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DEVELOPMENT OF ALTERNATIVE FUEL GENERATION TECHNOLOGY UNDER THE INFLUENCE OF MAGNETIC FIELDS FROM OIL COKE

Abstract: Oil refining and petrochemical enterprises have all the necessary prerequisites in order to become the basic industry for the processing of all types of waste within the framework of the concept of global recycling of industrial materials. This is especially important to emphasize, since this technology is developed in the framework of the most priority areas.

The relevance of this topic arose at the junction of two opposing trends arising in the oil refining industry: On the one hand, oil reserves are steadily decreasing, their price is constantly growing, their resources are decreasing, the costs of developing new fields are increasing, and tariffs for energy and rail transportation are constantly growing. On the other hand, waste from oil refining, petrochemical, mining, engineering, metallurgical and chemical industries, as well as the fuel and energy complex, accumulated over decades.

Today, in terms of volume and content of useful components, technogenic deposits can be equated to natural deposits. The location of waste near production facilities, as well as the fact that huge expenditures for their development are not required, are positive factors.

An analysis of these phenomena made it possible to formulate a scientific problem, the solution of which is possible in two directions: on the one hand, recycling and disposal of waste with the subsequent receipt of relatively cheap fuel raw materials. On the other hand, cleaning up entire regions where huge deposits of waste have accumulated. The result is a solution to one of the global environmental problems. One of such solutions is briquetting of heavy oil waste to obtain an alternative type of fuel, both industrial and domestic.

Key words: oil coke briquettes, mechanical force, compound, stable magnetic field, agglomeration, penetration.

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Introduction

This work is devoted to the urgent problem of obtaining an additional type of fuel as petroleum coke briquettes. Studies have been carried out to improve the physicochemical properties, environmental requirements and optimal use both in the domestic environment and in industry.

The objective of this work is to obtain petroleum coke briquettes with high mechanical strength and low

flash point. The study was based on coke breeze containing a mixture of petroleum bitumen and pitch as a binder, which additionally contains an extract for the selective purification of oils, asphaltite and paraffin, in the following ratio of components, mass% coke breeze (85-90%), oil bitumen (6-8%), pitch (1-2%), selective oil purification extract (1-2%) asphaltite (1.5-2), paraffin (0.5-1%).

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The novelty of this work is that a binder additionally containing an extract of selective purification of oils, asphaltite and paraffin in the declared amounts, the effect of the mixture in a stationary mode of a stable magnetic field on its dispersed and paramagnetic characteristics was investigated.[1-6].

As raw materials for the preparation of briquettes used: coke grade KZ, $\pm 0-8$ mm; bitumen obtained from the tar of the Azerneftlyag Refinery by oxidation at 250°-260°C; pitch obtained by thermal oxidative compaction (TSP) of heavy pyrolysis resin; extract obtained by selective purification of oils; asphaltite is a product of deasphalting with tar gasoline; paraffin waste hydrogenation of vegetable oils of the Azersun Holding enterprise.

The invention is illustrated by the following example. Example: The briquette is prepared as follows. The binder mixture of petroleum bitumen, pitch, selective oil purification extract, asphaltite and paraffin is heated to 130-150°C, then mixed in a laboratory mixer with coke breeze for 5-10 minutes, at 160-200°C. Then the resulting homogeneous mass is cooled to 60-90°C and pressed under a pressure of 25 kg/cm² (PPa). A briquette with a diameter of 50 mm and a height of 20 mm is obtained.

A decrease or increase in the amount of coke, petroleum bitumen, pitch, asphaltite, an extract for the selective purification of oils and paraffin below and above the stated limits is impractical, since the best performance is achieved in the declared limits of the content of components in the composition of petroleum coke briquettes.

The physicochemical properties of the resources for the binder were studied. With the rising cost of oil, the decrease in its reserves, alternative resources are becoming more widespread. Therefore, the possibilities of supplementing the oil coke briquette with vegetable oils were investigated.

The essence of the work lies in the fact that the use of asphaltite in addition to the binder, an extract of selective oil purification, using constant MP, improves mechanical strength and abrasion resistance of petroleum coke briquettes, and the waste of hydrogenation of vegetable oils in the process of which uses a catalyst consisting of paramagnetic, metallic nickel (22%) deposited on the surface of high molecular weight paraffin can reduce the ignition temperature, and increase adhesion communication ability.

The proposed work allows to increase the mechanical strength, abrasion resistance and lower the ignition temperature of petroleum coke briquettes. In addition, the proposed petroleum coke briquette due to its high calorific value can be used as fuel, both in industry and in everyday life, instead of coal, coal briquettes and wood.

Enterprises of oil refining and petrochemical industry have all necessary prerequisites to become

the primary industry for the processing of all types of waste within the framework of implementation of concept of the global recycling of technogenic materials. It is especially important to stress it, since this technology has been developed within the framework of the top priorities.

The topicality of this topic arose at the junction of two contrasting trends emerging in the oil refining industry. On the one hand, oil reserves are steadily decreasing, their price is constantly growing, their resources are decreasing, the costs for developing new oilfields are increasing, and tariffs for energy and rail transportation are constantly growing. On the other hand, wastes accumulated over decades from oil refining, petrochemical, mining, machine-building, metallurgical and chemical production, as well as the fuel and power complex, are increasing.

Today, technogenic fields can be equated to deposits of natural resources in terms of their volume and content of useful components. The location of wastes in the vicinity of production, as well as the fact that huge costs for their development are not required, are positive factors.

The analysis of these phenomena made it possible to formulate a scientific task the solution of which is possible in two directions. On the one hand, recycling and utilization of wastes with the subsequent production of fuel raw materials at relatively low cost. On the other hand, cleaning of the whole region where huge deposits of waste have accumulated. As a result, the solution of one of the global environmental problems. One of such solutions is briquetting of heavy petroleum waste to obtain both industrial and domestic alternatives[7-9].

II. RESULTS AND DISCUSSIONS

With the help of briquetting, energy-bearing waste, for example, waste from forest processing, coal processing, oil refining, agricultural products processing, waste from chemical productions, waste from the food and textile industries, waste from sewage treatment can be converted into high-quality fuel and sorbents.

In Russia, a huge amount of these wastes has already been accumulated and is still accumulating, they occupy large areas and pollute the air, water facilities, land and thereby they worsen the quality of the human environment, for example, huge quantities of sawdust, lignin, lignosulfonates have been accumulated in places of forest processing, millions tons of coal sludge have been accumulated in coal regions, and large amounts of precipitation from sewage treatment and other waste have been accumulated near cities. While this energy-bearing waste can serve as raw material for the production of fuel briquettes. At the same time, deficit of cheap high-grade fuel for communal and household needs is experienced in Russia.

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Briquetting is constantly given the highest priority in developed countries. Significant funds are invested in scientific and technological developments, in the construction of new and improvement of existing briquette productions, especially using waste or low-grade raw materials.

Briquettes on various technologies are produced based on coal fines in large volumes in England, France, Germany, Czechia, Poland, Turkey, the USA, Australia and other countries. This is due to the fact that when burning coal briquettes, as compared to burning ordinary coal, the efficiency of furnace devices increases by 25-35%, emissions of sulfur dioxide are reduced by 15-20%, emissions of solids with flue gases are more than halved, as well as

burning of combustible components decreases by 15 - 20% [2].

Agglomeration is the transformation of fine-grained natural resources into a lumpy product due to mechanical and (or) thermal effects using special additives or without them. One of the agglomeration varieties is briquetting, a physico-chemical process of producing a mechanically and thermally durable high-grade product-briquette which has a certain geometrical shape, size and weight. Briquetting differs from other known agglomeration methods (agglomerating and pelletizing) by simplicity of process and its low cost. This is confirmed by comparative data (in percent) of three ways of iron ore agglomeration.

Table 1. Comparative data.

	Briquetting	Agglomeration	Pelletization with burning
Prime cost	100	120-170	110-150
Expenses for 1 t.processing	100	130-160	90-140
Specific capital expenses	100	110-200	120-180

Briquettes are used in coal, coke-chemical, metallurgical, chemical and other industries, as well as household fuel. Depending on the properties of natural resources and technological purposes, briquettes must satisfy the following requirements: 1) to have atmospheric constancy, not to collapse from temperature effects and precipitation. 2) to have mechanical strength i.e. to withstand fairly high resistance to shock, abrasion and bending. 3) to have sufficient porosity, providing good gas permeability at high temperatures of burning and melting. 4) to contain a minimum amount of moisture, the availability of which requires additional heat consumption for evaporation and complicates the gas permeability of briquettes. 5) to have temperature resistance, not to collapse from the impact of high temperatures of burning and melting. Briquetting as a single technological process of agglomeration of natural resources, consists primarily of the following production operations:

1. Operations providing the preparation of raw materials for pressing: crushing, sifting, grinding and drying; preparation of binders; dosage of the components of the briquette charge, their displacement, heating and cooling of the briquette charge before the pressing procedure.

2. The operation of pressing the briquette charge with the application of the required efforts determined depending on the physicochemical properties and petrographic composition of the briquetted material.

3. Processing operations of "raw briquettes" with the purpose of their quickest solidification (cooling,

steaming, carbonization, drying, regenerative firing, etc.).

4. The operations of warehousing and loading of ready briquettes [1].

Due to the availability of a number of shortcomings in the provision of fuel to various regions of the Republic of Azerbaijan and in providing the environmental safety of the country as a whole, the search and creation of alternative fuel sources is one of the actual problems of our time.

The significance of solving this problem was confirmed by a decree of the President of the Republic of Azerbaijan dated 21 October 2004 and was reflected in the State Program on the "Use of Alternative and Renewable Energy Sources of the Republic of Azerbaijan".

Pursuant to the paragraphs of the State Program, we performed research operations in this direction. In the course of the research conducted, the possibility of briquette production from heavy oil residues as an alternative fuel was studied.

Coke fraction KZ-0 obtained at the oil refining plant named after H.Aliyev, and heavy oil residues from the refining processes obtained at the "Azerneftiyagh" oil refining plant were used as the main raw material for the production of fuel briquettes.

The main parameters of coke used as raw material are given in table 2.

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Table 2.

Raw materials	Density, kg/m ³ 25°C	Amount of light volatile hydrocarbons, mass %	Sulfur content, mass%	Ash formation, %
KZ-0-8 mm	2060-2080	13,5	0,12	0,2

As shown in Table 2, the raw materials for the briquette production contains a minimum amount of sulfur-containing compounds and forms a smaller amount of ash, which makes the briquettes obtained from this fraction of coke, completely suitable for use in everyday life and on public and social facilities.

In the process of briquette production, bitumen obtained in the process of tar oxidation at the “Azerneftyagh” oil refining plant, was used as a binder-other main raw material. The main quality parameters of bitumen used as a binder are shown in Table 3.

Table 3. Physico-mechanical parameters of oil bitumen.

Parameters	Values
Softening temperature, ° C	55-65
Penetration 25° C; 0,1 mm	60-70
Ductility, cm	45-50
Flash-point, ° C	220

Bitumen used in briquettes as a binder was obtained in the process of tar oxidation at a temperature of 250-260 ° C. Pursuant to studies conducted, the use of bitumen with the mentioned parameters in the production of fuel briquettes is more targeted. Approbation of various types of modifiers was conducted during studies in order to increase the bonding properties of bitumen.

A literature review showed that the use of bitumen of pitch, asphaltite, pitch distillate, heavy distillate of catalytic cracking, heavy pyrolysis resin, etc., as a binder, is more profitable from an economic point of view [1-12].

As a result of research conducted in the direction of the rational use of heavy oil residues, the possibility

of obtaining pitch from them was revealed. The pitch applied in the production of fuel briquettes was obtained from heavy pyrolysis resin and heavy catalytic cracking distillate. The heavy pyrolysis resin (HPR) and the heavy catalytic cracking distillate (HCCD) were heated to a temperature of 250 ° C and they were purged with nitrogen gas for 2 hours. Then, the resulting mass was heated up to 380–385 ° C under conditions of a constant increase in the heating rate and was oxidized by atmospheric oxygen for 1 hour. The quality parameters of the pitch obtained as a result of the thermopolycondensation reaction are shown in Table 4.

Table 4. The quality parameters of the pitch obtained as a result of the thermopolycondensation

Raw materials	Softening temperature, ° C	Fractional composition, mass %			Oxidation state, %
		α	β	γ	
HCCD	75-80	19,2	27,9	52,2	40,8
HPR	75-80	28,5	30,5	41,0	48

As shown in Table, the physico-chemical parameters of the pitch obtained from heavy pyrolysis resin are higher as compared with the pitch obtained from heavy catalytic cracking distillate. Higher values of the rate of coking and fractions providing the stickiness properties of the pitch, can be explained by the chemical group composition.

In order to increase the operational performance of the pitch, the various modifiers were added to their

composition. As modifiers, we used extract obtained as a result of oil purification by selective solvents and the wide petrol fraction of tar with asphaltite which is a product of deasphalting, proposed by us and obtained from the action of a magnetic field. The parameters of extract and asphaltite quality are shown in Tables 5 and 6.

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Table 5. Physico-mechanical parameters of the extract

Parameters	Values
Density, kg/m ³	969
Coking rate, %	16,9
Ash formation, mass %	0,035
Sulfur content, mass %	0,95

Table 6. Physico-mechanical parameters of the asphaltite

Parameters	Values
Density 20°C	1045
Softening temperature, °C	90-95
Ash formation, mass %	0,9
Coking rate, %	36,9

Composition of chemical group, %	Values
Oils	16,4
Resin	21,7
Asphaltenes	61,9

The preparation of fuel briquettes was studied with a laboratory facility.

The amount of binder added to petroleum coke, amounted 10% of the total mass during all experiments. Coke particles used for the preparation of fuel briquettes were dried at 60 °C and then heated to 80-90 °C. The binder in the mixer at 180-200 °C to a liquid state and then for 10-15 minutes. Intensively mixed with dried coke particles till obtaining of homogeneous mass.

After cooling to 70 °C, the obtained homogeneous mass was squeezed with a hydraulic press under a pressure of 20 kg /m³. The squeeze pressure was individually regulated for each sample depending on the desired need.

The obtained briquettes were tested for their resistance to compression and friction for ash formation and burning duration. Resistance to compression was determined by the pressure on the whole surface of the cylindrical briquette in a hydraulic press. To determine the resistance to friction, briquettes were placed in a standard cylinder, and values of the parameters were measured according to GOST 6114-57 (state standard). Digital value of resistance to abrasion was determined as the ratio of the mass of particles remaining on the sieve with a size of holes 250x25 mm after the cylinder made 100 revolutions to the primary mass of the briquette.

Studies have shown that the mechanical strength of fuel briquettes depends on quality, quantity, softening temperature of the binder, humidity of coke particles before the beginning of mixing with binder, on squeeze pressure and etc. When adding modifier-asphaltite to the binder briquette, the mechanical strength of the briquette is increased approximately two times. The mechanical strength of briquettes also increases with the application of petroleum pitch obtained from tar. When applied as an extract modifier, the strength parameter remained virtually unchanged.

III. CONCLUSIONS

Briquettes obtained as a result of application of binders made on the basis of petrochemical and oil refining industry residues, form less ash and the content of harmful substances in flue gases remains at a minimum level. Therefore, the use of binders is considered more targeted.

The proposed work allows to increase the mechanical strength, resistance to abrasion and to reduce the flash point of petroleum-coke briquettes. Besides, due to its high heating value, the proposed petroleum-coke briquette can be used as fuel instead of coal, coal briquettes and wood both in industry and at home.

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DETERMINATION OF COMPATIBILITY OF POLYMER SYSTEMS, SKEP, PU, KhKPE AND CHEMICAL FEATURES OF THEIR MIXTURES

Abstract: The technology for producing new composite materials based on industrial multi-tonnage polymers polyethylene (PE), polyvinyl chloride (PVC), polyurethane thermoelastoplast (DUTEP), butyl rubber (BC), chlorocarboxylate polyethylene (HCPE), ethylene propylene rubber (SKEP) has been developed.

Determined thermodynamic relationship (compatibility) system-butyl rubber-polyethylene (BK-LDPE), polyvinyl chloride, high – pressure polyurethane thermoplastic (PVC-UTEP), PVC chargeability polyethylene (PVC-CPE), HCPE of UTEP, BC-GATED (EPDM material-VC) by the method of inverse gas chromatography and identified structural features of these systems using IR spectroscopy and polarizing microscopy. It is shown that the presence of polyfunctional groups (chlorine, hydroxyl, carboxyl) significantly affects the compatibility mechanism and gives a universal set of properties (increased adhesive strength, tear and tear strength, resistance to thermal and chemical). The solubility parameters of four polymers of different polarities were determined using turbid metric titration (TD) and reverse gas chromatography. Based on the temperature dependence of the solubility parameter obtained from the retention times of the sorbents, the solubility parameter value was calculated, reduced to 298 K, and compared with the value obtained by the TDG method at the same temperature. An increase in the difference between the values of the solubility parameters obtained by the two methods is shown with an increase in the polarity of the polymer. The observed effect is explained by the Diametrically opposite state of the studied polymer-solvent systems.

Key words: polymer, macromolecules, compatibility, polyethylene (PE), polyvinyl chloride (PVC), polyurethane thermoplastic elastomer (DOTAP), butyl rubber (BK), chargeability polyethylene (HCPE), ethylene propylene rubber (EPDM material), solubility parameter, sorbent, stability, macromolecules, polyfunctional groups.

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ОПРЕДЕЛЕНИЕ СОВМЕСТИМОСТИ ПОЛИМЕРНЫХ СИСТЕМ ХПЭ,СКЭП,ПУ, ХКПЭ И ХИМИЧЕСКИХ ОСОБЕННОСТЕЙ ИХ СМЕСЕЙ

Аннотация: Разработана технология получения новых композиционных материалов на основе промышленных много тоннажных полимеров полиэтилен (ПЭ), поливинилхлорид (ПВХ), полиуретан термоэластопласт (ДУТЭП), бутилкаучук (БК), хлоркарбоксилатный полиэтилен (ХКПЭ), этиленпропиленовый каучук (СКЭП).

Определена термодинамическая зависимость (совместимость) системы бутилкаучук-полиэтилен (БК-ПЭВД), поливинилхлорид высокого давления – полиуретан термоэластопласт (ПВХ-ПУТЭП), ПВХ-хлоркарбоксилатный полиэтилен (ПВХ-ХПЭ), ХКПЭ-ПУТЭП, БК-ГОТЭД (СКЭП-БК) методом обращенной газовой хроматографии, а также выявлены структурные особенности этих систем с применением ИК-спектроскопии и поляризационной микроскопии. При этом показано, что наличие полифункциональных групп (хлорной, гидроксильной, карбоксильной) существенно влияет на механизм совместимости и придаёт универсальный комплекс свойств (повышенная адгезионная прочность, прочность на разрыв и разрыв, стойкость к тепловому и химическому разрушению) за счёт межмолекулярного полярного взаимодействия макромолекул.

Определены методами турбидиметрического титрования (ТДГ) И обращенной газовой хроматографии параметры растворимости четырех полимеров различной полярности. По температурной зависимости параметра растворимости, полученного по временам удержания сорбентов, вычислялась величина параметра растворимости, приведенная к 298 К, и сравнивалась с величиной, полученной по методу ТДГ при той же температуре. Показано увеличение разницы между величинами параметров растворимости, полученными двумя методами, с увеличением полярности полимера. Наблюдаемый эффект объясняется Диаметрально противоположным состоянием исследуемых систем "полимер-растворитель".

Ключевые слова: макромолекул, совместимость, полиэтилен (ПЭ), поливинилхлорид (ПВХ), полиуретан термоэластопласт (ДУТЭП), бутилкаучук (БК), хлоркарбоксилатный полиэтилен (ХКПЭ), этиленпропиленовый каучук (СКЭП). параметр растворимости, сорбент, стойкость, макромолекул, полифункциональные групп.

Введение

Проблема получения полимерных материалов, обладающих необходимыми свойствами для работы в экстремальных условиях, в настоящее время решается двумя-путями; синтезом новых видов полимеров и созданием полимерных композиций, где свойства отдельных компонентов аддитивно дополняют друг друга

В связи с этим, в существующих технологических условиях разработка различных полимерных композиций, значительно упрощающих технологический цикл переработки, резко снижающих массу и габариты продукции и, естественно, её себестоимость, является актуальной задачей[1-12].

Важной задачей также является проблема переработки полимерных композиционных систем, обладающих полифункциональными свойствами на основа полиолефинов и гетероцепных полимеров, обеспечивающих высокие физико-механические свойства изделий, работающих в экстремальных условиях. Задача исследования - создания полимерных систем, о требуемым комплексом технически важных

свойств, путем разработки теоретических основ совместимости, выявления термодинамических закономерностей, сочетания различных полифункциональных компонентов с оптимальными свойствами конечного материала[13-18].

Актуальность и важность этой проблемы определяется тем, что создание теории многокомпонентных систем крайне слабо отражено в литературе, хотя важность применения таких материалов в современной технике трудно переоценить.

Исследование свойств разработанных полимерных композиций и условий их переработки на существующем технологическом оборудовании в производственных условиях, создание многокомпонентных полимерных систем, с требуемым комплексом техники, важных свойств путем разработки теоретических основ совместимости соответствующим выявлением термодинамических закономерностей, сочетание различных полифункциональных компонентов с

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оптимальными свойствами делает выбранное направление актуальным в практическом плане.

-Выявлены закономерности термодинамической совместимости различных промышленно-выпускаемых полиолефинов и гетероцепных полимеров и возможность на основе их смесей получать композиционные материалы со значительно повышенными комплексами эксплуатационных свойств на базе существующих производственных мощностей и технологического оборудования.

-Разработанные методы химической и физической модификации индивидуальных полимеров, их смесей; для повышения эксплуатационных свойств композиционных материалов; в том числе метод модификации поли- этилена, -позволивший значительно повысить его - термоустойчивость на воздухе, к в вакууме, антикоррозийные свойства.

-Эффективность использования в композиционных материалах нефтеполимерной смолы-СПП, предназначенных для производства изделий, эксплуатирующийся в условиях повышенных механических износов, температур, давлений и деформаций.

-Разработаны композиционные материалы на основе смесей ПВХ+ПУТЭП, ХКПЭ+ПВХ, ХКПЭ+ПУ, ПЭВД+БК, технологии их производства и переработки, применение в новых эффективных изделиях технического назначения с экстремальными условиями эксплуатации: литьевые шины для сельскохозяйственных машин, центраторы для обсадных колонн, зонды для ядерно-магнитного каротажа, скребки и норийные ковши, уплотнители колец для пневматических излучателей, триерные поверхности для зерноочистительных машин

Проблема и ее актуальность. Проблема получения полимерных материалов, обладающих необходимыми свойствами для работы в экстремальных условиях, в настоящее время решается двумя путями: синтезом новых видов-полимеров и созданием полимерных композиций, где свойства отдельных компонентов аддитивно дополняют друг друга. Научно-технический прогресс- производства предъявляет к полимерным изделиям все новые и новые жесткие требования, а потребность промышленности к новым материалам непрерывно возрастает. Поэтому весьма актуальным в существующих технологически; условиях является разработка различных полимерных -композиций, значительно упрощающих технологию их производства и переработки, сокращающих затраты на получение материалов с необходимыми комплексами свойств.

В Азербайджане, с одной стороны, имеется крупнотоннажное производство индивидуальных полиолефинов и гетероцепных полимеров, позволяющих реализовать определенную гамму эксплуатационных свойств полимерных изделий, а с другой стороны, постоянное развитие техники требует расширения диапазона применения полимерных изделий, повышения их технического уровня. Это противоречие выдвинуло как одну из важнейших народнохозяйственных проблем необходимость разработки промышленной технологии получения на основе выпускаемых полиолефинов и гетероцепных полимеров, новых видов композиционных материалов с существенно расширенными эксплуатационными возможностями, предложить производство новых высокоэффективных изделий с использованием - существующих производственных мощностей и технологического оборудования.

Однако, несмотря на большие экономические и технические преимущества производства кошзшздаонных материалов на основе крупнотоннажного - производства полиолефинов и гетероцепных полимеров до последнего, времени в Сумгаитском экономическом районе , как и в других регионах страны, осуществлялось промышленное производство-индивидуальных полимеров; бутилкаучука, поливинилхлорида, хлоркарбосилатного полиэтилена, полиэтилена высокого давления, полиуретана и других, что значительно снижало эффективность их использования в народном хозяйстве - страны, экспортные возможности.

