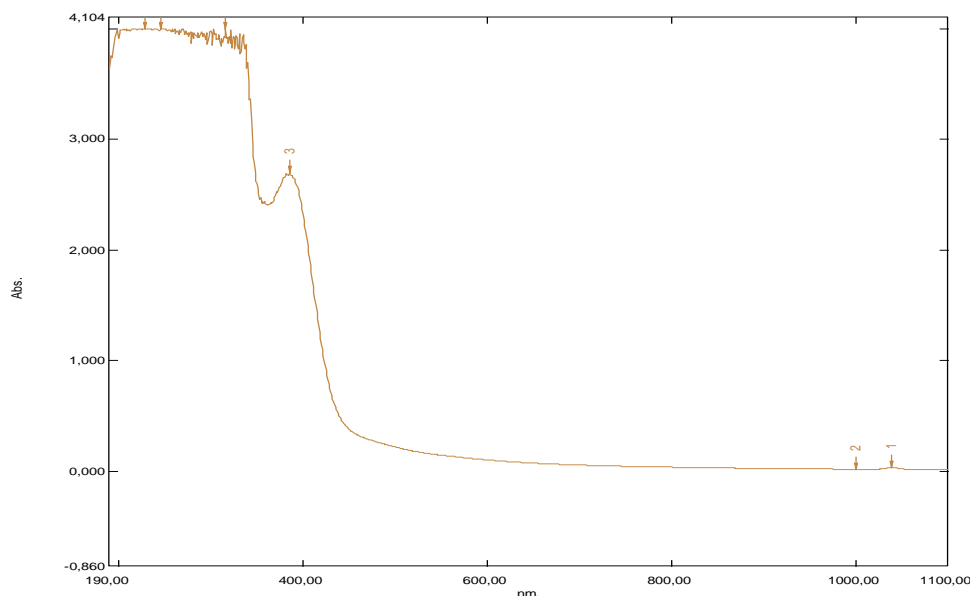


Fig.5. UV-spectrum of copper oxide nanoparticles stabilized by “HF”

If we pay attention to the results of the experiment, we found that the cause of the formation of copper oxide nanoparticles in 333-353 K heat is in the presence of dissolved oxygen in the solution. Oxygen in the solution oxidizes the emerging copper nanoparticles, and copper oxide nanoparticles are stabilized by “HF” molecules. At a temperature of 363 K, the oxygen content in the solution decreases. Therefore, at this temperature, copper nanoparticles stabilized with “HF” molecules are formed in the solution.

**Analysis of silver nanoparticles.** In the synthesis of silver nanoparticles, the yellowish-brown color of the solution is the first sign that silver nanoparticles have been formed.

When analyzing the UV-spectrum of the solution, the maximum light absorption of 430 nm, characteristic of silver nanoparticles, was observed. The chemical reaction of obtaining silver nanoparticles obtained using “HF” powder is as follows.

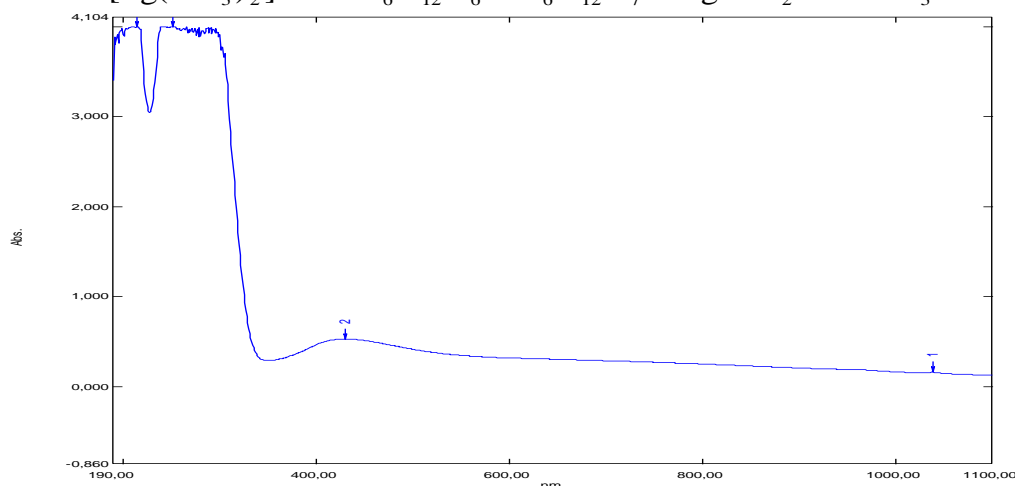
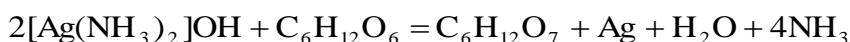


Fig.6. UV-spectrum of silver nanoparticles stabilized by “HF”

Silver nanoparticles are formed on the porous matrices of the "HF" and stabilize with active polyfunctional groups of porous. The reason for the use of D-glucose as a repellent is that glucose and the resulting substance is not poisonous, it is water-soluble.

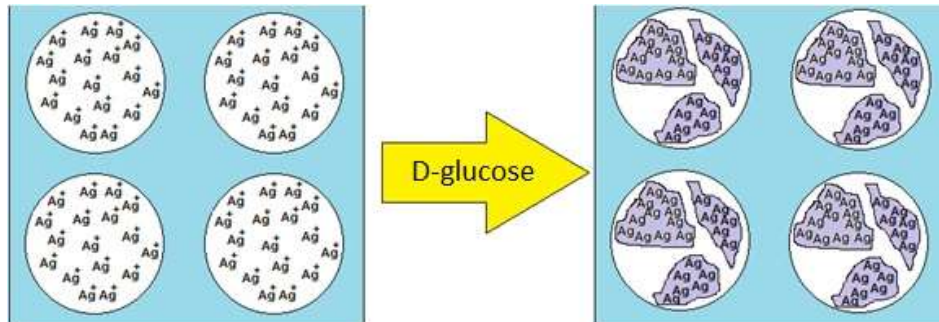


Fig.7. The formation of silver nanoparticles from silver ions in the matrices of particles hydrolyzed fibroin

The resulting silver nanoparticles remain in the micro and nanoporous matrix of the "HF". Below are pictures are taken from the microscope of the particles "HF", which holds silver nanoparticles.



Fig.8. The image of the particles of the "HF" holding silver nanoparticles (1000-fold magnified picture on the microscope "Optika\_B-150 DBR")

The importance of obtaining silver nanoparticles in the micro and nanoporous of the "HF" is that in such a form it is possible to store silver nanoparticles for a long time and in different conditions.

**Conclusion.** It has been found that the optimum luminous power for obtaining hydrolyzed fibroin ("HF") from natural silk under the influence of extremely high-frequency rays is 510 W. In this method, it was found that the hydrolysis process is completed 5-7 times faster than the conventional thermal method. We quickly and completely stabilized copper nanoparticles with "HF" by obtaining copper nanoparticles based on the copper-"HF" complex. This is because the copper-"HF" compound is completely covered by the protein molecule. The resulting copper nanoparticles are rapidly stabilized by "HF" molecules. The solution containing the copper nanoparticles turned red. We also synthesized silver nanoparticles using a solution and powder of "HF". An important aspect of obtaining silver nanoparticles in micro and nanoporous matrices of "HF" powder is that it allows silver nanoparticles to be stored for a long time and under different conditions.



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