Такая ситуация вызывалась тем, что еще совершенно- недостаточно развита теория многокомпонентных полимерных систем, отсутствовали научно-обоснованные рекомендаций по производству, переработке и применению таких композиционных материалов.

Актуальность проблемы: определяется необходимостью разработки научных основ совместимости промышленно выпускаемых полимеров путем выявления термодинамических закономерностей смесей полимеров.

Цель, работы - разработка научных основ промышленной технологии производства композиционных материалов, с широкой гаммой- эксплуатационных свойств на основе полиолефинов и гетероцепных полимеров с использованием существующих производственных мощностей и технологического оборудования; для обеспечения -выпуска первых в отечественной практике- высокоэффективных литьевых бескордных шин и других остродефицитных изделий. Достижение указанной цели потребовало: выявления наиболее важных. термодинамических закономерностей смесей промышленно-выпускаемых

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полиолефинов и гетероцепных полимеров и разработки на этой основе научных основ их совместимости, создания многокомпонентных композиционных материалов с требуемый комплексом эксплуатационных свойств;

- изучения термодинамической совместимости компонентов полимерных смесей, представляющих наибольший практический интерес для народного хозяйства и, прежде всего, Азербайджанского региона: бутилкаучука (БК), этилен-пропиленового каучука (СКЭП), хлоркарбоксилатного полиэтилена (ХКПЭ), полиэтилена высокого и низкого давлений ПЭВД и ПЭНД), поливинилхлорида (ПВХ), полиуретан термоэластопласта (ПУТЭП), хлорированного полиэтилена (ХПЭ);

-разработки остродефицитных материалов и изделий душ шинной и -нефтяной промышленности на основе двух - и многокомпонентных полимерных смесей;

- разработки технологии переработки созданных композиционных полимерных-материалов, позволяющей в наибольшей степени использовать существующие производственные мощности и технологическое оборудование;

- разработки необходимой технологической, технической и конструкторской документации для освоения промышленного производства созданных композиционных материалов и изделий.

Научная новизна работы. На основе анализа, обобщения существующих теорий совместимости полимеров и выполненных экспериментальных исследований впервые разработаны научные основы концепции создания композиционных материалов из многокомпонентных систем на основе промышленно-выпускаемых полиолефинов и гетероцепных полимеров. Выявлены закономерности между полярностью, термодинамической совместимостью полимеров, межфазными явлениями в смесях, их физической структурой эксплуатационными свойствами композиций.

Впервые изучены фазовые диаграммы полимерных систем. ПЭВД-БК, ПВХ-ПУТЭП, ПУТЭП-БК, ПВХ-ХКПЭ, ХКПЭ-ПУТЭП, СКЭП-БК, СКЭП-ПУ, ПУТЭП- ПЭ, ПЭ-ПВХ, ПЭ-СКЭП. Показано, что эти системы существенно отличаются по величине от ВКТС и НКТС и весьма затруднено полное термодинамическое совмещение полимеров.

Показано влияние различных полифункциональных групп - хлорной, гидроксильной; циановой, карбоксильной и сложноэфирной: на механизм совместимости; полимеров и на возможность придания смесям

повышенных адгезионных, прочностных, термостойких и коррозионностойких свойств.

1. Эксперимент

Исследование термодинамической совместимости бинарных смесей хлорсодержащих полимеров, один из компонентов которых в своем составе имел полярные карбоксильные группы, показало, что эти системы только частично термодинамически совместимы, несмотря на - наличие обеих, критических температур совместимости.

Изучение процессов термоокислительной стабильности хлорсодержащих полимеров показало, что она зависит прежде всего от концентрации хлорсодержащих групп. Процесс термодеструкции идет с разрывом С-С-связей в уже гидрохлорированном полимере. Установленные факты позволили разработать оптимальные составы и технологические процессы переработки таких полимеров и их смесей, получение изделий и высокой термостабильностью.

Установлено, что неполярные полимеры, в частности полиолефины, совмещаются значительно хуже полярных. Были разработаны методы повышения полярности полиолефинов, путем их модификации.

При изучении процессов растворимости полимеров было выявлено, что температурные зависимости параметров растворимости, полученные по времени удержания сорбатов и методом ТДТ, отличаются друг от друга. Разница между ними увеличивается с ростом полярности полимера, что объясняется диаметрально противоположным состоянием исследованных систем «полимер-растворитель».

Определена - термодинамическая совместимость и структурные особенности систем ПВХ-ПУТЭП, ПВХ-ХКПЭ, ХКПЭ-ПУ, ПП-БК.

Изучены процессы получения сшитого полиэтилена и установлено. влияние на его структурирование стирола и акрилонитрила в присутствии органической перекиси. Показано влияние на эксплуатационные свойства композиционных материалов наполнителей. В частности, установлена возможность снижения износа материала почти в 3 раза, повышение его термостабильный, на воздухе и в вакууме. Показана широкая возможность вариации свойств композиций -путем химической физической модификации отдельных компонентов материала, регулирования его состава и метода переработки.

В работах Серенко, Гончарук и др. были исследованы композиты на основе ПП. Было установлено, что с повышением температуры в наполненном ПП изменяется вид дефектов, образующихся вблизи крупных частиц наполнителя: от трещины к ромбовидной поре и

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затем к овальной или щелевидной поре. Видоизменение дефектов предопределяет смену механизма разрушения композита при постоянном содержании частиц наполнителя от хрупкого до достижения верхнего предела текучести к разрыву при деформировании или распространении шейки и, наконец, к пластичному неоднородному деформированию с устойчивым ростом шейки [19-28]

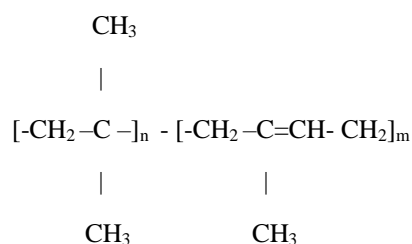
В настоящее время широко изучаются смеси неравновесных полимеров с наполнителями в виде твердых порошков. Известно, что для создания хорошо смешиваемых смесей необходимо наличие высокой адгезии между компонентами, которая в случае с полимерами очень слабая. Для повышения механических свойств таких смесей необходимо увеличение межфазной адгезии – компатибилизация.

В исследованиях ученых Заикина и Боброва [1-3]. было показано, что компатибилизация обусловлена адсорбционным связыванием разнородных макромолекул через частицы наполнителя, что возможно при локализации этих частиц между полимерными компонентами. [39-45] Также в их работах было установлено, что прочность смесей повышается при повышении удельной поверхности и уменьшении размера частиц введенного наполнителя, что связано с увеличением площади контакта частиц наполнителя, находящегося на границе полимерных фаз.

Известно, что чем больше компонентов в смеси, тем шире химические и физические возможности полученной смеси. С развитием изучения смешиваемости полимерных смесей, наряду с бинарным, началось и широкое исследование совместимости трех- и более компонентных смесей полимеров. В работе Кулезнева и Сурикова были широко изучены фазовые равновесия в трехкомпонентных смесях полимеров. Малая вязкость раствора позволяет достаточно быстро достичь равновесия и построить фазовую диаграмму смеси [29-34]. Построить такую фазовую диаграмму можно диффузионным методом, разработанным ученым А.Е.Чалых . Основное влияние на фазовую диаграмму указывает именно межфазный слой в структуре полимер-полимерные системы, так как эта зона является зоной повышенной растворимости третьего полимера. Расчет по теории Флори-Хаггинса-Скотта показывает, что в трехкомпонентной смеси полимеров вероятность возникновения метастабильного состояния выше, чем в бинарной. [35-41]

1.1. РАСЧЕТ СОВМЕСТИМОСТИ ДЛЯ СИСТЕМЫ БУТИЛКАУЧУК- ПОЛИ ЭТИЛЕН ВЫСОКОГО ДАВЛЕНИЯ (БК-ПЭВД) ПРИ ТЕМПЕРАТУРЕ 25⁰С

Рассчитываем параметры растворимости каждого компонента смеси с использованием табличных значений молярных констант притяжения различных химических групп Смола, учитывая плотность БК при 25⁰С $\rho=0,92 \times 10^3 \text{ кг/м}^3$, содержание изопрена- 5%, плотность ПЭВД $\rho=0,96 \times 10^3 \text{ кг/м}^3$. В расчете не учитываем распределение концевых групп и молекулярные массовые распределения. БК – формула ($n= 0,95$; $m=0,05$)

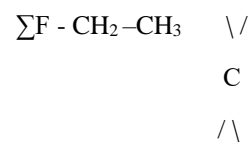


Молярные константы притяжения изопрена

$$\sum F = 133,2 + 93 + 214 + 28 = 415$$

$$M = 5 \times 12 + 8 \times 1 = 68$$

Молярные константы притяжения изобутилена



$$\sum F = 133 + 2 \times 214 - 93 = 468$$

$$M = 12 \times 4 + 5 \times 1 = 53$$

Тогда параметр растворимости БК

$$\delta_{\text{БК}} = 0,92/0,95 \frac{468}{53} + 0,05 \frac{415}{68} - 8,0$$

Параметр растворимости ПЭВД

$$\sum F = 133$$

$$M = 1 \times 12 + 2 \times 1 = 14$$

$$\delta_{\text{БК}} = 0,96 \frac{133}{14} = 9,12$$

Расчет параметра взаимодействия между полимерами выполняется по уравнению Гильдебранда; Р – газовая постоянная, равная 1,987 кал моль⁻¹ град⁻¹; Т – температура в градусах Кельвина и V_p- сравнительный объем (см³/моль), обычно принимаемый равным 100 см³/моль.

Для этого значения V_p и температуры 25⁰С уравнение Гильдебранда приобретает вид:

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JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

$$X_{AB} = (\delta_A - \delta_B)$$

В этом случае

$$X_{\text{БК-ПЭВД}} = \frac{(9,12-8,0)^2}{6} = 0,209$$

Для расчета критического значения $X_{\text{БК-ПЭВД}}$ используется следующее уравнение

$$X_{\text{кр}} = 1/2 [1/X_A^{1/2} + 1/X_B^{1/2}]$$

Которое включает степень полимеризации каждого полимера, выраженную через сравнительный объем. Степень полимеризации можно рассчитать на основании действительности степени полимеризации X , если известен молярный объем повторяющегося звена полимера, по уравнению

$$X_A = (\bar{V}/V_p)_x$$

Достаточно хорошее приближение получается из соотношения

$$X_A = M_A/100$$

Где M_A – молекулярный вес полимера.

Таким образом имеем:

$$X_{\text{БК}} = \frac{350000}{100} = 3500$$

$$X_{\text{ПЭВД}} = \frac{300000}{100} = 3000$$

Отсюда по уравнению для расчета критического значения:

$$(X_{\text{БК-ПЭВД}})_{\text{кр}} = 1/2 \times 1/3500^{1/2} + 1/3000^{1/2} = 6,18 \times 10^{-4}$$

Определим вероятность происхождения фазового разделения, для чего вычислим $X_{\text{БК-ПЭВД}}$ для различных фазовых составов. Результаты сведены в таблицу 1.

Таблица 1. Параметры растворимости системы БК-ПЭВД

$\Phi_{\text{БК}}$	$(X_{\text{БК-ПЭВД}})_{\text{сп}}$	$\Phi_{\text{БК}}$	$(X_{\text{БК-ПЭВД}})_{\text{сп}}$
0,00	-	0,55	6,3 x10
0,05	3,03 x10	0,60	6,55 x 10
0,10	1,61 x10	0,65	6,96 x10
0,15	1,15x10	0,70	7,60x10
0,20	9,23 x10	0,75	8,57x10
0,25	7,94x10	0,80	1,01x10
0,30	7,14x10	0,85	1,28x10
0,35	6,65 x10	0,90	1,83x10
0,40	6,35x10	0,95	3,48x10
0,45	6,20x10	1,00	-
0,50	6,19 x10		

Как видно, с уменьшением концентрации какого-либо компонента в смеси, спиновальный параметр растворимости возрастает, причем ПЭВД растворяется в БК значительно лучше, чем БК в ПЭВД. Вариационным методом были определены концентрации, при которых возможно абсолютное совмещение. Это 0,08% мас. для ПЭВД и 0,06% для БК.

Таким образом, расчетный метод показывает, что система БК – ПЭВД практически несовместима.

Для нахождения критической точки системы на фазовой диаграмме необходимо вычислить $G_{\text{см}}$ для различного состава системы. Расчет был выполнен для $T = 298^{\circ} \text{K}$, результаты которого представлены в таблице 2.

Таблица 2. Теплота смешения БК-ПЭВД

$\Phi_{\text{БК}}$	$G_{\text{см}}$	$\Phi_{\text{БК}}$	$G_{\text{см}}$
0,00	-	0,55	3,42 x10
0,05	6,58 x10	0,60	3,33 x 10
0,10	1,25 x10	0,65	3,16 x10
0,15	1,77x10	0,70	2,91x10
0,20	2,22 x10	0,75	2,60x10
0,25	2,60x10	0,80	2,22x10
0,30	2,91x10	0,85	1,77x10
0,35	3,16 x10	0,90	1,25x10
0,40	3,33x10	0,95	6,58x10

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0,45	3,42x10	1,00	-
0,50	3,46 x10		

Из расчетных данных видно, что для системы БК-ПЭВД наблюдается так называемый симметричный случай с нижней критической температурой растворения (НКТС). Исходя из принципа адитивности, имеем $T_{кр} 503^0 \text{ K}$.

Таким образом, из приведенного расчета можно сделать выводы:

1. Система БК-ПЭВД является практически несовместимой;

2. Совмещение возможно при концентрации БК в ПЭВД до 0,06% и концентрации ПЭВД до 0,08%.

Для сопоставления совместимости полимерных смесей в зависимости от полярности компонентов был проведен расчет параметров совместимости для системы полярных компонентов ПВХ и ПУТЭП (сравнение с неполярной системой ПЭВД-БК).

1.2. РАСЧЕТ СОВМЕСТИМОСТИ ДЛЯ СИСТЕМЫ ПОЛИВИНИЛХЛОРИД-ПОЛИУРЕТАН ТЕРМОЭЛАСТОПЛАСТИФИЦИРОВАННЫЙ (ПВХ-ПУТЭП) ПРИ ТЕМПЕРАТУРЕ 25⁰С

Рассчитываем параметры растворимости каждого компонента смеси с использованием табличных значений молярных констант притяжения различных химических групп Смола, учитывая плотность ПВХ при 25⁰С

($\rho_{25}=1,41 \times 10^3 \text{ кг/м}^3$). В расчете мы будем учитывать распределение концевых групп в следствии незначительности их количества и без учета молекулярно-вещного распределения.

Единичное звено ПВХ - $[-\text{CH}_2-\text{CHCl}-]_n$

Молярные константы притяжения

$-\text{CH}_2- -\text{CH} = \text{Cl} -$

$$\sum F = 133 + 28 + 270 = 431$$

$$M = 12,2 + 1,3 + 35,5 = 62,5$$

Тогда параметр растворимости ПВХ будет:

$$\delta_{\text{ПВХ}} = 1,41 \times 431 / 62,5 = 9,72$$

Параметр растворимости ПУТЭП с учетом того, что плотность ПУТЕП при 25⁰С ($\rho_{25}=1,1 \times 10^3 \text{ кг/м}^3$).

Единичное звено ПУТЭП

$[-(\text{CH}_2)_6-\text{OSOHN}-(\text{CH}_2)_4-]_n$

$-(\text{CH}_2)_6- -\text{COO}- -\text{NH}- -(\text{CH}_2)_4$

$$\sum F = 133,6 + 310 + 180 + 133,4 = 757$$

$$M = 12,11 + 1,21 + 16,2 + 14 = 199$$

$$\delta_{\text{ПУТЭП}} = 1,10 + 1820 + 199 = 10,06$$

Расчет параметра взаимодействия между полимерами в системе выполняется по уравнению:

$$X_{AB} = V_n / RT (\delta_A - \delta_B)^2$$

Где R – газовая постоянная, равная 1,987 ккал моль⁻¹ град⁻¹; T – температура в К; V_n – сравнительный объем (см³/моль), обычно принимаемый равным 100 см³/моль. Таким образом, для T=25⁰С уравнение принимает вид:

$$X_{AB} = (\delta_A - \delta_B)^2 / G$$

В этом случае для системы ПВХ-ПУТЭП имеем:

$$\delta_{\text{ПВХ-ПУТЭП}} = (10,06 - 9,72)^2 / 6 = 0,019$$

Для расчета критического значения ($X_{\text{ПВХ-ПУТЭП}})_{кр}$ используется уравнение

$$X_{кр} = 1/2 [1/X_A^{1/2} + 1/X_B^{1/2}]^2$$

которое включает степень полимеризации каждого полимера, выраженную через сравнительный объем V_n . Степень полимеризации можно рассчитать на основании действительной степени полимеризации X, если известен молярный объем повторяющегося звена полимера по уравнению:

$$X_A = (V / V_p)_x$$

Достаточно хорошее приближение получается из соотношения

$$X_A = M_A / 100$$

Где M_A – молекулярный вес полимера.

Таким образом имеем:

$$X_{\text{ПВХ}} = \frac{90000}{100} = 900$$

$$X_{\text{ПУТЭП}} = \frac{18000}{100} = 180$$

Отсюда по уравнению для расчета критического значения:

$$(X_{\text{ПВХ-ПУТЭП}})_{кр} = 1/2 \times 1/X_A (\Phi_A / G_{II}) + 1/X_B (\Phi_B)_{ср}$$

Полученные результаты показано в таблице 3.

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Таблица 3. Значения синодального параметра взаимодействия для различных фазовых составов

№№ п/п	ПВХ	$(X_{\text{ПВХ-путэп}})_{\text{сп}}$
1.	0,00	-
2.	0,05	$2,78 \times 10^{-3}$
3.	0,10	$1,40 \times 10^{-2}$
4.	0,15	$8,64 \times 10^{-3}$
5.	0,20	$6,97 \times 10^{-3}$
6.	0,25	$6,25 \times 10^{-3}$
7.	0,30	$5,93 \times 10^{-3}$
8.	0,35	$5,82 \times 10^{-3}$
9.	0,40	$5,86 \times 10^{-3}$
10.	0,45	$6,02 \times 10^{-3}$
11.	0,50	$6,29 \times 10^{-3}$
12.	0,55	$6,67 \times 10^{-2}$
13.	0,60	$7,18 \times 10^{-3}$
14.	0,65	$7,87 \times 10^{-3}$
15.	0,70	$8,79 \times 10^{-3}$
16.	0,75	$1,01 \times 10^{-2}$
17.	0,80	$1,19 \times 10^{-2}$
18.	0,85	$1,46 \times 10^{-2}$
19.	0,90	$1,92 \times 10^{-2}$
20.	0,95	$2,84 \times 10^{-2}$
21.	1,00	-

Таблица 4. Значения синодального параметра взаимодействия для различных фазовых составов

№№ п/п	ПВХ	$(X_{\text{ПВХ-путэп}})_{\text{сп}}$
1.	0,00	-
2.	0,05	$2,78 \times 10^{-3}$
3.	0,10	$1,40 \times 10^{-2}$
4.	0,15	$8,64 \times 10^{-3}$
5.	0,20	$6,97 \times 10^{-3}$
6.	0,25	$6,25 \times 10^{-3}$
7.	0,30	$5,93 \times 10^{-3}$
8.	0,35	$5,82 \times 10^{-3}$
9.	0,40	$5,86 \times 10^{-3}$
10.	0,45	$6,02 \times 10^{-3}$
11.	0,50	$6,29 \times 10^{-3}$
12.	0,55	$6,67 \times 10^{-2}$
13.	0,60	$7,18 \times 10^{-3}$
14.	0,65	$7,87 \times 10^{-3}$
15.	0,70	$8,79 \times 10^{-3}$
16.	0,75	$1,01 \times 10^{-2}$
17.	0,80	$1,19 \times 10^{-2}$
18.	0,85	$1,46 \times 10^{-2}$
19.	0,90	$1,92 \times 10^{-2}$
20.	0,95	$2,84 \times 10^{-2}$
21.	1,00	-

Так как 0,019 значительно больше 0,006, т.е. $X_{\text{ПВХ-путэп}} > (X_{\text{ПВХ-путэп}})_{\text{кр}}$, то эта система должна быть несовместимой в широкой области составов.

Используя уравнение:

$(X_{\text{AB}})_{\text{сп}} = 1/2 [1/X_{\text{A}}(\text{ФА})_{\text{сп}} + 1/X_{\text{B}}(\text{ФВ})_{\text{сп}}]$
определим вероятность происхождения фазового разделения, для чего вычислим $(X_{\text{ПВХ-путэп}})_{\text{сп}}$ для

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разных фазовых составов. Результаты исследования сведены в таблицу 4. и рис. 1.

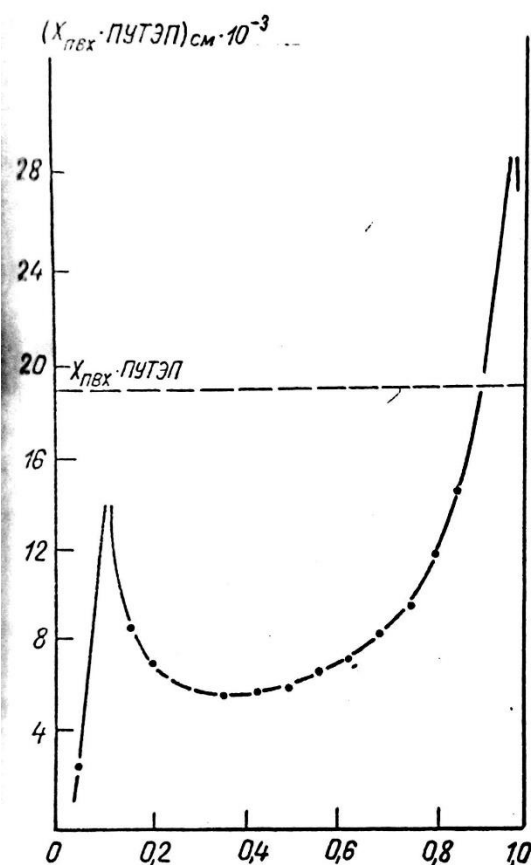


Рис. 1 Теоретическая фазовая диаграмма системы ПВХ-ПУТЭП

Как видно, ПУТЭП растворяется в ПВХ значительно лучше, чем ПВХ и при содержании менее 10% ПУТЭП должна наблюдаться полная совместимость систем. Из расчета следует, что наблюдается так называемый несимметричный случай с двумя критическими температурами растворения – нижний и верхний.

Параметры растворимости веществ характеризуют связь между энергией смешения и взаимной растворимостью. Знание параметра растворимости полимера необходимо для получения ценной информации о поведении полимера при смешении с другими полимерами или низкомолекулярными веществами.

Исследовали промышленные образцы полимеров, которые подвергали дополнительной очистке путём перебсаждения из 2 мас. % раствора в соответствующем растворителе в осадитель - этанол, при отношении растворитель-осадитель 1:10.

В качестве сорбентов растворителей и осадителей использовали; органические жидкости различного химического строения.

Исследования по методу ОГХ выполняли на газовом хроматографе "Цвет-100" с детектором ионизации в пламени. В качестве газоносителя использовали азот. Твердым носителем служил силанизированный носитель «Chromaton N-AW-D_{me}S» с диаметром частиц 0,20-0,25 км.

Насадку готовили методом испарения. Растворителями служили в случае СКЭПа-четырёххлористый углерод, в случае хлоркарбокислированного ПЭНП (ХПЭ), хлорированного ПЭНП (ХКЭ) ПВХ и ПУ - тетрагидрофуран. Процентное содержание неподвижной фазы в насадке определяли путем последовательного взвешивания после экстракции полимера в течении 1 недели в экстракторе Сокслета, Использовали колонки из нержавеющей стали длиной 1,0 м, которые заполняли насадками с содержанием полимеров 10+11 мас. %.

Опыты проводили при 353, 373, 393 К, что выше температуры стеклования всех полимеров. Объем пробы составлял 0,02-0,5 мкл. Значения

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времени, удержания "без взаимодействия" определяли по газообразному метану.

Равновесные значения удерживаемых объемов получали экстраполяцией на нулевую скорость потока газа-носителя.

Для определения параметров растворимости полимеров по методу ТДТ готовились растворы с концентрацией 0,05 г/дл. 3-15 мл полимерного раствора при перемешивании медленно добавлялся осадитель. Изменение оптической плотности раствора фиксировалось на фотоэлектрокалориметре ФЭК-М, после чего экстраполяцией на нулевую оптическую плотность определялась концентрация осадителя, соответствующая началу высвобождения полимера (точка мутности). Для титрования полимерных растворов при 296 К использовались два различных осадителя - один с более высоким параметром растворимости, другой - с меньшим параметром растворимости,

Как и следовало ожидать, для ХПЭ и ХКПЭ хорошими растворителями оказались полярные и неполярные хлорпроизводные углеводов.

Для ПУ хорошими растворителями оказались полярные хлорпроизводные углеводов и кетоны, а для СКЭПа - неполярные соединения. Интересно отметить, что для всех исследованных полимеров хорошими растворителями при температурах 353-393 К оказались тетрагидрофуран и хлороформ.

На рисунке 2 в графическом виде показано изменение интенсивности характерных полос при изменении состава смесей.

Как видно, спектры содержат полосы 1762 и 1693 см^{-1} относящихся к $\nu_{\text{C=O}}$ свободных и димерных групп COOH . Следует отметить, что ПВХ марки С-70 содержит достаточно значительное количество окисленной до кетона

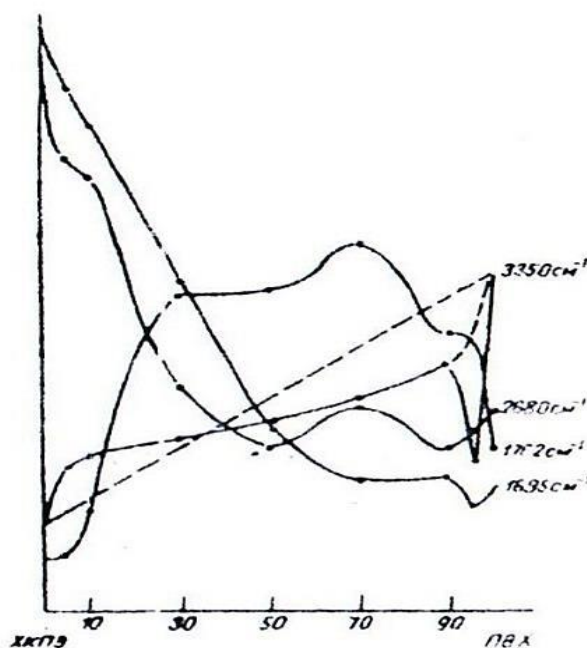


Рис.2. Изменение пропускания в областях характерных частот системы ХКПЭ-ПВХ

Полуколичественный анализ, основанный на использовании $\nu_{\text{C=O}}$ мономера ХКПЭ в качестве эталона, даёт содержание окисленных форм около 0,36 % мас. По изменению интенсивности число не взаимодействующих друг с другом, звеньев кислоты, видно, что при переходе от чистого полимера ХКПЭ к смеси свободных групп COOH монотонно увеличивается до содержания ПВХ смеси 70 % мас.

Выводы

Расчетным методом показано, что полимеры БК и ПЭВД практически несовместимы.

Вариационным методом была определена концентрация, при которой возможно абсолютное совмещение (0,08; масс).

2. Показано, что ПУТЭП растворяется в ПВХ значительно лучше, чем ПВХ. При содержании менее 10% масс. ПУТЭП наблюдается полная совместимость полимеров.

3. Анализ обобщенных функций желательности показал, что увеличение содержания ПВХ от 5-10% масс. Приводит к возрастанию D от 0,067 до 0,078.

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4. Система ПВХ-ПУТЭП является несовместимой в широком диапазоне составов.

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THE IMPORTANCE OF SOCIAL ENVIRONMENT OF TEMUR AND THE TEMURIANS PERIOD AND THE PERIOD HE LIVED IN THE SCIENTIFIC WORK OF SA'DUDDIN TAFTAZANI

Abstract: The article provides information about the scientific and educational environment in which Saududdin Taftazani lived, his life and activities, scientific research, the general characteristics of his works.

Key words: kalam, islamic science, usul al-fiqh, theology, logic, mutakallim.

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Introduction

The independence of the Republic of Uzbekistan has led to the study of scientific knowledge, in particular, the restoration of history, philosophy, culture, religion, national traditions and values, the formation of a correct and objective attitude to a particular period, their assessment and conclusions from a modern point of view gave an opportunity to understand the social reality in the development of science.

“Independence,” said the First President of Uzbekistan, Islam Karimov, “has expanded the level of education of the population of our country. Our social thinking on history and modern realities require the ability to overcome the abstract stereotypes of perception of life, to think independently and to be able to evaluate what is happening around.” [1, p.150].

Central Asian scholars and thinkers have made invaluable contributions to the development of Islamic science in the Middle Ages. It should be noted that many scientists and thinkers, who were born and raised in other regions, moved to the famous cities of Central Asia, in particular, to Samarkand, where they worked effectively in the field of science.

Materials and Methods

The first reason for the emergence of such a process, that's to say, leaving their homeland and coming to Central Asian cities, in particular, the ancient city of Samarkand played a essential role in various fields of science, is the unique opportunity for the development of science in this region or contribution can be cited as another reason (or second reason). This tendency is especially evident in the administration of Amir Temur and the subsequent rulers of the great state he founded. Timur began to gather famous scientists, “fuzalo”s (intellectual people), craftsmen and representatives of spirituality from the regions under his control. Its main and sole purpose was to restore in Samarkand the traditions of the Baitul Hikma scientific schools in Khorezm, Bukhara and Baghdad, which are known as the scientific centers of the Islamic world, as in the works IX-X. Scientists visiting Samarkand have all the facilities to engage in science. The scientists and other creative people who took part in the scientific discussions and debates organized at the initiative of Amir Temur were encouraged in the palace. In addition, the great scholars who passed the test were sent to teach (mudarris) in the newly opened educational institutions (madrasahs). Due to the high

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attention to science and enlightenment, many scholars at that time considered it an honor to visit Samarkand. All of these factors (aspects) have led to the emergence of motivation for science in any person.

“Amir Temur, who deeply understood such a vital need and highly valued science, attracted to the capital of his country mature scientists and scholars, architects and engineers from different regions of the world. This is proved by the names of hundreds of scholars who worked in Samarkand, such as Balkhi and Damascus, Baghdadi and Marvazi, Taftazani and Jurjani, Jazari and Shami. [2]

Sharofiddin Raqimi, who also provided information and valuable facts about the scientific and creative environment of that period, says: “Sahibkiran Amir Temur was in the position of expression during the reign of the Koragon Empire and the state. Many talented masters of the word, the classical fozi, lit the lamp of wisdom from the candlelight of his perception. Many divers have collected meanings and idioms from his imaginary treasure.” [3, p.21].

One of the "divers" described by Sharofiddin Raqimi was Sa'duddin Taftazani. Taftazani is one of the thinkers who left an indelible mark on the development of Central Asian philosophical thought.

One of the important aspects in studying the life and activity of a scientist, his scientific research, is to pay attention to the political, social and scientific attention in the society in which he lived. Because the environment of the period in which a person lived is of special importance in the formation of a person as a genius or uncle.

In particular, an in-depth study of Taftazani's life and scientific activity requires attention to the period in which he lived. It is also the basis for a complete picture of the role and status of scholars in Islam and society, the relationship between state and religion in the social environment of the period in which the thinker lived.

The scholar's full name is Mas'ud ibn Umar ibn' Abdullah Sa'd al-Din Taftazani, who was born in 1322 in the village of Taftazan in Nasa, Khorasan (now Turkmenistan). From an early age, the scientist was interested in education, studied with well-known scientists in the cities of Samarkand, Bukhara, Khorezm and Sarakhs, which were the centers of science of his time, and participated in various scientific discussions [4, p.209]. It is said that he was the leader of his time in many fields of science.

The famous Arab scholar, the founder of the science of sociology, the historian Ibn Khaldun, in his work "Muqaddima" entitled "Mental Knowledge and Their Classification" gives information about the sciences and says the following. “I came across a number of books on intellectual knowledge in Egypt. Their owner was Sa'duddin Taftazani, one of the nobles of Khurasan in Herat. His works on “kalam”, “usul al-fiqh” and narration show that he is highly qualified in these fields. [5, p.39 5, p.179-19]

In the first half of the 16th century, after the end of the Mongol rule in Movarounnahr (1221-1370), Timur and the Timurids rule were strengthening their influence in the political, social and other spheres of the state. Naturally, such political and social changes also affected the activities of scientists who lived and worked in that time and space.

It should be noted that scientific research is the most complex type of creativity. It is not in vain that "doing science is equated with digging a well with a needle." In the hadiths of Imam al-Bukhari, it is stated, "If you want to live well in this world, do business, if you want to live well in that world, do prayer, and if you want to live well in both worlds, do science."

In particular, we consider it appropriate to note the following about the remarkable aspects of the life and scientific activity of Sa'duddin Taftazani, who admitted that he was one of the “mutakallim”s. In all works of the scientist on religious-philosophical and logical themes:

- events that occur in nature or in existence, their interrelationships and causal relationships;
- human's free will, behavior and all moral aspects;
- the levels of creation, that is, the concepts of God and man's destiny, fate and destiny;
- the doctrine of the theory of knowledge;
- ontological understanding of the world;
- Theole and social significance of logical thinking in cognition and other observational scientific and philosophical views are studied as an urgent task.

In addition, Taftazani developed theology, philosophy and logic in all its aspects. In particular, during this period he made a significant contribution to the formation and development of the new doctrine in the Central Asian region. He explained the doctrine of the Word in essence and logic. He created famous works in the Islamic world on the topics listed above. The presence in the list of Taftazani's works of secular knowledge, not only Islamic knowledge, but also logic, grammar, morphology, arithmetic, geometry, testifies to the fact that the scholar was a great person who achieved harmony in science and religion.

The scholar's works promote such altruistic ideas as the pursuit of science, the glorification of the mind, spiritual purification, moral maturity, social justice, sharing goodness for all, friendship and brotherhood, which are universal values. These ideas are the main theme of Taftazani's works.

Therefore, the study and analysis of the works of the great thinker remains a topical issue facing researchers today.

As mentioned above, the scholar Taftazani mastered such sciences as tafsir (interpretation of the Qur'an), fiqh (issues of Islamic law), kalam (Islamic creed), navh (Arabic grammar), puberty and logic, and created invaluable works on the subject.

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Taftazani is one of the youngest scholars in the Islamic world. In 1338 (737 AH), when he was still a teenager, at the age of 16, he finished writing *Sharh at-Tasrif al-Izzi*. According to the data, the number of his works on scientific and spiritual heritage is 30 [6, p.223]. His works have not yet been fully translated into Uzbek, in-depth research has not been conducted, but we think that in the recent years this work will also be carried out and presented to our people and put into scientific retirement.

It should be noted that Taftazani's scientific activity, along with the creation of works, is also dominated by the practice of commenting on the works of great scientists who grew up in our country. He wrote detailed commentaries and margins on Abu Hafs al-Nasafi's "Aqeed al-Nasafi", Mahmud Zamakhshari's "Tafsir al-Kashshof" and Nawabig al-Kalam, and similar works.

When it comes to the scholar's hard work, such as commentary, it should be noted that *Sharh al-Aqeed al-Nasafi*, which is recognized as one of his most famous commentaries, has not yet been fully researched. It does not analyze the integral connection of the ideological issues raised with the historical context. Copies of this work in the manuscripts of Uzbekistan are not in a complex analogy with the copies in foreign state funds. Although this work has been taught as a textbook in religious educational institutions in Mavorounnahr and neighboring areas for almost 5 centuries, its methodological significance and place in the curriculum has not been studied and has not been referred to a wide readership.

However, "Sharh al-Aqeed an-Nasafi" answers the problematic issues that have arisen in the field of Islamic doctrine. This work is especially important in conveying to our people the true essence of Islam, which is the basis of our spirituality. At the same time, this work serves as an ideological weapon in the fight against various forms of religious and political currents and ideologies, views, doctrines in a destructive spirit that exist today. The struggle against destructive ideas and views, currents and sects disguised as Islam is not only a social problem of today, but such negative situations have occurred many times in history. From this point of view, "Sharh al-Aqeed an-Nasafi" has served as a spiritual source (torch) in the struggle against various religious fanatics.

For information, various copies of Taftazani's *Sharh al-Aqeed al-Nasafi* are kept in the Treasury of

Sources at the Tashkent Islamic University under the numbers 14, 98, 116, 158, 172 [7, p.212].

In another valuable work, *Tahzib al-mantiq va al-Kalam*, the scholar made an in-depth analysis of the issues of free morality, behavior and free will of the people living in the society. It was on these issues that there were different views and opinions in medieval social strata. Some philosophers debated the existence of fate and destiny, as well as the freedom of human behavior, that is, whether the will was given to each person or determined by the Creator.

We have noted above that the works created by Taftazani cover the branches of science in all religious educational institutions that exist in the secondary works. His works, except for the interpretation of the Qur'an, are written in Arabic. The interpretation of the Qur'an is written in Persian. Speaking of the greats who benefited from his works, the historian E.E. Bertels in his research states that the great classical poet of Persian-Tajik literature Abdurahman Jami learned poetry and the art of speech from the works of Saduddin Taftazani [8, p.132]. There are many scholars who have created their own creative path on the basis of Taftazani's works. In another source, Abdurahman Jami reads with great enthusiasm the books "Mukhtasar al-manani" and "Mutawwal" by the famous Central Asian philologist Sa'duddin Mas'ud Taftazani. There is information that Jojarmi, a student of Jami Taftazani, and Alouddin Ali, a famous teacher, were educated in Samarkand [9, p.47]. We plan to dwell on this topic in more detail in our future research. Because there are many world-renowned scholars and their works who have benefited from Taftazani's work.

Conclusion

In conclusion, the philosophical views of Sa'uddin Taftazani are in harmony with the views of the ancient Greek philosophers, who played an important role in the socio-philosophical thinking of the peoples of the Near and Middle East. However, Sa'duddin Taftazani did not limit himself to the philosophy of antiquity, but developed his views from the rise of the Eastern Renaissance, enriching them with new ideas. This is the remarkable aspect of his views. It can be concluded that Taftazani is a scholar of Islamic philosophy who has made a significant contribution to the development of theology as a science by applying logical conclusions to the word.

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QR – Article



Alexandr Sergeevych Praded

Bryansk State University named after I.G. Petrovsky
student, Russia

ON n -MULTIPLE ω -FIBEREDFITTING CLASSES OF FINITE GROUPS

Abstract: The article is devoted to study of Fitting classes of finite groups. The main research method used in the article is functional. We have obtained the n -multiple ω -fiber properties of some Fitting classes of finite groups.

Key words: a finite group, a class of groups, a Fitting class, an ω -fibered Fitting class, an n -multiple ω -fibered Fitting class.

Language: Russian

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ОБ n -КРАТНО ω -ВЕРНЫХ КЛАССАХ ФИТТИНГА КОНЕЧНЫХ ГРУПП

Аннотация: Данная статья посвящена исследованию классов Фиттинга конечных групп. Основным методом исследования, применяемым в статье, является функциональный метод. В статье установлена n -кратная ω -верность некоторых классов Фиттинга конечных групп.

Ключевые слова: конечная группа, класс групп, класс Фиттинга, ω -верный класс Фиттинга, n -кратно ω -верный класс Фиттинга.

Введение

В рамках алгебры зародился один из важнейших разделов математики – теория групп (см., например, [4]). Её последующее развитие дало толчок к появлению новых подразделов теории групп. Одним из них является теория классов групп, в которой рассматриваются особые структуры – классы групп, то есть множества, содержащие вместе с каждой своей группой и все группы ей изоморфные. Изучая классы групп, были выделены такие объекты, как классы Фиттинга [15, 16]. Результаты последующих исследований в этом направлении связаны с локальными классами Фиттинга. Так, были введены ω -локальные классы Фиттинга, позднее – ω -верные классы Фиттинга. Исследованием таких классов Фиттинга занимались Л.А. Шеметков, Н.Т. Воробьев, А.Н. Скиба, Н.Н. Воробьев, В.А. Ведерников, М.М. Сорокина, О.В. Камозина, В.Е. Егорова, Е.Н. Бажанова и другие (см., например, [1–3, 9, 11–14]).

В 1987 году А.Н. Скибой была введена в рассмотрение концепция кратной локальности для формаций конечных групп (см., например, [10]). В последующем она была обобщена на локальные и ω -локальные классы Фиттинга. В результате появились новые понятия, необходимые для описания подобных структур, одним из которых явилось понятие индекса $Ind_l(\mathfrak{F})$ локальности класса Фиттинга \mathfrak{F} . В данной работе вводится в рассмотрение понятие индекса $Ind_{\omega\delta}(\mathfrak{F})$ $\omega\delta$ -верности класса Фиттинга \mathfrak{F} конечных групп и изучаются его свойства.

В статье рассматриваются только конечные группы. Все используемые определения для групп и классов групп стандартны (см., например, [15]). Здесь приведены лишь некоторые из них. Классом групп называется множество групп, содержащее вместе с каждой своей группой G и все группы, изоморфные G . Через (\mathfrak{X}) обозначается класс групп, порождённый множеством групп (\mathfrak{X}) . Если \mathfrak{F}_1 и \mathfrak{F}_2 – классы групп, то $\mathfrak{F}_1\mathfrak{F}_2 =$

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(G | существует $N \triangleleft G$ такая, что $N \in \mathfrak{F}_1$ и $G/N \in \mathfrak{F}_2$). Класс групп \mathfrak{F} называется классом Фиттинга, если выполняются следующие условия:

- 1) если $G \in \mathfrak{F}$ и $N \triangleleft G$, то $N \in \mathfrak{F}$;
- 2) если $G = N_1 N_2$, $N_1 \in \mathfrak{F}$, $N_2 \in \mathfrak{F}$, $N_1 \triangleleft G$, $N_2 \triangleleft G$, то $G \in \mathfrak{F}$.

Через \mathfrak{E} обозначается класс всех конечных групп; \mathfrak{N} – класс всех конечных нильпотентных групп; \mathbb{P} – множество всех простых чисел. Пусть \mathfrak{F} – класс групп, $p \in \mathbb{P}$, $\emptyset \neq \pi \subseteq \mathbb{P}$. Тогда \mathfrak{F}_p и \mathfrak{F}_π – соответственно классы всех p -групп и π -групп, принадлежащих классу \mathfrak{F} . Через $\pi(G)$ обозначается множество всех простых делителей порядка группы G ; через ω обозначается произвольное непустое множество простых чисел; через $G^{\mathfrak{F}}$ обозначается \mathfrak{F} -корадикал группы G , т.е. наименьшая нормальная подгруппа группы G , фактор-группа по которой принадлежит классу \mathfrak{F} ; через $G_{\mathfrak{F}}$ обозначается \mathfrak{F} -радикал группы G , т.е. наибольшая нормальная подгруппа группы G , принадлежащая классу \mathfrak{F} .

Зададим следующие функции:

$f: \omega \cup \{\omega'\} \rightarrow \{\text{классы Фиттинга}\}$, где $f(\omega') \neq \emptyset$,

$h: \mathbb{P} \rightarrow \{\text{классы Фиттинга}\}$,

$\delta: \mathbb{P} \rightarrow \{\text{непустые формации Фиттинга}\}$, называемые соответственно ωR -функцией, $\mathbb{P}R$ -функцией, $\mathbb{P}FR$ -функцией. Класс Фиттинга

$\mathfrak{F} = (G \in \mathfrak{E} \mid O^\omega(G) \in f(\omega') \text{ и}$

$G^{\delta(p)} \in f(p) \text{ для любого } p \in \omega \cap \pi(G))$

называется ω -верным классом Фиттинга с ω -спутником f , направлением δ и обозначается $\mathfrak{F} = \omega R(f, \delta)$; класс Фиттинга $\mathfrak{H} = (G \in \mathfrak{E} \mid G^{\delta(p)} \in h(p) \text{ для любого } p \in \pi(G))$ называется верным классом Фиттинга со спутником h и направлением δ и обозначается $\mathfrak{H} = \mathbb{P}R(h, \delta)$ [13]. Направление δ ω -верного (верного) класса Фиттинга называется b -направлением, если $\delta(p) = \mathfrak{N}_p \delta(p)$ для любого $p \in \mathbb{P}$; p -направлением, если $\delta(q) = \delta(q)\mathfrak{E}_q$ для любого $q \in \mathbb{P}$, bp -направлением, если δ является b -направлением p -направлением [12].

Пусть δ – произвольная $\mathbb{P}FR$ -функция, $n \in \mathbb{N} \cup \{0\}$. Согласно [12], всякий класс Фиттинга считают 0 -кратно ω -верным с направлением δ . При $n \neq 0$ класс Фиттинга \mathfrak{F} называют n -кратно ω -верным с направлением δ , если \mathfrak{F} имеет хотя бы один $\omega R_{(n-1)}$ -спутник, то есть такой ωR -спутник, все непустые значения которого являются $(n-1)$ -кратно ω -верными классами Фиттинга с направлением δ .

Теорема 1.

Пусть δ – произвольная $\mathbb{P}FR$ -функция. Тогда класс Фиттинга $\mathfrak{F} = \mathfrak{E}$ является n -кратно ω -верным классом Фиттинга с направлением δ для любого $n \in \mathbb{N}$.

Доказательство.

Доказательство проведём методом математической индукции по параметру n .

1) Установим справедливость утверждения при $n = 1$. По теореме 1 [8] класс групп $\mathfrak{F} = \mathfrak{E}$ является ω -верным классом Фиттинга с направлением δ .

2) Предположим, что утверждение верно при $n = k$.

3) Покажем, что утверждение верно при $n = k + 1$. Согласно теореме 1 [8] $\mathfrak{F} = \omega R(f, \delta)$, где $f(\omega') = \mathfrak{E}$ и $f(p) = \mathfrak{E}$ для любого $p \in \omega$. По предположению индукции $f(\omega')$ и $f(p)$ для любого $p \in \omega$ являются k -кратно ω -верными классами Фиттинга с направлением δ . Тогда f – ωR_k -спутник класса Фиттинга \mathfrak{F} . Следовательно, \mathfrak{F} – $(k + 1)$ -кратно ω -верный класс Фиттинга с направлением δ .

Из пунктов 1)–3) по методу математической индукции следует, что утверждение верно для любого $n \in \mathbb{N}$.

Теорема доказана.

Теорема 2.

Пусть δ – произвольная $\mathbb{P}FR$ -функция. Тогда класс Фиттинга $\mathfrak{F} = \mathfrak{E}_\omega$ является n -кратно ω -верным классом Фиттинга с направлением δ для любого $n \in \mathbb{N}$.

Доказательство.

Доказательство проведём методом математической индукции по параметру n .

1) Установим справедливость утверждения при $n = 1$. По теореме 4 [8] класс групп $\mathfrak{F} = \mathfrak{E}_\omega$ является ω -верным классом Фиттинга с направлением δ .

2) Предположим, что утверждение верно при $n = k$.

3) Покажем, что утверждение верно при $n = k + 1$. Согласно теореме 4 [8] $\mathfrak{F} = \omega R(f, \delta)$, где $f(\omega') = \mathfrak{E}_\omega$ и $f(p) = \emptyset$ для любого $p \in \omega$. По предположению индукции $f(\omega')$ является k -кратно ω -верным классом Фиттинга с направлением δ . Тогда f – ωR_k -спутник класса Фиттинга \mathfrak{F} . Следовательно, \mathfrak{F} – $(k + 1)$ -кратно ω -верный класс Фиттинга с направлением δ .

Из пунктов 1)–3) по методу математической индукции следует, что утверждение верно для любого $n \in \mathbb{N}$.

Теорема доказана.

Теорема 3.

Пусть δ – произвольная $\mathbb{P}FR$ -функция, $\emptyset \neq \pi \subseteq \mathbb{P}$. Тогда класс Фиттинга $\mathfrak{F} = \mathfrak{E}_\pi$ является n -кратно ω -верным классом Фиттинга с направлением δ для любого $n \in \mathbb{N}$.

Доказательство.

Доказательство проведём методом математической индукции по параметру n .

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1) Установим справедливость утверждения при $n = 1$. По теореме 1 [6] класс групп $\mathfrak{F} = \mathfrak{E}_\pi$ является ω -всерным классом Фиттинга с направлением δ .

2) Предположим, что утверждение верно при $n = k$.

3) Покажем, что утверждение верно при $n = k + 1$. Согласно теореме 1 [6] $\mathfrak{F} = \omega R(f, \delta)$, где $f(\omega') = \mathfrak{E}_\pi$ и $f(p) = \mathfrak{E}_\pi$ для любого $p \in \omega$. По предположению индукции $f(\omega')$ и $f(p)$ для любого $p \in \omega$ являются k -кратно ω -всерными классами Фиттинга с направлением δ . Тогда $f - \omega R_k$ -спутник класса Фиттинга \mathfrak{F} . Следовательно, $\mathfrak{F} - (k + 1)$ -кратно ω -всерный класс Фиттинга с направлением δ .

Из пунктов 1) – 3) по методу математической индукции следует, что утверждение верно для любого $n \in \mathbb{N}$.

Теорема доказана.

Через $\mathfrak{E}_{c\omega}$ обозначим класс всех групп, у которых каждый главный ω -фактор централен; $\mathfrak{E}_{c\omega'}$ – класс всех групп, у которых каждый главный ω' -фактор централен.

Теорема 4.

Пусть δ – произвольная PFR-функция, являющаяся br -направлением таким, что $\bigcap_{p \in \omega} \delta(p) \subseteq \mathfrak{E}_{c\omega} \cap \mathfrak{E}_{c\omega'}$. Тогда класс Фиттинга $\mathfrak{F} = \mathfrak{N}$ является n -кратно ω -всерным классом Фиттинга с направлением δ для любого $n \in \mathbb{N}$.

Доказательство.

Доказательство проведём методом математической индукции по параметру n .

1) Установим справедливость утверждения при $n = 1$. По теореме 2 [6] класс групп $\mathfrak{F} = \mathfrak{N}$ является ω -всерным классом Фиттинга с направлением δ .

2) Предположим, что утверждение верно при $n = k$.

3) Покажем, что утверждение верно при $n = k + 1$. Согласно теореме 2 [6] $\mathfrak{F} = \omega R(f, \delta)$, где $f(\omega') = \mathfrak{N}$ и $f(p) = (1)$ для любого $p \in \omega$. По

предположению индукции $f(\omega')$ – k -кратно ω -всерный класс Фиттинга с направлением δ , а $f(p)$ для любого $p \in \omega$ – по лемме 3 [7]. Тогда $f - \omega R_k$ -спутник класса Фиттинга \mathfrak{F} . Следовательно, $\mathfrak{F} - (k + 1)$ -кратно ω -всерный класс Фиттинга с направлением δ .

Из пунктов 1) – 3) по методу математической индукции следует, что утверждение верно для любого $n \in \mathbb{N}$.

Теорема доказана.

Теорема 5.

Пусть δ – произвольная PFR-функция, являющаяся br -направлением таким, что $\bigcap_{p \in \omega} \delta(p) \subseteq \mathfrak{E}_{c\omega} \cap \mathfrak{E}_{c\omega'}$, $\emptyset \neq \pi \subseteq \mathbb{P}$. Тогда класс Фиттинга $\mathfrak{F} = \mathfrak{N}_\pi$ является n -кратно ω -всерным классом Фиттинга с направлением δ для любого $n \in \mathbb{N}$.

Доказательство.

Доказательство проведём методом математической индукции по параметру n .

1) Установим справедливость утверждения при $n = 1$. По теореме 3 [6] класс групп $\mathfrak{F} = \mathfrak{E}_\pi$ является ω -всерным классом Фиттинга с направлением δ .

2) Предположим, что утверждение верно при $n = k$.

3) Покажем, что утверждение верно при $n = k + 1$. Согласно теореме 3 [6] $\mathfrak{F} = \omega R(f, \delta)$, где $f(\omega') = \mathfrak{N}_\pi$, $f(p) = \emptyset$, если $p \in \omega \setminus \pi$, $f(p) = (1)$, если $p \in \pi$. По предположению индукции $f(\omega')$ – k -кратно ω -всерный класс Фиттинга с направлением δ , а $f(p)$ для любого $p \in \pi$ – по лемме 3 [7]. Тогда $f - \omega R_k$ -спутник класса Фиттинга \mathfrak{F} . Следовательно, $\mathfrak{F} - (k + 1)$ -кратно ω -всерный класс Фиттинга с направлением δ .

Из пунктов 1) – 3) по методу математической индукции следует, что утверждение верно для любого $n \in \mathbb{N}$.

Теорема доказана.

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MATHEMATICAL MODELING OF MAGNETOELASTIC VIBRATIONS OF A ROD IN A MAGNETIC FIELD

Abstract: When solving geometrically nonlinear problems of magnetoelasticity in the theory of plates and shells, it is difficult, in a general case, to evaluate the effect of nonlinearity in determining their stress state. To evaluate such a process, nonlinear oscillations of an isotropic rod of constant cross section under the influence of the electromagnetic Lorentz force are considered. The obtained estimates for the rod also characterize the qualitative side of the behavior of flexible plates and shells in a magnetic field.

Key words: rod, shell, magnetic field, magneto elasticity.

Language: English

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Introduction

In the mechanics of conjugate fields, an important place is occupied by the study of a continuous medium motion taking into account electromagnetic effects. Analysis of electromagnetic processes is possible only on the basis of a system of electrodynamic equations, together with material relationships. In recent decades, considerable attention in special literature has been devoted to the study of strain processes in electrically conductive bodies placed in an external constant magnetic field under the influence of force, thermal, and electromagnetic loads [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25].

Interest in research in this area is associated with the importance of a quantitative study and assessment of the observed effects of the relationship of mechanical, thermal and electromagnetic processes and their practical application in various fields of modern technology in the development of new practices, as well as in the field of radio electronics, electrical engineering, modern measuring systems and etc. Most of the known works on elastic conductive body strain have been performed for a linearized system of equations. However, the solution of a number of applied problems, which include non-stationary problems of determining the stress state of flexible current-carrying anisotropic plates and shells, requires a more complete study of mechanical

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processes, including wave fields accompanying magnetoelastic interaction, based on a nonlinear model of magnetoelasticity and presents an urgent scientific problem.

I. STATEMENT OF THE PROBLEM. THE EQUATIONS OF MAGNETOELASTICITY.

Suppose that an electrically conductive body is in a magnetic field formed by an electric current in the body itself (self-magnetic field) and a source located at a distance from the body (external magnetic field). The body has finite electrical conductivity σ and does not have the property of spontaneous polarization and magnetization. Let's assume that, in the general case, there are no surface currents and foreign charges.

Magnetoelasticity equations for similar bodies in the Euler coordinates are presented in the form [3,9,10]:

equations of motion:

$$\frac{\partial t_{ki}}{\partial x_k} + \rho(F_i + F_i^\wedge) = \rho \frac{dV_i}{dt}, \quad (1)$$

$$\rho F_i^\wedge = \varepsilon_{ilm} J_l B_m + \rho_e E_i, \quad (2)$$

Maxwell equations

$$\varepsilon_{ijk} \frac{\partial H_k}{\partial x_j} = J_i + \frac{\partial D_i}{\partial t}, \quad \frac{\partial B_i}{\partial x_i} = 0, \quad (3)$$

$$\varepsilon_{ijk} \frac{\partial E_k}{\partial x_j} = -\frac{\partial B_i}{\partial t}, \quad \frac{\partial D_i}{\partial x_i} = \rho_e. \quad (4)$$

In relations (1)-(4) the following notation is introduced: t_{ij} - the components of the tensor of internal stresses; ρF_i - the vector components of volume mechanical forces; ρF_i^\wedge - the components of the vector of Lorentz volume forces; E_k, D_k, H_k, B_k, J_k - the components of the vectors of intensity and induction of the electric field, intensity and induction of the magnetic field, respectively; $J_k = J_k^* + \rho_e V_k$ - the components of the density vector of total current; J_k^* - conduction current density; $\rho_e V_k$ - the convective current density; ρ_e - the density of electric charges; ρ - the density of the substance in the current state; V_k - the components of the velocity vector; $\frac{d}{dt} = \frac{\partial}{\partial t} + V_k \frac{\partial}{\partial x_k}$ - the total time derivative.

It is necessary to add kinematic equations for the processes of electrical and thermal conductivity and the governing equations to the equations of magnetoelasticity (1)-(4). Later, we will neglect the temperature effects, and take the kinematic equations for the processes of electrical conductivity in the form of Ohm's law:

$$J_i = \sigma \left(E_i + \varepsilon_{ijk} \frac{\partial u_j}{\partial t} B_k \right) + \rho_e \frac{\partial u_i}{\partial t}, \quad (5)$$

and

$$D_i = \varepsilon E_i, \quad B_i = \mu H_i, \quad (6)$$

where ε is the coefficient of electrical permeability, μ is the coefficient of magnetic permeability ($\mu = \mu_0, \varepsilon = \varepsilon_0$).

When setting the boundary value problems, it is necessary to formulate the boundary conditions for mechanical and electromagnetic characteristics. In spatial variables for the full stress tensor, it can be written:

$$v_k(t_{ki} + \tau_{ki}) / S_1 = \left[P_i + v_k \tau_{ki}^{(c)} \right] / S_1. \quad (7)$$

Here τ_{ki} is the Maxwell tensor

$$\tau_{ki} = E_i D_k + H_i B_k - 1/2 \delta_{ki} (E_j D_j + H_j B_j) \quad (8)$$

$\tau_{ki}^{(c)}$ - is the Maxwell tensor in vacuum; P_i - the components of surface forces related to the site dimensions in a strained state; v_k - the components of the unit normal vector to the strained boundary of the body; S_1 - the part of the body boundary on which the boundary conditions in stresses are set.

II. NUMERICAL EXAMPLE. ANALYSIS OF RESULTS.

Consider a rectilinear rod made of aluminum, l long with a hinged fixing in its ends. We believe that the flexible rod is in a constant external magnetic field and serves as a conductor of electric current, supplied to the ends of the rod from an external source and is a function of time t . As a result of current interaction with the magnetic field, the Lorentz volume forces arise in the rod [3]:

$$\rho \vec{f} = \vec{J} \times \vec{B} \quad (9)$$

The current density is set by the formula

$$\vec{J} = -J_{10} \cdot \sin \omega t \vec{i}, \quad (10)$$

and the magnetic induction vector is taken as constant

$$\vec{B} = B_0 \cdot \vec{j} \quad (11)$$

where ω - is the circular frequency. In this case, the ponderomotive force is

$$\rho \vec{f} = J_{10} \cdot B_0 \cdot \sin \omega t \vec{k} \quad (12)$$

The equation of the rod transverse bending according to the balance of forces acting on the element along the axis z takes the form

$$\begin{aligned} \frac{Eh^3}{12} \frac{\partial^4 w}{\partial x^4} - h \sigma_x \frac{\partial^2 w}{\partial x^2} + \rho h \frac{\partial^2 w}{\partial t^2} = \\ = J_{10} \cdot B_0 \cdot \sin \omega t, \end{aligned} \quad (13)$$

where σ_x - is the membrane part of the longitudinal normal stress.

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Boundary conditions are:

$$w = 0, \quad \partial^2 w / \partial x^2 = 0 \quad \text{at } x = 0, \quad x = l \quad (14)$$

Initial conditions are:

$$w = 0, \quad \dot{w} = 0 \quad \text{at } t = 0 \quad (15)$$

For the case where only the transverse load acts ($\sigma_x = 0$, linear case) equation (13) takes the form

$$\frac{Eh^3}{12} \frac{\partial^4 w}{\partial x^4} + \rho h \frac{\partial^2 w}{\partial t^2} = J_{10} \cdot B_0 \cdot \sin \omega t, \quad (16)$$

Equation (13) is a differential equation of forced bending vibrations of a rod of constant cross section. Consider the physical meaning of various terms of equation (13). Their signs depend on the chosen sign rule, and do not have a special physical meaning. The first term of equation is the deflection resistance, calculated as a variation of transverse force, the moment of which balances the variation of the bending moment, which occurs due to a change in curvature, i.e. we have the bending resistance to deflection proportional to the bending rigidity of the rod.

The second term is the transverse component caused by the curvature of a certain axial force N_x . If the force N_x does not depend on deflection due to the axial load applied at the ends and so that it remains constant under bending, then the second term is linear with respect to w . Axial force N_x can also be caused by deflection. This happens if the rod supports prevent the ends of the rod from moving towards each other. Then, if the rod is bent by transverse forces, the axial line will extend, and since it bends, and therefore becomes longer, than it was originally, the supports will create tensile force N_x acting on the rod, which will increase in proportion to the square of deflection. The second term in this case will increase in proportion to the third degree of deflection, and the equation will become non-linear with respect to w .

The third term presents the action of inertial volume load. The fourth term of equation is a transverse load, tending to cause deflection. Representing the electromagnetic load as

$$J_0 \cdot B_0 \sin \omega t \sin \pi x / l, \quad (17)$$

a solution to the boundary value problem (13) - (15) is sought in the form

$$w(x, t) = w_1 \sin \omega t \sin \pi x / l, \quad (18)$$

where w_1 – is the deflection in the middle of the rod span. Before proceeding to the solution of the problem, determine the normal stress σ_x . Let Δl – be the difference between the lengths of the curved and non-curved axes of the rod. Then

$$\sigma_x = E \frac{\Delta l}{l} = \frac{E}{l} \int_0^l \left[\sqrt{1 + \left(\frac{\partial w}{\partial x} \right)^2} - 1 \right] dx \approx \quad (19)$$

$$\approx \frac{E}{2l} \int_0^l \left(\frac{\partial w}{\partial x} \right)^2 dx = \frac{\pi^2 E}{4l^2} w_1^2 \sin^2 \omega t.$$

Substituting expression (18) and (19) into equation (13), after dividing by $\sin \frac{\pi x}{l}$, we have

$$\frac{Eh^3}{12} \left(\frac{\pi}{l} \right)^4 w_1 \sin \omega t + Eh \left(\frac{\pi}{l} \right)^4 w_1^3 \sin \omega t - \quad (20)$$

$$- \rho h \omega^3 w_1 \sin \omega t = J_0 B_0 \sin \omega t.$$

Given that

$$\sin^3 \omega t = \frac{3}{4} \sin \omega t - \frac{1}{4} \sin 3\omega t$$

and collecting the coefficients at $\sin \omega t$, we obtain

an approximate relation with respect to w_1/h in the form

$$\frac{w_1}{h} + 9 \left(\frac{w_1}{h} \right)^3 = \frac{12l^4}{Eh^4 \pi^4} \left(J_0 B_0 + \rho h^2 \omega^2 \frac{w_1}{h} \right). \quad (21)$$

The first term of relation (21) characterizes the load resistance due to bending; the second term characterizes the resistance due to the force action

$$\sigma_x h \frac{\partial^2 w}{\partial x^2}.$$

In Fig. 1, the dashed line shows the resistance due to the bending only, the solid line shows the total resistance, where P – is the right-hand side of expression (21). It can be seen from Fig. 1 that the elementary linear theory gives a good approximation until the deflection is small, say, of an order $w_1 \leq 0.3h$ compared to the height of the cross section. For large deflections, the part of the load

corresponding to the second term $\sigma_x h \frac{\partial^2 w}{\partial x^2}$ grows

rapidly and therefore must be taken into account.

By resolving relation (21) with respect to the square of the circular frequency, we have

$$\omega^2 = \frac{Eh^2 \pi^4}{12 \rho l^4} \left[1 + 9 \left(\frac{w_1}{h} \right)^2 \right] - \frac{J_0 B_0}{\rho h^2} \left(\frac{h}{w_1} \right). \quad (22)$$

To implement the oscillatory process, it is necessary for the right-hand side of relation (22) to be positive. Fulfillment of this requirement allows one to determine the limits of variation of the current density depending on w_1/h at known B_0 . Failure to do so

leads to the fact that part of the frequencies is equal to zero or to an imaginary value. The amplitudes of the corresponding oscillations will increase unlimitedly.

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This is due to reaching or exceeding the critical value according to Euler, and the rod loses stability.

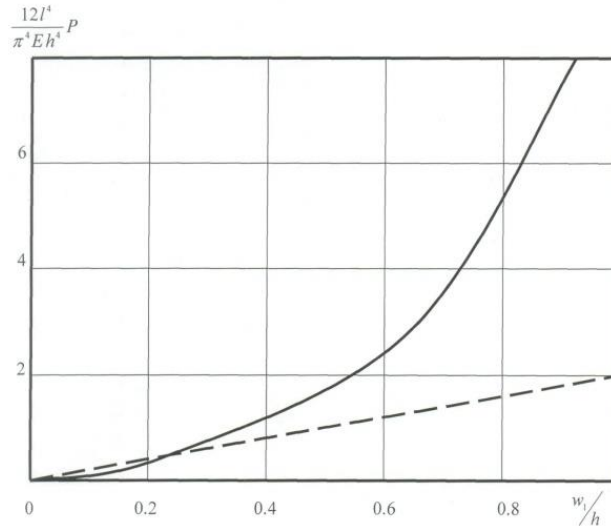


Fig. 1. Deflection resistance.

Figure 2 shows the dependencies J_0 on relationship w_1/h in linear and nonlinear cases. The dashed line indicates the linear case, the solid line indicates the nonlinear case at $B_0 = 0.5T$ and at the following parameters of the rod:

$$l = 0.5 \text{ m}; \quad h = 2 \times 10^{-3} \text{ m};$$

$$E = 7.1 \times 10^{10} \frac{\text{N}}{\text{m}^2}; \quad \rho = 2670 \frac{\text{kg}}{\text{m}^3}.$$

From the graphs it follows that for the corresponding values of w_1/h of oscillatory process, the component of the current density vector J_0 must take the values that are below the given lines.

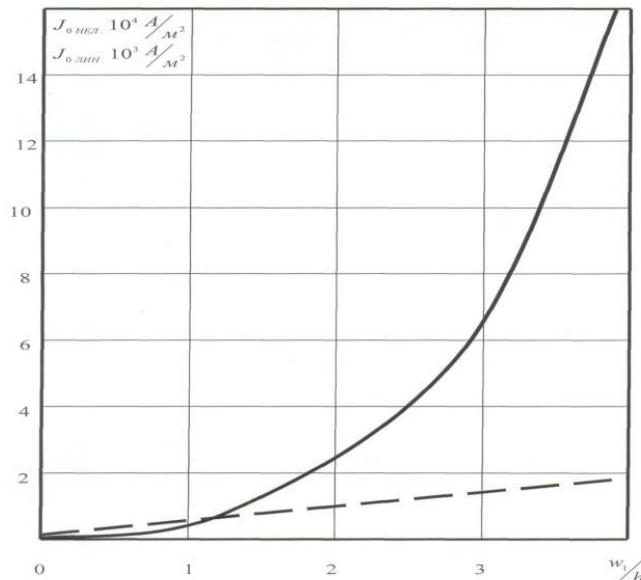


Fig. 2. Comparison of solutions in linear and nonlinear cases

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From the same graphs it follows that, given the appropriate values of J_0 , it is possible to determine the values for the corresponding relations w_1/h .

Note that everything said above regarding the considered rod characterizes qualitatively the behavior of flexible plates and shells located in an electromagnetic field.

III. CONCLUSIONS.

When a material body moves in an electromagnetic field, force interaction and energy exchange occur between the body and the field, due to

conduction currents and body polarization and magnetization phenomena. If to ignore the body polarization and magnetization, and consider only the conduction currents, then the force interaction of the body and the field occurs only due to the Lorentz forces, and the energy exchange is caused by the Joule heat only. To assess the influence of nonlinearity in determining the stress-strain state of flexible current-carrying plates and shells, nonlinear oscillations of an isotropic rod of constant cross section under the Lorentz electromagnetic force are considered. The obtained estimates for the rod also characterize the qualitative side of flexible plates and shells behavior in a magnetic field.

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STUDYING THE PACKAGE OF MATERIALS USED IN MANUFACTURE OF RACHA DANCING SUIT

Abstract: Traditional clothing is an important part of the material culture of the people. It reflects its character, the level of spiritual and material culture, and age-old traditions. In the preservation and promotion of the national costume, an important role played by choreography and dancing suits, whose comfort in wear is due to materials used.

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ИССЛЕДОВАНИЕ ПАКЕТА МАТЕРИАЛОВ РАЧИНСКОГО ТАНЦЕВАЛЬНОГО КОСТЮМА

Аннотация: Традиционная одежда является важным элементом материальной культуры народа. В ней отражаются его характер, уровень духовной и материальной культуры, многовековые традиции. В деле сохранения и популяризации национального костюма важную роль играет хореография и танцевальные костюмы, удобность и комфортность которых обусловлено используемыми материалами.

Ключевые слова: традиционная одежда, пакет одежды, толщина пакета.

Введение

Народный танец и народный костюм – это составляющие одного целого. В воплощении народного танца большое значение имеют сценические костюмы, которые создаются на основе народного. Разнообразие традиционной одежды и танцевальных стилей во многом обусловлено разнообразием этнических групп внутри страны. Грузия очень выдающаяся страна

в этом отношении. На западе и востоке, в горах и равнинах каждый этнический уголок Грузии имел свои традиции, образ жизни, костюмы и танцы, которые отражены в современных хореографических представлениях.

Следует отметить, что современные костюмы более или менее приближены к традиционной одежде, чего нельзя сказать о танцевальном костюме прекраснейшего, горного

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этнического уголька Грузии - Рача. Женский танцевальный костюм в корне отличается от традиционной одежды этого уголька [1; 2].

Целью исследования является разработка танцевального костюма на основе изучения женского традиционного костюма Рача, исследование и оптимизация пакета материалов. Для изготовления танцевального костюма были выбраны те же материалы, что и в традиционном костюме и были определены структурные показатели и физические свойства используемых материалов (хлопчатобумажные и шелковые ткани), с использованием стандартных методов [3; 4].

Для определения общего теплового сопротивления пакета одежды, которое

необходимо для комфорта и удобства танцовщицы, во время эксплуатации костюма, вся поверхность тела человека была разделена на отдельные области и структура пакета одежды определялась соответственно.

Следует отметить, что воздушный слой между телом человека и одеждой, а также слоями одежды оказывает большое и существенное влияние на теплозащитность и воздухопроницаемость одежды. В танцевальном костюме средний слой воздуха варьируется от 1-15 мм и зависит от материала и конструкции одежды, условий работы танцора [5; 6; 7; 8]. Схематическое изображение пакета одежды на участке плеча и предплечья показано на рис. 1.

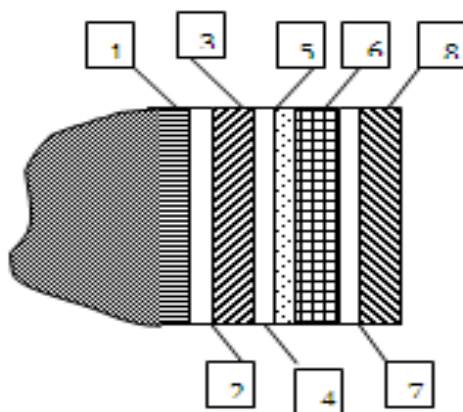


Рис. 1. Схема пакета одежды на плече и области предплечья: 1 холст; 2; 4; 7-слой воздуха; Сатин-3; 5-клеевые прокладки; Сатин-6; 8- Миткаль

Табл. 1. Структура пакета одежды на участке тела

состав	Толщина элементов пакета, м	Коэффициент теплопроводности λ Вт/м ² °С	Тепловое сопротивление м ² · °С/Вт,
Средний слой воздуха	0,001	0,01	0,1
Хлопок	0,0008	0,041	0,119
Средний слой воздуха	0,001	0,01	0,100
Хлопок	0,0009	0,041	0,120
Средний слой воздуха	0,0015	0,044	0,113
Сатин	0,0010	0,042	0,130
Средний слой воздуха	0,0015	0,019	0,103
Сатин	0,0009	0,045	0,138

Табл. 2. Структура пакета на плече и предплечья

состав	Толщина элементов пакета, м	Коэффициент теплопроводности λ Вт/м ² °С	Тепловое сопротивление м ² · °С/Вт,
Средний слой воздуха	0,001	0,01	0,10
Хлопок	0,0008	0,046	0,120
Средний слой воздуха	0,001	0,01	0,1
Сатин	0,0009	0,042	0,013
Средний слой воздуха	0,0015	0,044	0,101

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Клеевая прокладка	0,0005	0,04	0,375
Сатин	0,0009	0,05	0,130
Средний слой воздуха	0,0015	0,019	0,105
Миткаль	0,0002	0,052	0,009

Табл. 3. Структура пакета на бедре

состав	Толщина элементов пакета, м	Коэффициент теплопроводности λ Вт/ (м ² °С)	Тепловое сопротивление м ² · °С/Вт,
Средний слой воздуха	0,001	0,010	0,1
Миткаль	0,0008	0,046	0,0120
Средний слой воздуха	0,001	0,010	0,1
Миткаль	0,0009	0,042	0,0130
Средний слой воздуха	0,0015	0,044	0,1
Сатин	0,0010	0,042	0,143
Средний слой воздуха	0,001	0,01	0,01
Сатин	0,0009	0,045	0,138

Структура пакета материалов Рачинского танцевального костюма на разных участках тела показаны на рис. 2.

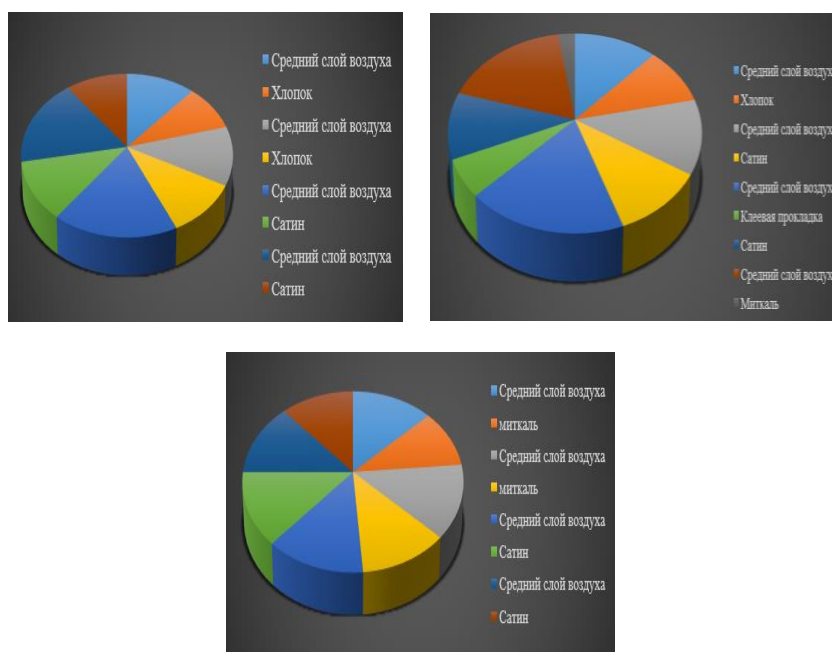


Рис. 2. Структура пакета материалов рачинского танцевального костюма на участке: а) тела; б) плеча и предплечья; в) бедра.

Заключение.

Термостойкость текстильных изделий существенно зависит от их толщины, и эта зависимость является линейной [9;10]. Исследования показали, что толщина пакета материалов традиционной одежды женщин на участках тела, плеча и предплечья бедра отличаются от толщины пакета материалов танцевального костюма на соответствующих участках и значительно больше. Это вызвано,

прежде всего многослойностью пакета. Многослойность пакета определяет также вес одежды- 2,100 кг, в то же время общее тепловое сопротивление в областях тела, плеча, предплечья и бедер составляет 0,25 - 0,284 м² °С / Вт. Соответственно, тепло, выделяемое во время танца, легко распространяется от поверхности тела к окружающей среде, таким образом защищая тело от перегрева и обеспечивая комфортное состояние танцора за время танца.

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QUALITY ASSESSMENT IN MANUFACTURE OF CLOTHING

Abstract: In order to improve the consumer properties and visual quality of product, it is necessary to activate the enterprise quality management system. The article considers the quality assessment during performing the technological operations of sewing.

Product quality assessment methods allow us for checking the consumer properties of finished goods and valuing the losses, depending on the type of materials and product failures, which in turn should be used to prevent defects in production. Improvements in the quality assessment methods at all stages of manufacture of clothing is a prerequisite for producing competitive products and consequently for increasing efficiency of production.

Key words: the cloth, clothes, Quality, defects, Quality control.

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ОЦЕНКА КАЧЕСТВА ПРИ ИЗГОТОВЛЕНИИ ОДЕЖДЫ

Аннотация: Для усовершенствования потребительских свойств и визуального качества изделия, необходимо активировать систему управления качеством предприятия. В статье рассматривается оценка качества технологии выполнения швейных операций. Методы оценки качества продукции позволяют нам в зависимости от материалов и вида дефектов, проверить потребительские свойства готового изделия и оценивать их потери, который в свою очередь должен быть использован для профилактики дефектов в производстве. Совершенствование методов оценки качества на всех этапах производства одежды является обязательным условием для изготовления конкурентоспособного изделия и, следовательно, для повышения эффективности производства.

Ключевые слова: ткань, одежда, качество, дефекты, оценка качества.

Введение

В рыночной экономике наибольшее внимание уделяется проблеме качества из-за существования конкурентной среды.

Современные методы контроля качества продукции приобретают все большее значение и позволяют добиться высокой стабильности качественных показателей при минимальных

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затратах. Эффективная система контроля позволяет своевременно и преднамеренно влиять на качество производимой продукции, избегать всех возможных недостатков и сбоев в работе и обеспечить минимальными расходами оперативное воздействие и устранение дефектов[1-4].

Положительные эффекты текущего контроля качества могут быть определены на стадиях обработки продукта, производства, эксплуатации (клиент) и восстановления (ремонт). Экспертиза дефектов продукции легкой промышленности отличаются в зависимости от вида товаров. Качество экспертизы материалов зависит от вида используемых материалов. Суммарные штрафные баллы принимаются путем суммирования физико-механических характеристик, оценки внешних и локальных дефектов. Например, в случае тканей: в тканях I степени не допускаются заметные дефекты, в тканях II степени допустимо не более одного распространенного дефекта [6,8]

Количество штрафных баллов местного дефекта рассчитывается по условной длине:

$$B_f = \sum B \frac{L_g}{L}$$

где: $\sum B$ - сумма штрафных баллов в материале для дефекта внешнего вида материала длиной L ;

L_g - условная длина ткани в зависимости от ширины ткани.

Допустимое количество дефектов материалов, используемых на предприятиях легкой промышленности, определяются стандартом. Например, количество дефектов на условной площади ткани 3м^2 рассчитывается следующим образом:

$$n_f = n_a \frac{3 \cdot 10^3}{LS}$$

где: n_a - количество фактических дефектов;

L - длина;

S -площадь ткани;

Объекты и методы исследования

Объектами исследования являются материалы, применяемые в одежды и в одежды.

Качество готовой продукции определяется тремя методами - внешним осмотром, линейным измерением и лабораторным обследованием. Внешний осмотр производится на поверхности или со стороны подкладки, для которого производят сравнение и измерение отдельных деталей, определение частоты стежков путем подсчета его количества на определенном участке [5,7]

При оценке качества обуви ее сложность определяется множеством деталей и сложной и разнообразной технологией сбора изделия. Обувные материалы отличаются в зависимости от его расположения и назначения в изделии. Процесс сбора изделия отличается в зависимости от используемых методов и средств и зависит от точности нормативов выполнения технологической операции. По этому оценка и контроль качества обуви должны проводиться на всех этапах - от приёма материала до получения готового изделия. Особенно важным является качество связи заготовки с подошвом и деталей заготовки. Так как они напрямую связаны с сохранением целостности изделия во время эксплуатации.

Постановка задачи

Целью данной статьи является определение качества одежды путём лабораторного исследования.

Результаты и их обсуждения

Для определения качества путём лабораторного исследования, выбор образца производится непосредственно экспертом с разных мест изделия и количество образцов зависит от величины партии товара. Контроль подлежат: ввозимое в производство сырье, основные и вспомогательные матерьялы, полуфабрикаты, комплектующие изделия, производственные изделия, детали, сборочные единицы, оборудования, снаряжения, технологические процессы изготовления продукции.

Проведена оценка качества операций по пошиву одежды в готовом изделии и была составлена соответствующая схема (табл. 1; рис. 1, 2).

Табл. 1. Виды дефектов в процессе выполнения технологических операций

#	Показатели вида дефектов	Количество дефектов образцов	Растущая сумма $\sum n_i$	$\Delta I = n_i / \sum n_i$ *100%	Растущая сумма $\sum n_i$ %
	Неправильный сгиб лацкана воротника	3	3	5	5

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Искривление закрепления шва	9	12	14	19
Разность длин бортов	2	14	3	21
Неровное распределение рукава в срезе	2	16	3	24
Рамка карманного среза растянута	5	21	8	32
Подкладка талии брюк видна на внешней стороне	2	23	3	35
Нижний срез брюк не разработана тесмой	3	26	5	40
Деформация прокладочного материала	7	33	11	51
Отклонение отделочного шва	8	41	12	62
Обрезка ниток в шве	4	45	6	68
Утолщение ниток	3	48	5	65
Близна	2	50	3	68
Несовпадение картинки	3	53	5	73
Некрашенные места	4	57	6	79
Пятна	8	65	11	100

Диаграмма (рис. 1) показывает, что наиболее распространенными являются: 1) дефект отсутствия закреплённой строчки (9); 2) пятна и

отклонения декоративной строчки (8); 3) Деформация материала прокладки (7).

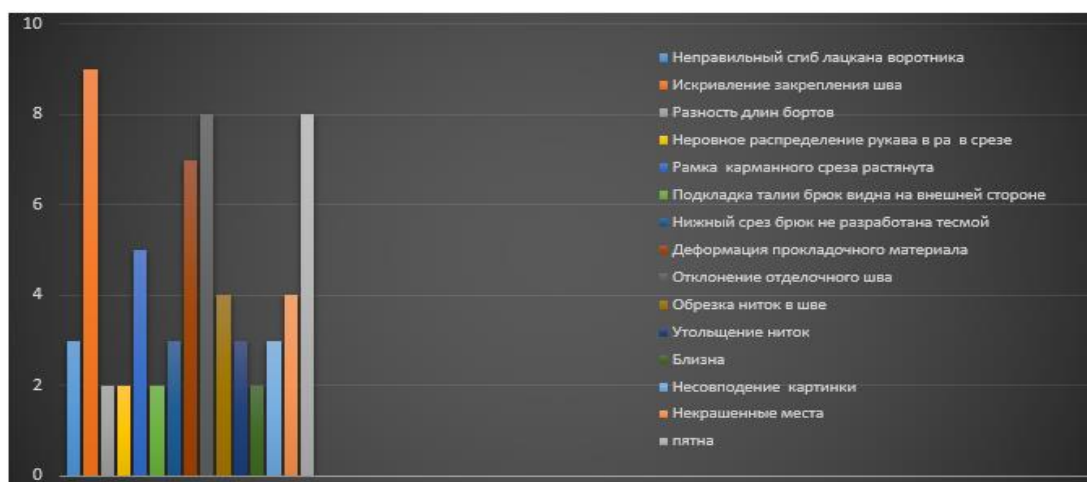


Рис. 1. Количество дефектов образца

Диаграмма потеря качества в совокупности показана на рис. 2

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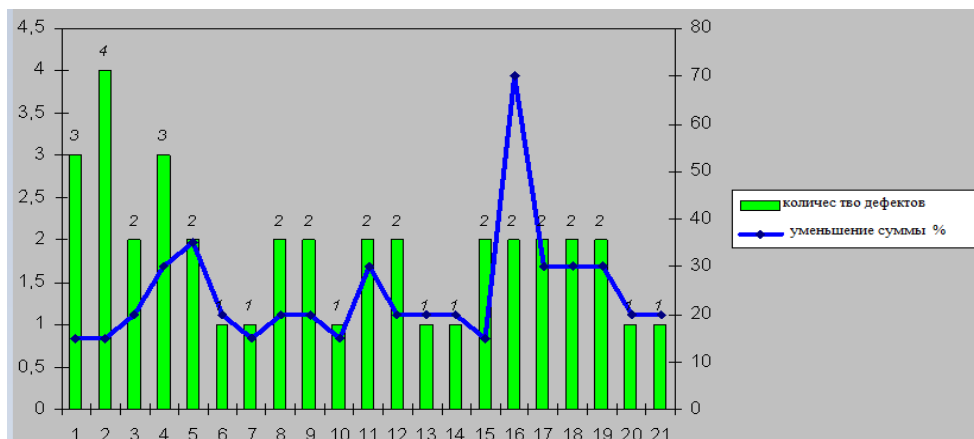


Рис. 2. Потеря качества в совокупности в зависимости от вида дефекта.

В исследованиях, проведённых для оценки качества изделия легкой промышленности (здесь рассматриваются результаты исследования качества одежды), результаты сравнения по видам

дефекта показаны в таблице 2, а распределение дефектов по потребительским свойствам показано в таблице 3, на основе которых были построены диаграммы распределения (рисунок 3)[9,10].

Табл. 2. Виды дефектов

#	Вид дефектов готовой продукции	Количество дефектов n_i	Растущая сумма Σn_i	$\Delta I = n_i / \Sigma n_i * 100\%$	Растущая сумма $\Sigma n_i \%$
1	Виды внешних дефектов	32	32	47	47
2	Несоответствие с эталоном-образцом	1	33	2	49
3	Низкие физико-механические показатели	9	42	14	63
4	Нарушение маркировки и упаковки	18	60	26	89
5	Разное	7	67	11	100

Табл. 3. Виды дефектов по потребительским свойствам

#	Виды дефектов по потребительским свойствам	Количество образцов с уменьшением качества	Растущая сумма Σn_i	$\Delta I = n_i / \Sigma n_i * 100\%$	Растущая сумма $\Sigma n_i \%$
1	Волокнистый состав	1	1	5	5
2	Толщина ткани	3	4	14	19
3	Твердость, упругость, драпируемость	2	6	10	29
4	Усадка	5	11	24	53
5	Электростатический заряд	4	15	19	72
6	Воздухопроницаемость	6	21	28	100

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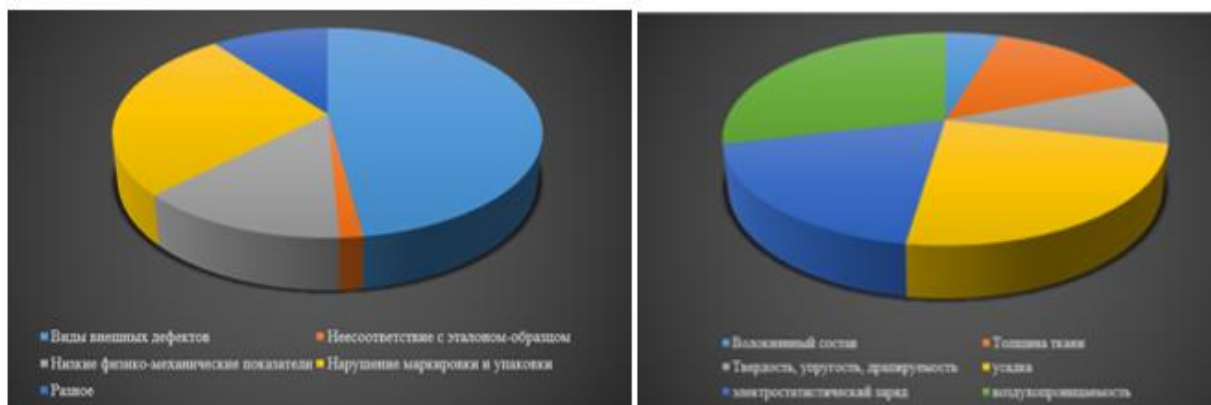


Рис. 3. Виды дефектов готового изделия

Выводы:

Как видно из диаграммы, внешние дефекты в готовой продукции представлены в значительной степени, что однозначно указывает на то, что предприятию придется потратить некоторые материальные затраты на улучшение потребительских свойств и визуального качества изделия, в частности, активация систем входящего

контроля предприятия, на контроль подготовительных операции, на текущий контроль производственного процесса и на заключительном этапе производства на контроль процесса отделки готового изделия – для производства обусловлено необходимостью и расходы, понесенные для этой цели, станут предпосылкой для экономии ресурсов.

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TEACHER'S WORK ON ARTWORK AT READING LESSONS AT PRIMARE SCHOOL

Abstract: This article reveals the stages of artwork in reading lessons used in primary school. The content of the work is described at each stage of reading a work of art in primary school.

Key words: Synthesis, analysis, perception, illustration, verbal, graphic.

Language: English

Citation: Sadikov, R. M. (2020). Teacher's work on artwork at reading lessons at primare school. *ISJ Theoretical & Applied Science*, 03 (83), 342-345.

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Introduction

Big changes are happening in Uzbekistan in the education sphere. President of Uzbekistan Sh. Mirziyoyev began full-scale globalization in all spheres of the life of people. Of particular importance is the training and education of the younger generation. A great joy for teachers is the fact that students are entering the world arena. For the relatively young Republic, the indicative results of participation in various competitions in subjects are especially pleasing.

In work on fiction, the teacher relies on the data of modern psychology, literary criticism and wide pedagogical experience. The peculiarity of working with artwork in elementary grades is its practical orientation, it is determined by the age characteristics of students. A work of art is a complex whole in which all its components are interconnected and interact with each other.

As a result of the above, work on a composition is divided into three main stages:

- 1) the first stage is the primary synthesis;
- 2) the second stage is analysis;
- 3) the third stage is secondary synthesis. [1]

The sequence of work with fiction is based on the laws of perception of fiction, and it begins with preparation for reading.

The teacher must create all conditions for a vivid, emotional perception of the artwork.

The tasks of the preparatory work are:

- expand students' perceptions of the phenomena, events depicted in the artwork;
- introduce the life of a writer;
- prepare for the emotional perception of the work;
- reveal to children the lexical meaning of unfamiliar words. [2]

Various didactic forms of preparatory work are possible, e.g: a teacher's story, a demonstration of reproductions of paintings by artists, a film demonstration, listening to a tape recording, conversation, and a tour. The story of the teacher. Interest in a artwork will increase significantly if you introduce students to a writer - author of a work, his life, creativity. Demonstration of films.

Filmstrips and films will help students consolidate and supplement information, systematize the representations they have. Cognitive material of films promotes conscious reading and a vivid emotional perception of the content. Excursion. During the excursions, student's knowledge about natural phenomena deepens and expands.

It is also an opportunity to develop the ability of children to observe, describe natural phenomena, the ability to cultivate their love of nature and respect for it.

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The first stage of work on the text involves introducing students to the specific content of the text, clarifying the emotional impact of the artwork.

At the second stage, the text is analyzed in order to establish causal relationships in the development of the plot, to clarify the motives of behavior actors and their main features, the disclosure of the composition of a work, the identification of pictorial means in unity with the disclosure of a specific content and assessment of the motives of the behavior of the heroes. The content of the work at the third stage is: a synthesis of the essential features of the actors, a comparison heroes and their assessment, clarification of the ideological orientation of the work, assessment of the work as a source of knowledge of the surrounding reality and how works of art. After such work, you can conduct creative work - composition, presentation. The connection with the life experience of students carried out throughout the work on the work. But as the analysis deepens, enrichment of schoolchildren with the thoughts and experience of the author, connection with Students' life experience is changing qualitatively. On the one hand, the author acts on the student with a logical and emotionally-shaped side works. On the other hand, creatively reworking the work, the student forms his view of things and phenomena that are not always identical to the author's. The text is read by a teacher or a pre-trained student. Then a conversation is held, which aims to find out what impression the work made on students, to interest children in the analysis of the text and create conditions for active work in the lesson. The teacher can formulate the questions as follows: What moment did you find the story most interesting? Why? What part of the story do you remember most? What picture do you most vividly imagine listening to the story? Which of the heroes did you especially like? When was it especially joyful (sad) for you? Regulation on the relationship between skill formation reading and the ability to work with text is one of the most important for the teacher and determines his approach to the analysis of the work. Second possible methodological the provision is an interconnected consideration of the content and visual means of the work. The third starting position is integrated implementation of educational and educational tasks in the process of working on a work. The main directions of text analysis: clarification specific content, composition of the work, motives of the actors' behavior and their characteristic features, ideological orientation of the work. [4]

The types of work with text in the analysis process can be next:

1. Selective reading - reading part of the text in accordance with the task. Selective reading is used in conjunction with other types of work – with compiling a characterization of the hero, with the disclosure of the idea of the artwork. This is necessary for the

development of the creative imagination of children, their speech and memory.

2. Answers to questions in your own words - the most common type of work with text. This type of work develops the ability to reason about what has been read.

3. The questioning by the students themselves is also an effective type of work with text. Asking questions in the text can be homework, which provides students with activity when checking homework in the classroom.

4. For the development of creative imagination of students is this type of work, as an illustration of the text used in 2 versions:

- verbal;
- graphic

Verbal drawing is a peculiar and rather important type of work, it is considered one of the effective means of speech development of students. Graphic drawing can most often be done at home. On the illustrations of students in the lesson, selective reading is carried out, this allows you to consolidate the connection words and image.

5. The necessary types of work on the text include retelling. Types of retelling: detailed, concise, selective, creative.

6. Drawing up a work plan is carried out with the aim of a more conscious and deep understanding of the content of the artwork. Skills training the plan is built taking into account the gradual increase in difficulties and is carried out in a certain system, starting from the 2nd grade. Clarification of an idea is the core analysis of an artwork. The disclosure of ideas combines all the components of analysis. Based on the idea, the teacher builds a system of questions and tasks. Although in the primary grades students are not specifically acquainted with the theme and idea of the work, these terms are not introduced, but what the writer tells about students can find out by analyzing the text and what is their main idea. The idea in a work of art is revealed through an image or a system of images, through the actions of heroes, their relationships. Therefore, it is necessary to find out the motives of the actors' behavior, their connection with the facts and events of artwork. Through facts and events, attitude to actors the author shows his ideological position, reveals his worldview. In the process of work on the work, during the analysis, an estimated the judgment of students, their worldview. Therefore, the analysis should take place as an informal conversation in which the author and his characters are present. More often Summarizing the specific content of the story, students come to understand the idea. [5]

If in the story the idea is clearly formulated by the author in one or two sentences, it is revealed in two ways:

a) from specific content to a generalized conclusion,

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b) from the conclusion to specific events. After the first perception of the content of the text, students can be offered find the words (sentences) in which the main idea is expressed, and say what events the thought is in. This task allows you to create a search situation, Interested in re-reading the story. Correct emotional perception of the story is one of the most important conditions for understanding the idea artwork. Reflections on why the composition is so named also leads to an understanding of the idea, its theme.

The material in reading books is arranged taking into account the ideological and thematic principle. The teacher develops a system of lessons, taking into account the general ideological and thematic basis works combined in one section. The teacher must know exactly what knowledge students should enrich, what personal qualities he will cultivate in the process of reading this cycle of works.[6]

It is necessary to strive for a holistic analysis of the composition: work on the disclosure of the idea takes place simultaneously with work on the features actors, visual means of the text, over the skill of informed and expressive reading. In primary school, the term actor is used, not "image." The task of teaching work with text is to develop in schoolchildren by the end of the 4th grade the ability to select material about the characters, (to be able) to evaluate their actions, express their attitude to them, make a story about the characters.

In preparing for reading lessons, the teacher should proceed from the following provisions:

1. In the image - character, the author summarizes his life observations on human characters and at the same time, the image is concrete. Therefore students in the analysis process should perceive the actor as a representative of a certain social group of people, a certain era and at the same time as a specific living person with specific characteristics.

2. In the process of revealing the characteristic features of the hero of the artwork, stand out leading, main features. More often it is this main characteristic that explains the motives of the hero of the artwork, allows you to understand the image as a whole. But not less to consider this feature is necessary in connection with other features, to teach children to see the hero in all the complexity and dialectical inconsistency of the features.

3. Understanding by students of the image - the character helps to clarify the author's attitude to a particular hero. If the author in the works expresses his attitude to the actors in value judgments, then students must independently find these words and prove with examples from the text, why the author says so, to cite the facts in support of this assessment.

4. An important condition for the effectiveness of work on the image of art the work is empathy with the reader, his sympathy or antipathy to the image - the character. Image analysis - the character should include as obligatory of its component, clarification of students' own attitude to the actors of the artwork. Stage of work on the image - character determined taking into account the psychological foundations of the process of perception of a work of art by younger students. At the 1st stage - emotional, often unmotivated perception of the image by students, specification of their initial holistic perception at the 2nd stage, and generalized motivational-evaluative judgment, which students come to the 3rd stage.

Stage I - the initial perception of the text, a holistic impression of the characters in the emotional plan.

Stage II - careful work with the text, the formation of students' ability to select material about the characters. At the final stage III, students generalize the selected specific material, make up a story about the hero, the main questions on which Students are prepared as follows:

- 1) Who is he ?,
- 2) appearance
- 3) attitude to people, to the assigned case,
- 4) your attitude to it. Summarizing the material

about the characters, students are brought to the idea of the work. From class to class, work on the main idea of the work and its actors complicated. [7]

Grade II - the ability to highlight with the help of a teacher the main idea of what is read. The ability to find words and expressions that characterize the events of the characters.

Grade III - the ability to highlight the main content of the part and the story as a whole, to evaluate the actions of the heroes.

Grade IV - the ability to select material for speaking about the characters, evaluate their actions, express their attitude to them, make a story ab.

The independence of students in working with text is increasing out the hero.

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USE OF INFORMATION TECHNOLOGIES IN TEACHING STUDENTS OF PRIMARY EDUCATION TO SOLVE COMBINATORICS PROBLEMS

Abstract: This article discusses the possibilities of improving the teaching methodology of the module "Elements of Combinatorics" in the subject "Theory of the initial course of mathematics" using the technology of problem-based learning and information technology. The article reveals the content and essence of the technology of the process of problem education, in particular, the SCAMPER method, describes the state of the teaching methodology of the module "Elements of Combinatorics" in the direction of "Primary Education and Sports and Educational Work". The article also presents the developed didactic support for the module "Elements of Combinatorics" based on problem-based teaching, the technology for conducting lectures and practical exercises, didactic materials.

Key words: Elements of Combinatorics, mathematics, problem-based learning, information technology, the SCAMPER method, Excel program, Primary Education, didactic support, didactic materials.

Language: Russian

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ИСПОЛЬЗОВАНИЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ ПРИ ОБУЧЕНИИ СТУДЕНТОВ НАЧАЛЬНОГО ОБРАЗОВАНИЯ РЕШЕНИЮ ЗАДАЧ НА КОМБИНАТОРИКУ

Аннотация: В данной статье рассматриваются возможности совершенствования методики обучения модуля «Элементы комбинаторики» по предмету «Теория начального курса математики» с применением технологии проблемного обучения и информационных технологий. Раскрывается содержание и сущность технологии процесса проблемного обучения, в частности, метода SCAMPER, описывается состояние методики обучения модуля «Элементы комбинаторики» на направлении «Начальное образование и спортивно-воспитательная работа». Также в статье приведено разработанное дидактическое обеспечение модуля «Элементы комбинаторики» на основе проблемного обучения, технология проведения лекции и практического занятия, дидактические материалы.

Ключевые слова: Элементы комбинаторики, математика, проблемное обучение, информационные технологии, метод SCAMPER, программа Excel, начальное образование, дидактическое обеспечение, дидактические материалы.

Введение

На мировом уровне в обеспечении высокого качества подготовки кадров первоначальной актуальной проблемой считается не увеличение объема теоретических знаний, а формирование способности применять усвоенные знания в решении жизненных практических задач с внедрением таких технологий которые

отображают в себе современные достижения науки и техники, которые ставят в центр процесса обучения активную познавательную деятельность обучаемых.

В настоящее время в Республике Узбекистан во всех сферах жизни и общества осуществляется ряд реформ, обозначенных Указом Президента Республики Узбекистан «О Стратегии действий

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по дальнейшему развитию Республики Узбекистан» от 7 февраля 2017 г. № УП-4947 [1], Постановлениями Президента Республики Узбекистан «О мерах по дальнейшему развитию системы высшего образования» от 20 апреля 2017 г. № ПП-2909 [2], «О дополнительных мерах по повышению качества образования в высших образовательных учреждениях и обеспечению их активного участия в осуществляемых в стране широкомасштабных реформах» от 5 июня 2018 г. № ПП-3775 [3], Указом Президента Республики Узбекистан «Об утверждении Концепции развития системы высшего образования Республики Узбекистан до 2030 года» от 8 октября 2019 года № УП-5847 [4]. В Концепции развития системы высшего образования Республики Узбекистан до 2030 года поставлены задачи внедрения передовых стандартов высшего образования, в частности поэтапный переход от образования, учебные программы которого направлены на получение теоретических знаний, к системе образования, направленной на формирование практических навыков. В Концепции сказано, что системное реформирование высшего образования в Республике Узбекистан осуществляется в целях «поднятия на качественно новый уровень процесса подготовки самостоятельно мыслящих высококвалифицированных кадров с современными знаниями и высокими духовно-нравственными качествами, модернизации высшего образования, развития социальной сферы и отраслей экономики на основе передовых образовательных технологий» [4], что подразумевает повышение качества знаний подготавливаемых специалистов, организацию образовательного процесса на основе современных инновационного подходов, в том числе и проблемного обучения.

Согласно теории проблемного обучения, усвоение знаний и развитие обучаемых происходит не путем передачи им некоторой информации, а в процессе собственной активной деятельности. Следовательно, в преподавании учебных предметов (и, прежде всего, в процессе обучения математике) необходимо использовать такие методы, которые позволили бы формировать опыт исследовательской деятельности студентов, вооружить их приемами самостоятельного и творческого мышления.

На практике такой подход может быть реализован посредством проблемного обучения, которое ориентировано на развитие способностей студентов к творческой деятельности и направлено на открытие студентами новых знаний и способов действий. [8] Проблемное обучение основано на моделировании процесса познания в учебных условиях. Суть его заключается в следующем: после того как перед студентами

поставлена проблема, студенты исследуют пути и способы ее решения самостоятельно или при непосредственном участии преподавателя. [6] Они строят гипотезу, намечают и обсуждают способы проверки ее истинности, аргументируют, проводят эксперименты, наблюдения, анализируют их результаты, рассуждают, доказывают.

Психолого-педагогические основы теории проблемного обучения были разработаны в исследованиях А.А.Абдукадирова, Н.Н. Азизходжаевой, А.В. Брушлинского, Л.С. Выгодского, П.Я. Гальперина, В.Н. Дружинина, Р.Д. Ишмухаммедова, О.В. Зиминой, М.В.Кларина, И.Я. Лернера, А.М. Матюшкина, М.Х. Махмудова, Г.К.Селевко, Г.А. Цукермана, Ж.Г. Юлдашева и др. Методические аспекты проблемного обучения в процессе преподавания математики отражены в работах математиков и методистов Б.С.Абдуллаевой, В.А. Гусева, М.Э.Жумаева, Н.Б. Истоминой, Ю.С. Заяц, Л.Д. Кудрявцева, Ю.М. Колягина, И.Ш.Лактаевой, Л.Л. Николау, Д. Пойа, Л.П. Стойловой, З.Г. Таджиевой, Л.М.Фридмана, Н.А. Хамедовой, Д.И. Юнусовой, Е.Янгабаевой и др. Исходя из исследований ученых, можно подчеркнуть, что предмет математики благодатен для проблемного обучения: почти на каждом занятии, при изучении любой темы студенты могут встретить затруднения, которые нужно преодолеть.

В настоящее время существует объективная необходимость применения новых методов обучения, которые позволяют формировать творческих знающих специалистов, способных самостоятельно решать научные проблемы. Активное развивающее проблемное обучение формирует творческое мышление.

Глубокие, прочные и, главное, осознанные знания могут получить все студенты, если развивать у них не столько память, сколько логическое мышление, если «заразить» студентов поиском пути решения заданной проблемы.

Каждый преподаватель стремится найти наиболее эффективные методы обучения, которые ведут к высокому качеству усваиваемых знаний, и способствует развитию студентов.

Если преподаватель хорошо усвоит содержание и сущность теории организации процесса проблемного обучения, овладеет формами, методами и техническими средствами обучения и будет систематически творчески применять усвоенное на практике, то успех придет сам. Хорошая дидактическая подготовка преподавателя сегодня особенно важна, потому что без знаний общей теории нельзя творить, а сам процесс преподавания – это искусство, искусство увлечь детей своим предметом, удивить красотой мысли, знания, побудить к самостоятельным действиям. [10]

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Проблемное обучение требует изменения типа деятельности студента и изменения структуры учебного материала. Суть активности, достигаемой при проблемном обучении, заключается в том, что студент должен анализировать фактический материал и оперировать им так, чтобы самому получить из него новую информацию. Другими словами, это расширение, углубление знаний при помощи ранее усвоенных знаний или новое применение прежних знаний. Нового применения прежних знаний не может дать ни преподаватель, ни книга, оно ищется и находится самим студентом, поставленным в соответствующую ситуацию. [8] Это и есть поисковый метод учения как антипод методу восприятия готовых выводов преподавателя.

При изложении теоретического материала проблемная ситуация возникает в результате выявления противоречия между новой информацией и теми знаниями и представлениями, которые сформировались у учащихся в результате предшествующего опыта. В этом случае задача преподавателя состоит в том, чтобы подвести учащихся к необходимости вводить новые понятия, а также расширять и/или принципиально изменять имеющиеся представления, чтобы устранить выявленное противоречие. Подчеркнем, что это не является искусственным методическим приемом — именно так эти понятия и возникали, о чем свидетельствует история науки. [14]

В преподавании учебных предметов (и, прежде всего, в процессе обучения математике) необходимо использовать такие методы, которые позволили бы формировать опыт исследовательской деятельности студентов, вооружить их приемами самостоятельного и творческого мышления. На практике этот подход может быть реализован посредством проблемного обучения, которое ориентировано на развитие способностей студентов к творческой деятельности и направлено на открытие студентами новых знаний и способов действий. Проблемное обучение основано на моделировании процесса познания в учебных условиях. При проблемном обучении в создании проблемных ситуаций можно использовать такие интерактивные методы обучения, как «Вопросы к

автору», «SCAMPER», «Концептуальная карта», «Диаграмма Венна», «Карта памяти» и др. А контроль и оценку усвоения знаний, умений и навыков по модулю можно возложить на компьютер и интернет: студенты могут самостоятельно проверить свои знания по тестам, составленным в программе Ispring, а на лекционном занятии можно быстро оценить студентов при помощи интернет-тестирования Plickers.

При изучении дисциплины «Теория начального курса математики» мы разработали модуль «Элементы комбинаторики» на основе проблемного обучения с использованием информационных технологий. Студенты при подготовке к изучению данного модуля читают текст лекции на платформе, составляют по тексту лекции вопросы, затем на лекционном занятии проводится обсуждение по методу «Вопросы к автору», это значит, что студенты задают вопросы по непонятным местам в лекции. Особенность в том, что на вопросы студентов по непонятным местам в лекции, сначала они пытаются найти ответ в парах, затем в малых группах, и только после этого нерешённые вопросы выносятся на фронтальное обсуждение. Такой подход создает проблемную ситуацию, которую студенты пытаются разрешить своими силами.

На практическом занятии мы предлагаем решать задачи со всесторонним анализом решения по методу SCAMPER. Для этого преподаватель сначала знакомит с методом SCAMPER, на основе презентации излагает основные сведения о деятельности по данному методу. SCAMPER (аббревиатура от англ. *Substitute Combine Adapt Modify Put Eliminate Reverse*) — методика креативности в форме проверочного списка. Автором методики является Боб Эберле (1997 год), хотя идея использования более обширного проверочного списка принадлежит Алексу Осборну. Методика часто используется для разработки новых продуктов. [15] Техника заключается в том, чтобы последовательно ответить на вопрос о модификации задачи, которая рассматривается (Табл. 1). Тем самым изучаются различные её аспекты, в том числе и те, что пока мало используются и имеют в себе потенциал для развития или улучшения.

Таблица 1. Метод SCAMPER

Сокращение	Модификация (англ.)	Значение
S	Substitute	Заменить что-то, например, компоненты, материалы, людей
C	Combine	Комбинировать, например, с другими функциями, приборами
A	Adapt	Добавить что-то, например, новые элементы, функции

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M	Modify / Magnify	Модифицировать, например, изменить размер, форму, цвет или другой атрибут
P	Put	Применить для чего-то другого, в другой отрасли
E	Eliminate	Удалить части, упростить до главного
R	Reverse / Rearrange	Поменять местами, перевернуть, найти применение в чём-то противоположном

Рассмотрим применение этого метода на примере следующей задачи по комбинаторике.

Задача.

Каких чисел от 1 до 1 000 000 больше: тех, в записи которых встречается цифра 5, или тех, в которых она не встречается? [7, 9, 12]

Решение:

Всего 1 миллион чисел. Считаем числа, в которых нет 5.
 Однозначные - 8 чисел (2,3...9)

Двузначные - $8 \cdot 9$ чисел

Трёхзначные - $8 \cdot 9 \cdot 9$ чисел

Четырёхзначные - $8 \cdot 9 \cdot 9 \cdot 9$ чисел

Пятизначные - $8 \cdot 9 \cdot 9 \cdot 9 \cdot 9$ чисел

Шестизначные - $8 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$ чисел.

Семизначные - 1 число.

Перемножаем, складываем, получаем: Чисел, в записи которых нет цифры 5 – 531441.

Ответ: Чисел, в записи которых нет цифры 5 больше.

Преподаватель после решения задачи предлагает заполнить таблицу креативных вопросов по задаче (Табл. 2). Показывает, как можно скомбинировать с программой Excel, предлагает алгоритм выполнения действий на ноутбуках. Предлагает студентам высказать свои мнения. Подводит итоги.

Таблица 2. Применение метода SCAMPER для решения задачи

Сокращение	Модификация (англ.)	Значение
S	Substitute	Заменить цифру 5 на 1, или на 2-9, или на 0
C	Combine	Комбинировать решение с программой MS Excel
A	Adapt	Добавить что-то, например, если взять две цифры, то есть 5 и 2
M	Modify / Magnify	Модифицировать, например, изменить в пределах 10, 100, 1 000, 10 000, 100 000, рассмотреть закономерность: уменьшается или увеличивается с увеличением разрядности
P	Put	Применить для чего-то другого, в другой отрасли, сколько вариантов кода на цифровом замке, если точно знать, что цифра 5 не участвует
E	Eliminate	Удалить части, упростить до главного, ответ на вопрос: может ли их стать меньше?
R	Reverse / Rearrange	Поменять местами, перевернуть, найти применение в чём-то противоположном - ответ на вопрос: когда, в пределах каких чисел их станет меньше?

Комбинирование решения задачи с программой MS Excel позволяет, во-первых, облегчить вычисления, во-вторых, увидеть тенденцию убывания количества чисел, в записи которых нет цифры 5, с увеличением разрядности.

Рассмотрим подробнее комбинирование решение задачи с программой MS Excel. В первой строке записываем числа от 1 до 10, во второй строке в ячейке A2 вводим число 8, а в следующую ячейку вводим формулу $=A2 \cdot 9$ и

протягиваем ее до ячейки J2. В третьей строке в ячейке A3 вводим формулу $=СУММ(\$A2:A2)+1$ и протягиваем ее до ячейки J3. В четвертой строке в ячейке A4 вводим формулу $=A3/(10^A1)$ и протягиваем ее до ячейки J4. В четвертой строке будет выдаваться процент чисел, в записи которых нет цифры 5, из первых 10 чисел, 100 чисел, 1000 чисел и т.д. Если по первой и четвертой строке построить диаграмму в виде графика, сразу будет

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видно, что чем больше разрядность, тем меньше таких чисел (Рис. 1).

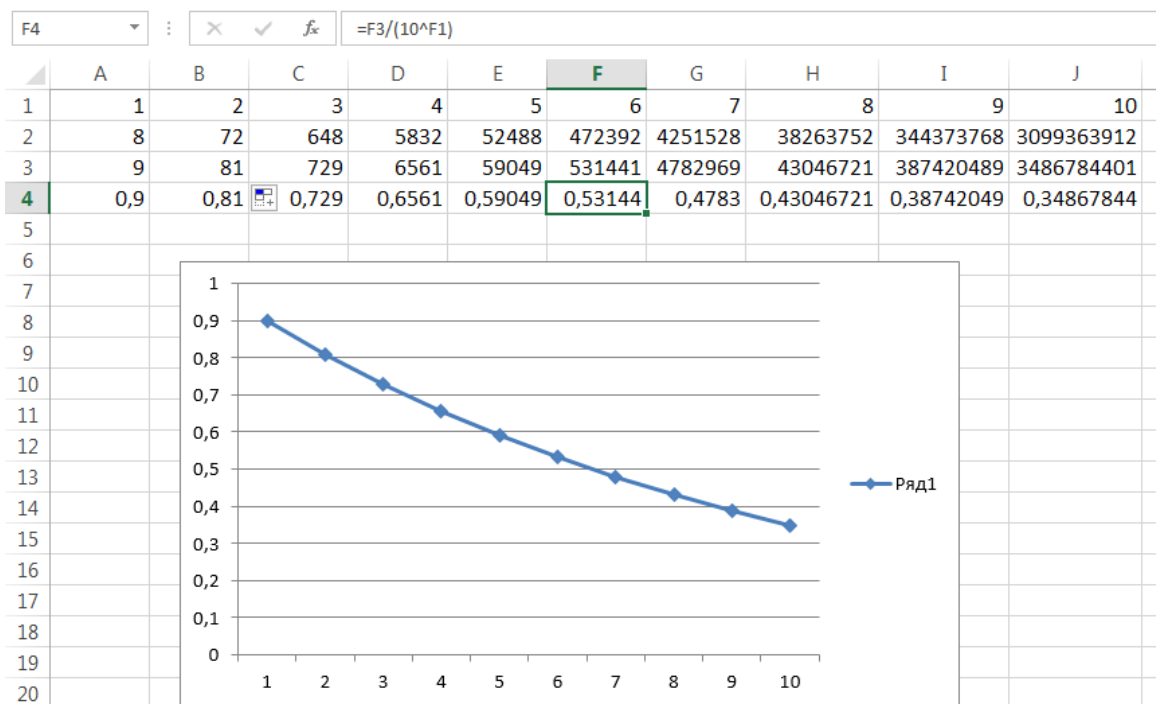


Рис. 1. Решение задачи в программе MS Excel

В заключении можно сказать, что преобразования различных сфер деятельности, происходящие в различных странах мира, требуют от человека умения самостоятельно мыслить, творчески подходить к своей работе, применять наиболее оптимальные способы действий. Эти тенденции модернизации образования отражаются и на изменениях, происходящих в математическом образовании. В-частности, формирование у студентов в процессе изучения математики качеств мышления, необходимых для полноценного функционирования человека в современном обществе, для динамичной

адаптации человека к этому обществу. Однако это недостижимо, если на уроках используются приемы и методы, ориентированные на заучивание готовых знаний, воспроизведение заданных образцов деятельности.

Каждый учитель должен быть всегда в поиске чего-то нового и интересного для своих учеников. Использование новых технологий улучшает эмоциональный настрой студентов, повышает интерес к предмету, а это, в свою очередь, способствует формированию мотива деятельности студентов, активизации их познавательной деятельности.

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A MASTERPIECE OF ARABIAN TALES AND WORLD LITERATURE

Abstract: *In the XII-XIV centuries, many myths and legends, tales of strange adventures and various oriental romantic works were translated into European languages. It is well known that among the Arabic works translated into European languages, the fairy tales “1001 Nights” have fascinated readers of the world since ancient times. As a result, this work influenced the works of world and Uzbek writers. The article analyzes the best work of world literature which was created on the basis of the Arabian fairy tale “1001 Nights”.*

Key words: *European literature, medieval, Arabian literature, amorous- romantic works, Renaissance, magic tales and legends.*

Language: English

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Introduction

It is not secret that in the XII and XIV centuries many myths and legends, stories about interesting adventures, various Eastern romantic works were translated into the languages of European nations. It is well-known that among the Arabic works translated into English, the magical tales of the “One Thousand and One Nights” have touched the hearts of readers of the world since ancient times. Although “One Thousand and One Nights” did not fully translate into Latin in the XII and XIV centuries, some parts and chapters, had been absorbed among Roman peoples. The stories from the “One Thousand and One Nights” are very popular in medieval European literature, especially the stories “Sinbad” and “Forty Ministers”. “This series of stories,” “One Thousand and One Nights, which originated on Indian soil and then translated into Persian and Arabic, had a profound effect on the work of Pedro Alfons, Juan Manuel and other European writers. As well, these stories have been published repeatedly in the French, Spanish and Italian languages until the eighteenth century”, Najmiddin Komilov wrote in his book. [4; 131]

According to the dates of B. Riftin, European writers Juan Ruis de Alarcon (XVII century), Fransoa Blanshe (XVIII century), Juan Valera, X.Andersen

(XIX century) and others use medieval Indian and Arabic literature in their own novels and stories. They have made good use of their stories, drama and comedies, and have produced wonderful characters based on Oriental motives. [6; 81]

Thus, in Oriental literature, an old artistic style – a story in story, laying down a book with one purpose and gather series of close-knit works, laid the groundwork for the creation of many wonderful prose works in Spain, then Italy, France and England. Writers of the Renaissance and later European writers have used themes of the Eastern literature, especially stories from “One Thousand and One Nights”. On the basis of these themes, Western works have become classical masterpiece. “Decameron” has a special place among them.

There is much evidence that the romantic works of the East have been translated into European languages. Accordingly, Spanish intellectuals who have a good command of Arabic also read and spread Oriental literature. Traveling actors and Bakhshis performed these pieces in the city.

The Italians also had close relationship with the Spaniards. In addition, the Italians established economic and cultural relations with the countries of the East through the Mediterranean. In the XII-XIV

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centuries in Italy the most interesting adventures, romance and romance works were widely distributed.

Commenting on the creativity of [Giovanni Boccaccio](#), Najmiddin Komilov commented on the works that inspired the work of the famous writer: "He had Arabic translations, books of Spanish and Italian writers based on Oriental tales, folk-tales of the East-West in folklore, memories of ancient Roman and Greek sources, tourists and traders. The Italian writer has made good use of all of these resources. In particular, the formulation of Oriental storytelling was a great help". [4;132]

Indeed, there is no doubt that Giovanni Boccaccio's famous work "Decameron" [2; 135] is based on the impression of "One Thousand and One Nights", which is a rare work of the oriental people. Because Giovanni Boccaccio leaves no doubt that he used the "One Thousand and One Night's" techniques, including molding, in his work. The "One Thousand and One Nights" contains more than three hundred fairy tales and stories. This is done by molding. Giovanni Boccaccio puts together a hundred stories in "Decameron", placing them into ten chapters, each of which is divided into ten chapters, but there are many similar stories in terms of content and ideas. In "One Thousand and One Nights" many internal stories are logically connected to the story, which remains in the focus of the content.

"One Thousand and One Nights" is a romantic, adventurous work, in which the theme that causes dramaticism relates to women's activities, also women mostly known as the main character. Giovanni Boccaccio's "Decameron" is also one of these works. This is because women are portrayed as central characters too. The idea of going to an isolated village to forget the dreadful scenery in the city is their idea. Girls were active, initiative, and fought for their rights.

The "One Thousand and One Nights" stories are varied in size. It contains from small stories, that make up one or two pages, to large stories. This is one of the important features of "Decameron" too. The effect of "One Thousand and One Nights" can be seen in many chapters of Giovanni Boccaccio. "One Thousand and One Nights" are sometimes copied in a much altered way and sometimes directly. For example, in one story, Marxist Monferrat goes to participate in the Christian crusade. King Philip hears about Marquess's beautiful wife and falls in love with her. The King visits the Monferrats Castle to see the woman. Marquise's wife welcomed him with respect. However, the meal was served by a variety of chicken dishes. Realizing this, the king whispered to the woman: Madam, do you have just hens, do not you have roosters? Markiza answers: "Why, sir, we have roosters, so our hens do not need any other roosters. After this answer king ashamed and went back. [2; 85]

The story, which is based on the clever answer, is found in the "One Thousand and One Nights" in the section "Prince and the Seven Ministers": King as he

walks into his castle, he sees a woman on the roof, and falls in love. The king inquires and finds that the house belongs to one of his ministers. The king instructed the Minister to visit the province and he himself visited the house. The minister's wife greeted the king politely. While cooking meal, she recommends to the king to read the book of exhortation. The woman offers ninety kinds of food to the king. The dishes were different, but they all tasted the same. When the king asked what this meant, she said, "I did this to make you learn from it. There are ninety maidens in your palace, even though they have different colors, their taste is the same. The king was embarrassed by this statement and went back... [5; 87]

The details, the names, the situation are different, but the content and the conclusions is the same. But logic of the the story from "One Thousand and One Nights" is strong.

Another story from the same chapter from the "One Thousand and One Nights" appears in the "Decameron". In it, the minister says to prove to the king the plot of the wives: One of the king's bodyguards loves a woman. One day he sent his servant to the wife. While the wife was having fun with the slave, the guard knocked on the door. The wife hides the slave boy on the shelf. The guard enters the house with his sword in his hand, sits beside the woman and begins to fall in love. At that moment the wife's husband knocks on the door. When the guard fearing asks: "What have I done now?" the woman says: "Swear at me with your sword, and when my husband comes in, come out" and opens the door.

At that time woman told to her husband who saw this situation: "Oh, hubby, you came here at the right time. A poor man came running into our yard and begged me to save him. I hid him on the shelf, this man came naked with the sword, and if you come late he would kill me". Her husband unloaded the young man and escorted him off safely. [5; 380]

And in Giovanni Boccaccio:

A noblewoman, whose name was Donna Isabella fell in love with Leonetto, and secretly from her husband communicated with young man. To this beautiful woman Lambertuchcho was also enamored. Although she disliked the Lambertuchcho, after sending a lot of people and threatening, she agrees to meet. One day while her husband was away from home and enjoying a dinner with Leonetto, Lambertuchcho came to her. The woman hides Leonetto behind her curtain and accepts Lambertuchcho. As Isabella and Lambertuchcho were on the brink of adventure, suddenly Isabella's husband returned and knocked on the door. Then Isabelle said: "If you want to save me from death, obey my command. Take a knife in your hand and shout. Then threaten to get out of the door. Lambertuchcho erroneously completes his mission and disappears. When shocked husband asked about this situation, Isabella said: "Suddenly a young man came to my

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house. Lambertuchcho followed him with a knife, and when the door of my room was open by accident, the young man came in and trembled, begging me to save him, and I hid him behind the curtain. Then I stood on the threshold and didn't let Lambertuchcho go in, and then you came in". [2; 85]

Clearly, there is no significant difference in the plot of both stories. However, Giovanni Boccaccio's pen is sharper in providing details of events. According to Grinser, this plot is first seen in the Indian works of "Hitopadesha" and "Shukasaptati" (the Indian version of the "Tutinoma"). [3; 229]

Analyzing Giovanni Boccaccio's work: "The feudal laws of the Giovanni Boccaccio's era clearly did not allow love, especially for women, who were strangled and forced to express their feelings secretly. The author opposes this. That's a good thing. But Isabella's love is not pure love. This can not be described as a noble, sacred human emotion," [4; 148] – the professor Najmiddin Komilov was completely right.

Indeed, faithfulness, devotion, and pure singing are among the sacred themes of Oriental literature from ancient times. The great poets of the East have expressed these ideas in various genres with great passion and immortality. This strong code of ethics has enriched the lives and consciousness of our peoples and has acquired a great social meaning. He helped strengthen the family. After all, loyalty and love between couples are the foundation of the human race.

A "One Thousand and One Nights" is artfully crafted, and finally charming. That is why these fairy tales have become one of the world's favorite readers.

The translators, of course, play an important role. His entry into Europe in the fourteenth century influenced the work of many writers.

But the most complete translation of the work was made by Antuan Gallan (1646-1715). Subsequently, English, Russian, and German translations were created from this French translation. Translations from the original Arabic. By the middle of the XIX century, the fairy tale "One Thousand and One Nights" was among the most popular in Europe, with only one English edition published 25 times during that period.

N.G.Chernyshevski, who has a great respect for folk art, reads this work over and over again. The magical power of fairy tales captures the imagination of the great writer. He wrote: "I was fascinated by "One Thousand and One Nights" fairy tales when I was young. I know many beautiful examples of prose, but I do not know any better than that".[9; 8]

It is noteworthy that Chernyshevski had a direct influence on oriental literature. In this respect, the writer's novel "Stories in Stories" deserves attention.

"This literary-balletistic and scientific-critical work written in the Petropavlovsk Prison in 1863, as the author himself notes, "was born under the

influence of "One Thousand and One Nights": – It is because of my love for the wonderful fairy tales of the "One Thousand and One Nights". [4; 225]

It should be noted that the work "One Thousand and One Nights" has not only influenced the work of Western writers but also the Uzbek folklore and the works of writers.

For example, the fairy tales of the Kharezmi folk "Punishing of slanderers" [10; 14-18], the fairy tales of "Urozboy and Oltinjon", "The Poor woman" [8; 100] are similar to the story of "One Thousand and One Nights".

Apart from this, H. Niyazi's comedy "The Work of Maysara" [12; 73] is almost the same. Because we can see that this comedy is very close to the plot of the sixth minister in the chapter "The Prince and the Seven Ministers" in "One Thousand and One Nights".

The story of the concubine and the jeweler in the story "A One Thousand and One Nights" refers to the king in the story "Prince and Seven Ministers" [5; 399]. A concubine tells the king that a carpenter was in love with a girl in a carpenter's heart, and that he was in love with her, and that he was willing to work hard to find her. As the story goes, the carpenter was unstable to the girl in the picture, and his love afflicted him. One day, one of his friends came to visit him and asked him why he was sick. He said, "Brother, I am sick and sick because of the love that came to my heart. I fell in love with a picture hanging in my friend's house". After his friend told: you are crazy, my friend. Can a man fall in love with a photo? It is an inanimate thing? – The artist painted a picture of a beautiful woman". [5; 400]

Some of the scenes mentioned above are similar to some of the masterpieces of the master of the word Mir Alisher Nava'i in the book "Sab'ai Sayyar". Remember: King Bahrom, who loves to hunt, calls a traveler in the desert and asks who he is. He says that he traveled from city to city and wants to meet King Bahrom, to tell him the secret in his heart, and that he is an artist. When King Bahrom introduced himself, he said: "If you would like to hear it, I will complain it: I am called by the world people Moniy. My memory is enriched with a lot of knowledge, but I am well-known in the world for painting". [1; 386]

After that, the world-renowned artist – Moniy says that he is familiar with many events, including many in China, and says that he saw a musician at a merchant's party: "She is such a unique-beautiful toy that after seeing her all Chinese people were disturbed. It is as if a man has given his life to death, so that if somebody does not die when see her, after that she clings to her beautiful hands, and woe to him. If the dust of her soul sounds and she sings and follows, then it will end..." [1; 389]

The artist tells to the king Bahrom that he has painted this girl. "And the king was mad when he saw the image of this beauty." [1; 389]

In the story "The Woman and the Jewel" from

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the chapter of "The Prince and the Seven Ministers" people who came to see the jeweler began to look for painter. The artist cannot be found, because he has moved to another city. "His brothers were sorry for him and wrote a letter to the artist: "Have you painted just miracle a picture or seen such a woman in the world?" The artist replied: "I painted a concubine musician from a minister in the Indian city of Kashmir." [5; 400]

As we have seen, Alisher Navoi's Bahrom is a jeweler from the "One Thousand and One Nights", Dilorom is a Kashmiri musician, and artist Moniy is a painter. It is a similarity in images. The similarities between these images mean that Bahrom (or jeweler) will be in love with a beautiful girl, and they will both fall in love, the beauty of the beautiful Dilorom – Chinese merchants beautiful musician were described in the story.

However, Navoi's Bahrom is the king, hero of the story is jeweler, for King Bahrom, that girl was the mistress who was achieved at the expense of one year's Chinese dues, for the jeweler in the story the mistress was the woman which he achieved by the use of cunning. The story tells how the jeweler who was born in Persia went to the Indian country and there he used various tricks and kidnapped girl.

If we pay attention to the story in the "One Thousand and One Nights" ("The Queen and the Seven Ministers") is actually told to the king to prove that a woman can use her cunning trick to men for hiding her bad work. Thinking deeply we could understand that Shakhризada says that her mister Shakhriyoz falls in love not just with women, also with men too. The idea is not to blame someone who fell into a trap. However, we can not always agree with the ideas put forward by the "One Thousand and One Nights".

It was shown by Alisher Nava'i in a different

way, extending it to the image of Bakhrom Gur, extending it and respecting that so-called love.

Nava'i used this plot to express his progressive ideas, complementing the short story novels and creating a compelling piece of content. What is important is that Alisher Nava'i closely linked the seven stories with the molding story, which is the centerpiece of the poem. This connection was masterfully made through the seventh story, thanks to the artist's skill. This ensured that the poem was composed as a whole compositional chain.

In addition to the aforementioned story, the first volume of "One Thousand and One Nights" contains the story of "The Merchant Ayyub and his son Ghanim ibni Ayyub". [5; 343] If we pay attention to the details of the story in it, the development of events is very similar to one of the most interesting scenes in the book by the author Gafur Gulam, "Shum Bola" [11; 141], which is a favorite of the Uzbek people. [11; 64]

Paying attention to these pages, the author enjoyed the above-mentioned story of "One Thousand and One Nights" in his work, and used it in his book "Shum Bola". It is the highest peak in the series of adorable scenes. Because the writer changed the lies of the slave in the story "One Thousand and One Nights" by enlarging it a little bit and introducing it to the image of a naughty boy, giving him an Uzbek spirit. By presenting his work to the reader, Gafur Gulam has firmly established his place in Uzbek literature, and over the years, for centuries, he has managed to create an immortal work that does not lose its charm and readability.

For the creation of the best works mentioned above, of course, one cannot fail to recognize the invaluable contribution of "One Thousand and One Nights".

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SYMBOLISM IN «THE LORD OF THE RINGS»

Abstract: This article is devoted to the study of the use of symbols in the novel “The Lord of the Rings”. Analysis of some stylistic devices, the function of symbols of colors, elements of ordinary use and others are given in the text.

Key words: symbol, color, idea, function, symbolism, interpret, fantasy, ring, author, novel.

Language: English

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Introduction

Symbolism is often used by writers to amplify their works. Symbolism can give literary work prosperity and color can make a sense of the work deeper. Symbolism gives a writer freedom to add double levels of meanings to his work: a literal one that is self-evident, and the symbolic one whose meaning is far more profound than the literal. Symbolism, therefore, gives universality to the characters and the themes of a piece of literature. Symbolism in literature evokes interest in readers as they find an opportunity to get an insight into the writer’s mind on how he views the world, and how he thinks of common objects and actions, having broader implications.

John Ronald Reuel Tolkien was born in South Africa in 1892.

It is not surprising that young Tolkien did not enjoy the traditional children's books: “Alice in Wonderland”, “Treasure Island”, “The Pied Piper”, and the stories of Hans Christian Andersen. Like C. S. Lewis, he was moved by the Curdie books of George Macdonald. They were set in remote kingdoms where misshapen and malevolent goblins lurked beneath mountains. Though he was drawn to the Arthurian legends, Tolkien the boy found his chief delight in the “Red Fairy Book” of Andrew Lang. It contained the

best story he had ever read, the tale of Sigurd, the warrior who slew the dragon Fafnir. It was also a story set in the far-off and nameless North—a region at once the richest and most beautiful he had ever encountered, but also the most perilous. Again with Lewis, the fierce and dark beauty of Northernness, the stark and violent world of Scandinavian myth and saga, would always be more attractive to Tolkien than the sunnier mythologies of the Mediterranean world. It fit their own early, bitter experience¹.

In 1928, while grading exams, Tolkien absentmindedly wrote on a blank sheet of paper, “In a hole in the ground there lived a hobbit.” With this sentence, Tolkien began to imagine what “hobbits” might be like and what they might do. From these imaginings grew “The Hobbit”, a children’s story and Tolkien’s first published work. In 1936, a version of “The Hobbit” reached a representative of the publishing firm Allen and Unwin, which published the novel a year later. The novel met with great success, and there was demand for a sequel.

Heartened by the profits of “The Hobbit”, Tolkien’s publisher encouraged him to start work on what later became “The Lord of the Rings”. Tolkien spent twelve years writing the novel. His initial goal was only to write a very long tale, but as the novel took shape, he related his story of Hobbits to the vast

¹ Drout, Michael D.C. Rings, Swords, and Monsters: Exploring Fantasy Literature. Course Guide. Recorded Books, LLC, 2006, p. 48

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history and mythology of Middle-earth that he had developed in the Silmarillion stories. “The Lord of the Rings”, completed in 1949, was conceived of as a single novel, but published in three volumes—“The Fellowship of the Ring” (1954), “The Two Towers” (1954), and “The Return of the King” (1955) — for logistical reasons.

If to pay attention to mood and tone, it is important to note that Fantasy novels also provide various moods and tone. Although the genre is generally optimistic, an elegiac tone pervades many titles, as the victories are not accomplished without loss. Every Fantasy fan has mourned the death of a favorite character, one who has been sacrificed, albeit willingly and knowingly, to ensure victory. Still, the mood ranges from dark and bleak tales of Dark Fantasy and Urban Fantasy to uproariously humorous ones, with much in between².

According to etymology, symbol literally means something that has been put together. The source of the word is the Greek word *symbollein*, that refers to the idea of putting things together to contrast them, and ultimately became a word that was used for compare. From the word symbol came the concept of symbolism where one object is used to refer to something else. So, when an author or a poet uses one object to refer to a completely different idea, then he or she is employing symbolism.

It's hard to find a work of literature that lacks any kind of symbolism. Symbolism is an important literary device for creating complex narratives because it enables writers to convey important information without having to state things directly. In addition, the use of symbolism is widespread because it can:

- Help readers visualize complex concepts and central themes, and track their development.
- Afford writers the opportunity to communicate big ideas efficiently and artfully.
- Invite readers to interpret a text independently, rather than be directly told what the author means.
 - Add emotional weight to a text.
 - Conceal themes that are too controversial to state openly.
 - Imply change or growth in characters or themes through shifts in the way that characters interact with particular symbols, or ways in which the symbols themselves change over time.

When the author wants to show a certain temper or feeling, he can also use symbolism to suggest it, rather than just ordinary saying it. In literature symbolism can take many forms including;

- A figure of speech where an object, person, or situation has different meaning rather than its literal content.

- The performance of character, word, action, or event that have more extensive sense in the structure of the whole story.

A metaphor is one of figures of speech that is used symbolism. It analogizes two objects which are not comparable and depicts that they have something in common. Metaphor has additional meaning to a word. This makes it an example of symbolism.

Tolkien's such characters as Frodo, Gandalf, and their band come into their own powers and join the battle to save the world³.

«The Lord of the Rings» is an epic high-fantasy novel. The story began as a sequel to Tolkien's 1937 fantasy novel «The Hobbit», but eventually developed into a much larger work. Written in stages between 1937 and 1949, «The Lord of the Rings» is the best-selling novel ever written, with over 150 million copies sold. The novel was published in three volumes over the course of a year from 29 July 1954 to 20 October 1955. The three volumes were titled «The Fellowship of the Ring», «The Two Towers», and «The Return of the King». Structurally, the novel is divided into six books, with several additions of background material included at the end of the third volume. Some editions combine the entire work into a single volume. The novel has since been reprinted numerous times and translated into 38 languages.

Tolkien's fantasy serves as a mirror to reflect reality, cruelty and in this way he backs his readers so that they can recognize that same reality in their own world. As for his masterpiece “Lord of the Rings”, it is surely one of the most influential books of the 20th century. The main reason for that is Tolkien's unmistakable ability to portray truly deep and diverse characters that make the novel both entertaining and didactic about human nature, while the themes discussed in it are and will be true in the centuries to come.

One of the most common criticisms of J.R.R.Tolkien's writing is that he merely produced idealistic, allegorical stories for children. Because the purpose and meaning of his work are often misinterpreted, the bulk of Tolkien criticism, whenever his work is given any consideration, is "shallow and silly commentary, both hostile and laudatory."⁴ Despite this fact, Tolkien's The Lord of the Rings was named Britain's best-loved novel of all time in 2003. Award-winning adaptations of The Lord of the Rings have been made for radio, theatre, and film.

² Trevor Hart and Ivan Khovacs. Tree of Tales: Tolkien, Literature, and Theology. Baylor University Press, 2007, p.189

³ Tolkien, J.R.R. The Fellowship of the Ring. New York: Houghton Mifflin, 1999, p.233

⁴ Rosebury, Brian. Tolkien: A Critical Assessment. London: St. Martins, 1992, p.227

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The full extent and nature of the Ring's power never becomes entirely clear to us, but we get the sense that the Ring symbolizes a power almost without limits, and which is utterly corrupting. It is immensely difficult for many of the characters to resist the temptation to take the Ring for themselves and use it for their own ends. Regardless of the wearer's initial intentions, good or evil, the Ring's power always turns the wearer to evil. Indeed, even keeping the Ring is dangerous. "The Fellowship of the Ring" is strewn with examples of those who are corrupted by the Ring⁵.

He accomplishes it through such a small, but a very symbolic thing as a ring, the symbol of greed for power and wealth. None of the characters have the strength to resist the power of the ring, except for Frodo and Sam.

After the events the novel describes, the age of the Elves will pass and the age of Men will dawn. A large portion of the story eulogizes this passing age of the Elves. The Elves and their realms have a beauty and grace unmatched by anything else in Middle-earth. Though the Elves themselves are immortal, as Galadriel tells us, the destruction of Sauron's One Ring will weaken the Three Elven Rings, forcing the Elves to leave Middle-earth and fade away⁶. Throughout the novel, Tolkien gives us the sense that the adventures of the Ring represent the last burst of a sort of magic that will not be found in the world that comes afterward. This later world will be a world without Sauron, but also a world without Lothlórien.

If we go back for a moment to the very beginning of the novel, to the forging of the great ring, Tolkien tells us that except this One Ring, nineteen more rings were created: nine for the race of Men, seven for the race of Dwarves and three for the race of Elves. All these peoples were deceived into believing that they were in control of their fate, however soon they lost their souls to the evil of the One Ring and Sauron.

At the time of the novel, all the characters prove to be unworthy to possess the ring: Gandalf is afraid to take the ring and he urges Frodo not to tempt him⁷, because he knows it will corrupt him, Galadriel, one of the Elven queens, has the same fear⁸. They both fear that the Ring will do great evils through them. Aragon, the heir of Isildur, is unsure of his ability to govern Gondor, although it is his rightful throne, and his possession of the Ring is out of the question. Boromir, Gollum and Saruman have already been corrupted by the ring and paid their lives for it. Even Bilbo Baggins, Frodo's uncle, the one who found the Ring in the first place, in the end becomes dependent upon the ring and he even snaps back at Gandalf when he offers help:

*"Bilbo flushed, and there was an angry light in his eyes. His kindly face grew hard. "Why not?" he cried, "And what business is it of yours, anyway, to know what I do with my own things? It is my own. I found it. It came to me." "Yes, yes," said Gandalf, "But there is no need to get angry." "If I am it is your fault," said Bilbo, "It is mine, I tell you. My own. My precious. Yes, my precious.""*⁹.

But the main element of the novel is the ring. The Ring was made by and belongs to Sauron, the Dark Lord, who is attempting to conquer all of Middle-earth. It was lost many years ago, but now it is trying to get back to its master, who is seeking it. With the Ring, the Dark Lord is effectively invincible. The only way to destroy it is to take it to Mount Doom in the heart of the land of Mordor and throw it into the lava. The Ring is safe with Frodo because he does not desire dominion over others, but Frodo himself is not safe, as he is being sought by the servants of the enemy. And over time, the desire that the Ring creates takes a terrible psychological toll on the bearer. It symbolizes the world which could be under the reign of The Dark Lord and at the same time it is a symbol of a community of those who tried to save the earth and to establish a peaceful life there.¹⁰

The color reflects the color, character, and beauty of all that exists in nature, and it has long been a reflection of the different moods, thoughts, and feelings associated with them. That is why people paid great attention to colors and tried to learn about its features. The great philosopher Abu Nasr Farabi in "Philosophical Questions and Answers" answers "What is the color?" When asked, "Color is the limit of what a shiny body is, and it is reflected on the surface of the body."¹¹

Color can have a communicative value that defines the relationship between elements and objects of nature; symbolic indicating a phenomenon, object or essence, and expressive (expression), transmitting a certain feeling and evoking the corresponding emotions (trinity of color).

Color is superimposed on the image naturally, therefore such expressive characteristics as warm (red), cold (blue), close (yellow), far (blue), light (white), heavy (black), over time, acquire a stable meaning of associations. However, when assessing the emotional impact of the color system, images sometimes resort to musical terms, since the purely pictorial vocabulary "warm, cold, colorful, color-local, transparent, pasty" gives too limited definitions that do not affect spirituality in the perception of color.

An ethnographer L. Mironova wrote about the generalized meanings of white, red, and black in

⁵ The same source, p.347

⁶ The same source, p.348

⁷ Tolkien, J.R.R. The Fellowship of the Ring. New York: Houghton Mifflin, 1999, p.336

⁸ The same source, p.339

⁹ The same source, p.123

¹⁰ Michael D.C.Drout. "Rings, swords and monsters:Exploring fantasy literature", Wheaton college, 2006, p.22

¹¹ Абу Наср Форобий. Фалсафий саволлар ва уларга жавоблар. – Тошкент: Фан, 1953. – Б.74.

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mythological imagination: "In the red the primitive man saw blood, fire, heat and the sun."¹²

Thus the novel shows the reader how the elements of fiction can be symbols of different types and stylistically can affect the further development of the structure.

Symbolism is often used by writers to amplify their works. Symbolism can give a literary work prosperity and color can make a sense of the work deeper.

All 5 famous Istari magicians had different colors (White Saruman, Gray Gandalf, Brown Radagast and two blue ones, with later changes of Gandalf to white and Saruman to "many colors").

When the author wants to show a certain temper or feeling, he can also use symbolism to suggest it, rather than just ordinary saying it. In literature symbolism can take many forms including;

- A figure of speech where an object, person, or situation has different meaning rather than its literal content.
- The performance of character, word, action, or event that have more extensive sense in the structure of the whole story.
- "Gandalf was shorter in stature than the other two; but his long white hair, his sweeping silver beard, and his broad shoulders, made him look like some wise king of ancient legend. In his aged face under great snowy brows his dark eyes were set like coals that could leap suddenly into fire."¹³

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Gandalf is a major character of J.R.R. Tolkien's "Hobbit" and "Lord of the Rings". He was a protagonist in these works. Gandalf is a magic character, one of the last stunners of Middle-earth. Though, he looked like unprepossessing, grizzled, tall man with staff, all grey, in cloth and appearance, he was actually one of the mightiest wizards.

"He wore a tall pointed blue hat, a long grey cloak, and a silver scarf. He had a long white beard and bushy eyebrows that stuck out beyond the brim of his hat. Small hobbit children ran after the cart all through Hobbiton and right up the hill. It had a cargo of fireworks, as they rightly guessed. At Bilbo's front door the old man began to unload; there were great bundles of fireworks of all sorts and shapes, each labeled with a large red G and the Elf rune. That was Gandalf's mark, of course, and the old man was

Gandalf the Wizard, whose fame in the Shire was due mainly to his skill with fires, smokes, and lights."¹⁵

In "Hobbit" Gandalf played a role of ideological encourager, what shows his effect on others. Exactly Gandalf reasoned Bilbo into going with gnomes for treasure hunting. At the beginning of their adventures gnomes did not like Bilbo, because instead of helping he always prohibited them. But wise wizard cooled gnomes down, because he believed in Bilbo and liked him.

Among people Olorin was known as Gandalf the Gray, Elves called Mithrandir, Grey Vagrant. He walked in Middle-earth, never staying for a long time somewhere.

Gandalf was the only wizard, interested in Hobbits. It is unknown when exactly; he came to Shire first time. He appeared there time by time, and was famous with his fireworks. Gandalf liked hobbits for their courage in dangerous situations and mercy to each other. He also knew, that hobbits can be inconspicuous- what is very useful merit. Exactly hobbit Bilbo was chosen by him for adventures. In "The Lord of the Rings" Gandalf returned to Shire for Bilbo's "eleventy-first" birthday party. Wise Gandalf encouraged Bilbo, to leave the ring to Frodo. The ring was troubling him, that is why, with the help of Gandalf's; he decided to leave it for Frodo and departed for Rivendell. With the help of Gandalf, he became the first of ring bearers who gave it up willingly.

White is the color of purity and innocence. Some of the positive meaning that white can convey includes cleanliness, freshness and simplicity. Being like a blank slate, white symbolizes a new beginning or a fresh start. This thing is exactly related with Gandalf. After his renewal, he became much stronger and wiser than before.

Gandalf and Fellowship of the ring travelled to Rohan, where they saved King Théoden from Worm tongue's influence. Then he made effort to gather army for coming battle with Sauron. Gandalf came in time to Minas Tirith, where his presence was resented by Denethor, the Steward of Gondor. In the battle with forces of Mordor, Gandalf managed to confront the Witch-king of Angmar, Lord of the Nazgûl. With the help of Aragorn Gandalf distracted the Dark Lord's attention from Frodo Baggins Sam Gamgee, scaling Mount Doom to destroy the One Ring.

Gandalf was the grey, also because of his humility. As we know, grey itself is a color of compromise. In the first part of "The Lord of the Rings", Gandalf was not in the center of attention. But he always had a role of controller.

White is a color that defends and emboldens. It proposes a sense of peace and tranquility, comfort and

¹² Миронова Л.Н. Цветоведение. – Минск: Высшая школа, 1984. – С.19-25.

¹³ Tolkien J.R. The Fellowship of the ring, Many meetings, p.290

¹⁴ The same source, p.290

¹⁵ Tolkien J.R. The Fellowship of the ring, chapter 1 p. 7

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hope, and helps to relieve emotional disturbances. White color meaning gives a sense of order and competence, and it is a great help if you need to clean up your life. The color white offers an inner cleansing and purification of your thoughts, feelings and ultimately, your spirit. It is refreshing and strengthens your entire energy system. Although there are very few negative meanings of the color white, too much white (especially in Western culture) seems cold, solitary and empty. White can give a sense of sterility, distance and lack of interest. In other cultures, the white color is traditionally associated with death and mourning. In these cultures, death usually means the end of one life and the beginning of another. So in color psychology, the meaning of new beginnings still lasts. White may indicate the end of a cycle in your life.

Positive characteristics given by white are purity, innocence, simplicity, cleanliness, neat, open, equality, and new beginnings. The color also has a negative part, giving traits like ignorance, sterility, distant, boring, cold, empty, or critical. If used in balanced proportions it can be our savior from the dark side in times of distress. It represents a clean future and the fact that we have a change to a better beginning. It is efficient, showing an excellent organization and sense of order.

Tolkien used white color with the personage called Saruman.

"[Saruman] is great among the Wise. He is the chief of my order and the head of the Council. His knowledge is deep, but his pride has grown with it,

and he takes ill any meddling. The lore of the Elven-rings, great and small, is his province. He has long studied it, seeking the lost secrets of their making (...)"

Saruman was known as Saruman the White in J.R.R.Tolkien's "The Lord of the Rings". He was a head of Istari Wizards, and a leader of White Council. After coming to Middle-earth, he became popular as Curunir, which meant "Man of Skill". It is considered that the purity of his knowledge has connection with the white color. He was the wisest wizard. In Valinor Saruman was named Curumo.

Tolkien did try to create an escapist world, which was one of the most important factors that distinguished him among all other writers. He created a world where adults could relax at least for some time from their everyday lives. This eternal theme of good wins evil was very important at the time throughout the world, as people had just been through the two world wars and a cold war, and they needed to escape from this for some time.

Concerning the novel itself, two main aspects of it were discussed in the dissertation work: the importance of color symbolism in *The Lord of the Rings* and the connection between the colors and the main personages of the work. Tolkien managed to depict his heroes in both side, with negative and positive colors. White, brown, gray, blue, yellow, red, black are the main colors he used in his writing. Each of these colors has deep meaning which is associated with the characters of wizards.

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FEATURES OF CHILD MEMORY AND ITS DEVELOPMENT

Abstract: as the whole mental development of a human being consists mainly of memory, memory begins to develop from the earliest days of the child's life. The child's first signs of memory become apparent when he or she recognizes the people and objects in the vicinity. This is evident from the actions we take when a child sees something familiar to him. For example, when a child sees someone close to him, he or she may feel stranger or consider the stranger an alien. In young children, the ability to identify themselves allows them to remember what they perceive. As a child grows into adulthood, he develops complex memory patterns, or memory. Children will be able to remember things and events that they have learned since then.

Key words: features of child memory, type of memory, children's imagination, development of memory, senior groups, early childhood period.

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Introduction

The role of children's imagination is very important. Because of their imagination, children can easily remember past events, for example, if you tell a child what is wrong, he or she will look around for it. Growth of speech is very important in the development of memory. During this time, the child will be able to perceive things and events not only directly but also through the names of these things and events. They also enrich their memories by asking and listening to adults. In early childhood period, all memory processes begin to be seen. For example, a young child will be able to remember it mechanically, that is, without first understanding it. It has its own peculiarities, of course. First of all, as we have already mentioned, children have little experience in life, they do not yet know many things, but they are often remembered for their conflict in life. Secondly, the plasticity of the nervous system in children is greater than that of adults. For this reason, it is not difficult for children to remember mechanically.

II.Literature review

Children also develop very early in their sense of meaning. For example, early childhood children love

some of the stories they love and some hate. In general, the content of stories affects children and gives them a sense of well-being that suggests that children understand the meaning of the story. Early childhoods occur as a result of involuntary recall. They are reluctant to remember things and events that are of interest to them. Remembering and anamnesing something is an association. They do not deliberately remember them. When something else needs to be remembered in the game, other associations come to mind as a result.

III.Analysis

Development of memory in preschool children. Kindergarten children (especially small group children) are reluctant to remember what is important to them and what they are passionate about. They do not set themselves the goal of remembering them and have not yet been able to set goals. It is no coincidence that in preschool age children are predominantly forced to remember. There are a number of reasons. Every educator must know the characteristics of a child's memory. This is where children's memory can be developed properly. The difference in the memory of preschool children from

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adults is primarily due to the peculiarities of high nerve activity. According to the results of research conducted by a number of psychologists, kindergarten-age children have the following characteristics: firstly, the nervous system of kindergarten children is very plastic, just like the early childhood period nervous system, meaning that their nervous systems are highly elastic. For this reason, time-series associations can be formed very easily in children of this age. The characteristics of the nervous system in children do not affect their ability to remember. As a result, kindergarten children will remember songs, rhythmic poems, interesting and profound impressions and will remember them very quickly. Secondly, although the nervous system in kindergarten-age children is mild, the time-to-time associations that occur may be very unstable. Therefore, different things and events that are perceived by children of this age will not be stored in their memories for long. Not only do they remember quickly, but they quickly forget. Often things and events are preserved in preschoolers' memories, depending on how emotional these events and cases are affecting the child. Thirdly, kindergarten-age children are poor at braking compared to excitation in the nervous system. As a result, they are confused with many things at once. If a kindergarten boy is asked to describe what he perceived to be a festive holiday, he cannot tell it in a meaningful and systematic way. In this case, the child starts with what he has accidentally remembered. Because a lot of things you see at once are completely confusing. The child has no system in what he or she remembers, so the child will be able to speak first, from the first impression, or from the memory. This means that if a kindergarten child is exposed to too many things at the same time, they will blend everything together and not even remember. Experience has shown that middle-aged and older kindergarten children have little or no ability to memorize and remember mechanically. However, this does not mean that as children grow older, their memory is weakened. The point is that as children grow and experience more and more speech, they are more likely to remember things that they need, rather than what they are supposed to be. It should also be noted that in recent years, preschoolers have the impression that logical remembering is preferable to logical remembering. Mechanical remembering was opposed to logical remembering. Recent experimental studies have shown that preschoolers play an important role in understanding the meaning of words. But the logic of preschoolers is evident when they are given a full understanding of the material. In preschoolers, children have more memory. That is why they remember what they saw in relation to what they heard. The main reason is that, firstly, perceptions of kindergarten children have a specific image. Secondly, they have not yet formed a complete speech. Children will be able to remember what is

being said only after they have mastered the speech in senior groups. Children often remember most things during game activities. For this reason, their memories are often episodic and random, making it difficult to put what they remember into a particular system. As a result, the memories of children are confused and intertwined. As a result, it will be difficult to remember. It is up to the educators to eradicate the memory disorders inherent in preschoolers and to increase memory. The educator should select the material that the children need to remember to suit their age. It is important to use different games to teach children memory. Generally, the facilitator should always supervise the child to remember and recall the material. Because all types of kindergarten-age memory begin to grow. However, it is characteristic that among the main types of memory (such as figurative, mechanical, logical) memory moves more strongly. This is why children of this age can easily learn different activities and play music. Mechanically mastered speech material also partially moves into memory. For this reason, kindergarten children learn to recite poems in a variety of fast-paced rhythms. For example, the "count" before hiding a game of hiding. There is no point in counting the slacker game, but it has a very expressive and rhythmic sound. Although preschool children have good emotional memory, this type of memory is stronger in children than in adults. Adults will never forget some of the things and events that were emotionally disturbing. Kindergarten children can sometimes forget about their emotional effects. Educators and parents also play a very important role in children's memory. When speaking with a child, the talk should be simple, pronunciation and clear. Memory development does not end during the childhood of the kindergarten, but changes and grows according to the child's further development, that is, education and lifestyle.

IV. Discussion

Experiment. Experimentation is one of the main methods of scientific knowledge. The main difference from this observation is that the researcher is actively influencing the situation under study, manipulating one or more variables. In the experiment, mental properties are studied in special conditions. Two types of experiment are distinguished: laboratory experiment and natural experiment. Laboratory experiments are carried out in specially equipped places under strict control. In the case of a natural experiment, he does not know that it is the object of the experiment. This will eliminate the probability of such tests, such as emotional stress in the laboratory experiment, the desire to alter the results of the experiment. For example, you may want to take a preschool child to a separate room where he/she can read a series of words and then ask them to return. However, this is not unusual for a child. Therefore, the

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emotional stress (anxiety, suspicion, etc.) of the child does not allow the child to begin the task as much as possible. This means that the results obtained from the experiment cannot be valid. If you have been tasked with playing with the child and shopping in the store for what he has been given as a customer, it's easy to determine what he or she has forgotten or forgotten. Therefore, the results of natural experiments in this way are more accurate. A number of requirements must be met when organizing and conducting experimental research. These requirements are systematized by G.U.Uruntayeva and Y.A.Afonkina:

1. At the planning stage, it is necessary to clearly define the purpose of the study, the composition of the tests, the methods used in the experiment, the conditions (place and time) of the experiment, and all necessary conditions.

2. Establish a trusting relationship with the child participating in the experiment during the experiment, give a friendly, warm tone to the dialogue, put the child in front of the child, and ignore the child's mistakes, it is necessary to adjust the pace of the child's individual-psychological characteristics. The experiment with the child should not be long and should not be altered during the experiment. Usually, the experimenter is the person who completes the record of the experiment in addition to the researcher. The other two types of experiment - deterministic experiment and formative experiment are also differentiated. In the exploratory experiment, certain characteristics of the child's mental development are noted. For example, it is possible to determine whether parents' disputes affect their child's emotional state. This requires identifying adult children in a disputed family and learning about their emotional state, and comparing the results with those of other children. The results of the comparison suggest that there is a link between parent-child conflict and child emotional development. Experimental experiments reveal an active effect of the experimenter on the changes that occur. For example, it is possible to determine how the improvement in parenting affects the child's emotional state. For this, it is necessary to compare the emotional characteristics of the child with improved parenting, or to compare the emotional characteristics of the children with whom the parent relationship is controversial, or the subsequent emotional characteristics of the child. In some cases, the control experiment also differs. This experiment is similar to the multivariate experiment. The purpose of the transfer is to determine what is the role of the impact on the changes in the active group. To do this, the results of the control group that are not affected are compared with the active group. If the difference is significant, then it is concluded that the changes in the first group are caused by the effect of the changes.

Request. Inquiry is a method used to collect primary verbal information during direct or indirect interaction between the researcher and the respondent.

The survey may be in the form of a questionnaire or an interview. The questionnaire will respond to written questions and oral questions during interviews. The request is divided into the following steps:

1. Epigraph. Here the examiner's ideas are directed in a specific direction and the testers are invited to answer the questions.

2. Instructions. The examiner is told how to respond to questions during the survey, and how the data is used.

3. Adaptation to Requests. It focuses on answering the quiz questions, building self-confidence, building a relationship of trust that gives the impression that the questions can be answered as you wish. For this purpose, the survey first asks emotional, neutral, easy questions.

4. Achieving the goal. This will provide you with the basic information you need. For this, the questions at this stage are important for both the researcher and the pilot.

5. Overcoming stress. This eliminates the sentiment of the whole query process regarding the questions asked. This can be done by asking relatively simple, positive emotional questions, such as the social demographic characteristics of the examiner. The questions asked to the examiner are not separate. They are the rings of a single chain.

One question in the request is pertinent to the next. Therefore, special attention should be paid to the following questions:

1. One question and one answer should not affect the answers to the following questions.

2. The question after a particular question should not be completely shifted to another subject, nor should the subject change dramatically from one subject to another.

3. External expression of questions should involve the testers (should be symmetrically correct, questions should be beautiful and understandable by written or oral).

4. The individual characteristics of the test takers and the length of the inquiry should be consistent (for example, using 5-6 questionnaires for parent interviews).
5. It is advisable to express the words of gratitude and appreciation to the examiner at the end of the survey - "Thank you for your answers" and "Thank you for your help".

Projective methods. Project method is one of the methods of personal study. It creates experimental situations that can be interpreted by testers. By analyzing the test's interpretation, certain conclusions about its personality are made. This is because when interpreting a particular experimental situation, the projection mechanism exposes its own experiences, thoughts, dreams, fears and anxieties. Typical proactive techniques used in working with preschool children are: "Bola appertsepsiya testi", "Oilaviy ustanovkalarning Jekson testi", "Dyuss ertaklar

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metodikasi” and so on. The application of these techniques is mainly done in the individual work process, which takes a long time. It takes a great deal of research to interpret the results of a project-based research.

V. Conclusion

Activity learning method. When it comes to learning preschool children through learning about activity, first of all, it involves analyzing the effects of children's visual activity. For this reason, methods based on the study of visual arts are called graphical methods. Graphic techniques include drawing techniques “Avtoportret”, “Erkin mavzudagi surati”, “Dunyo surati”, “Oila rasmi”, “Oilaning kinetik surati”, “Uy, daraxt, odam”, “Geometrik shakllardan odam rasmini yig‘ish”, “Daraxt”, “Grafik diktant” and more.

Test. Testing is a set of tasks that are used to measure the level of development of a particular psychological quality. The test method uses certain standard tasks and situations (tests). This method has a number of advantages:

- it can be conducted with a large group of testers;
- calculation and processing of results is much easier and simpler. The main disadvantage of the method is that it cannot inform the child's future development.

Psychology currently has a set of tests that identify the characteristics of preschool children, their emotional traits, their motivational field characteristics, their individual-typological characteristics, and the child's cognitive processes.

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FUNCTIONS OF FOREIGN LANGUAGES ACQUISITION METHODS AND THEIR APPLICATIONS

Abstract: *there is a lot of work being done not only on teaching foreign languages, but also on finding and testing new methods of teaching all subjects. This is one of the most important issues in education today. If in the past foreign language teaching was considered to be the study of this language system, in recent years the main focus of teaching has been to develop these students' foreign language skills.*

Key words: *teaching foreign languages, new methods, language system, students' foreign language skills, audiolingual method, intensive method, audiovisual, hypnopedia, relaxopedia, suggestopedia, rhythmopedia, methodological literature.*

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Introduction

It should be noted that these goals in foreign language learning are not set by oneself or by others or individuals, but are closely related to changes in the sciences of linguistics and psychology and the social development of society. For example, consider the audiolingual method. The development of this method was influenced by changes in linguistics, that is, the structural flow.

It includes the following factors:

- teaching a foreign language should start with speaking;
- language learning is based on different structures, patterns of speech;
- exercises also require language repetition based on language requires exercise;
- the choice of grammatical patterns and vocabulary should depend on the results of the comparison of the foreign language with the native language;
- great attention to pronunciation is required.

The main disadvantages of this method are the large number of mechanical exercises and real speech is a lack of exercise.

II.Literature review

The founders of the audiolingual method are methodist scholars Ch.Fries and R.Lado. For example, Ch.Fries says that the main content of the initial stage should be the study of structures. It is important that grammar skills are based on this. According to Ch.Fries and R.Lado, students must first remember the set of structures (sentences) used in oral speech. It is then necessary to build new sentences based on these structures, that is, to develop skills and abilities. This is done through training exercises. Later, a new method began to take shape in the West. This was an audio-visual method. Its founders are the Yugoslav Methodists P.Guberin and the Frenchman Pierre Rivon, L.Gugenheim and others. This method is based on quick memorization of language (language material) by hearing and seeing. The main advantage of this method is that it requires the study of the language material in relation to real-life situations. Language learning is based on seeing, listening and understanding. According to the authors of this method, the aim is to study the most common topics in everyday life (for example, apartments, furniture, trade, etc.). They are mastered mainly on the basis of

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perceptual perception and extensive use of technical means.

III. Analysis

Much has been done and is being done in our country and abroad to intensify foreign language teaching. This led to the development of new intensive methods. So what is an intensive method? How can it be understood? The first meaning of the word intensive training is short-term to engage students in speaking activities in the foreign language they are learning, i.e. to teach to speak. This is based on the students' internal psychological capacity and memory. (Leontev A.A. Kitaygorodskaya). Thus, the following two characteristics of intensive teaching can be identified:

- study a certain amount of study material in a short period of time and carry out a corresponding foreign language speaking activity;
- maximum from all reserves (psychological capabilities) of a person's memory use, that is, increase student engagement. In recent years, much needs to be done to increase student engagement in the classroom. One of the most important tasks is to create an environment of verbal communication in order to increase the activity of students in the classroom, using the internal capacity of personal memory. The methods used by the teacher and the various visual aids should be aimed at this goal. The psychological state of speech communication is one of the most important tasks in increasing the activity of students.

One of the well-known Methodist scholars, E.I. Passov says that the communicative approach used in modern foreign language teaching is a form of intensive teaching based on speech situations. The intensive method was first developed in the early twentieth century on the basis of the "correct" method began. Prof. According to E. I. Gez, "The right method has created a favorable opportunity and basis for intensive foreign language teaching." Some of the key aspects of the right method, such as interest in oral speech, especially the choice of speech situations for dialogic speech, and the need to increase student engagement in the classroom, are the basis of some modern intensive methods. Each new method retains the advantages of the previous method. In recent years, words denoting a new direction, such as audiolingual, audiovisual, hypnopedia, relaxopedia, suggestopedia, rhythmopedia, have become more common in the methodological literature. It should be noted that audiolingual and audiovisual methods cannot be used in intensive training. This is their principle that is, not relying on the use of the mother tongue, learning, memorization, and a large number of creative exercises by imitating the language.

Hypnopedics, Relaxed Therapy - these methods only give good results in memorizing language material, but do not provide use in speech. That is why the well-known scientist, Professor Gegechkori L.Sh.

suggests that hypnopedics and relaxation should be considered as opportunities that can be used in foreign language teaching because they are only concerned with remembering the information provided.

In the years that followed, the study of the individual as an object and all of it became creative pedagogy, psychology, social psychology, medicine in determining the possibilities. Much attention is paid to the integration of research in the sciences. An important issue today is the focus on preparing students for new thinking, creative thinking, and preparation for life. This increases the need for a comprehensive study of the individual. Thus, the student's personality has become a central figure in the learning process. G. Lozanov - psychotherapist, doctor of medical sciences, Bulgarian scientist - focused on the study of the potential of the human internal reserve. He began to study three important factors:

1. Open memory reserves;
2. To study the intellectual activity of the student;
3. Positive emotion, (loses the feeling of fatigue, the role of the teacher, authority; the relationship between teacher and student; mutual trust, a high level of motivation, the opening of the inner reserve of the person).

Gegechkori L.Sh. and Leontev A.A. It is acknowledged that the Lozanov method involves:

- 1) in the study of a large number of speech units;
- 2) students are taught to use language, vocabulary, in the process of speaking a foreign language developing the ability to use a unit of speech in another situation;
- 3) creating high motivation to learn to read;
- 4) the presence of psychological barriers (shyness, fear, humanity) gives very good results in removing.

It is noteworthy that Lozanov developed a method of teaching foreign languages did not make it an exit task. In the 60s and 70s, Lozanov's method was used in foreign language learning. At present, scientists and methodologists have developed ways to use intensive methods in combination with the practical methods used in our country. He said that it is expedient to apply only some principles of this method (Lozanov).

1. Emotionally method (I. Yu. Shexter) – role in the process of games focus on meaningful change. Such a view is one of the linguistic units of one's personal thinking is based on the idea that it does not originate from a complex. The main tool in this method is in the system of communicative tasks. This method of training is divided into 3 forms (periods):

- a) learn to speak based on the most common situations in life. No grammar, no homework. By the end of this period, 1,200 to 1,400 lexical items can be read.

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b) transition to a professional speech process. Manological speech develops in all directions. Gradually, refereeing begins with the study of writing and grammar. Teaching a foreign language on the basis of various games, consisting of problematic situations related to the profession, using texts of a scientific and emotional nature.

c) speech is increasingly shaped by a particular profession. Custom texts, recruitment Relevant documents, professional correspondence form the training material.

2. The intensive course offered by L. Gegechkori to teach adults intended for. There are 3 periods. The inter-period stage (ie the language preparation stage) is the main feature that distinguishes this method from other methods. In this case, the language material is consciously assimilated.

3. An experiment was conducted on the intensive method of teaching foreign languages to students. The learning process is organized as follows:

Semester 1 - Speech preparation exercises based on conscious learning of a foreign language performance;

Semester 2 - Development of dialogic speech based on the method of G. Lozanov;

Semester 3 - Teaching a wide range of profiles based on conscious study of language material;

Semester 4 - Development of monologue based on the method of G. Lozanov;

Semester 5 - Study of texts in the specialty;

Semester 6 - The Sleeping Course (Plesnevich A. S. tried English teaching) is designed for 10 days. Purpose: To provide researchers with scientific and professional contacts with foreign colleagues. This method can be used in the final stages of teaching students. As a return to previous topics.

5. Suggestokibernetik integral method. (Petrusinsky V.V.) (for adults) – Cybernetization of suggestive control is the basis of this method. Training is provided by automated technical means. The teacher is not present. It only controls the selection of material and the knowledge, skills and abilities. This method mainly helps to automate the initial method and chooses to memorize the lexical material. In short, some features of this or that intensive course can be used in the teaching of foreign languages in higher education. It is designed to increase the individual's active participation in the learning process.

IV. Discussion

This term is widely used as a general theory of pedagogical teaching on the concept of “method”. Didactics interprets the term “method” in terms of the way teachers and students work to acquire knowledge, skills, and attitudes, and to create opportunities for teachers to learn. General teaching methods have been developed for the subjects that teach the basics of science. The methodology of teaching a foreign language is developed taking into account the

specifics of the subject. The use of foreign language teaching methods has a long history. In foreign language teaching methods, the term “method” has three main meanings.

Firstly, a whole line in the history of methodology (translation method, correct method, comparative method, mixed method);

Secondly, the training system that is part of the direction;

Thirdly, the way teachers and students interact. (Methods of acquaintance, practice and application).

In the history of foreign language teaching, the first and second methods are called “historical” methods, and the third is called “process expression” methods. Historically, the methods have been grouped into four groups, with the addition of the words “translation”, “correct (or without translation)”, “comparative”, “mixed” to their names, so that the foreign language all the methods in the centuries-old history of the unit are grouped into four categories. A brief analysis of each of them is required, because in the first method some of their features are used in a certain way.

Translation method. The name of this method is often used in the plural with the term “translation methods”. So it's not hard to know the meaning; the foreign language material is translated into the native language. In Europe, translation was used as a method of understanding, first in Greek and then in Latin. In the second half of the eighteenth century and throughout the nineteenth century, French was studied through translation, in the twentieth century English and finally German, and in the Muslim world mainly Arabic and partly Persian were studied as foreign languages. Dead and living languages are taught by translation, and this process is a factor in the development of logical thinking. was calculated. Arabic, on the other hand, was a means of teaching Islamic works, which most students learned by rote memorization. Arabic, Persian and Turkish languages are taught in higher and religious schools. The most common translation methods are known as “Grammar-translation method” and “Text translation method”. Proponents of the former have used word and color translation to teach grammar, while proponents of the latter have used translation to read and understand the text. aimed at. The use of both translation methods is for educational purposes only. A foreign language is learned receptively. Based on the linguistic and psychological knowledge of the time, foreign language teaching methods were developed. Some teachers still misuse translation methods. For example, translating text is a non-methodical method. It is not forbidden to translate certain sentences or parts of the text for a specific purpose. Using the dictionary, you can provide short texts for translation to learn the meaning of new words, where the purpose of translating the text is to teach the use of the dictionary.

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The right method. The main reason for the name of the method is that it is taught in the right way attempts have been made to establish a direct association between the foreign language word and the subject, that is, the mental connection, by passing the mother tongue. The same methodology is used in teaching foreign language grammar; they wanted to make a direct connection between grammatical meaning and form. By the end of the last century, this method was invented as a result of the reform of foreign language teaching in Western Europe and the United States. Later, this method spread to Asia, Africa and other countries. Attempts to teach a foreign language without the participation of the mother tongue began to be expressed in terms such as the correct method, the inductive method, the natural method. From these methods the main goal is to teach a foreign language in a practical way. The conditions for learning the mother tongue have been accepted in this method without any changes. Two of the most common types of modern methods are audiolingual and audiovisual. According to the founders of the audiolingual method (famous American Methodists Charles Carpenter Frieze and Robert Lado), a foreign language is practical and studied for educational purposes. Emphasis is placed on the selection and teaching of foreign language sentences (speech patterns) from language materials. The procedure for studying the types of speech activities is as follows:

- listening comprehension;
- to speak;
- reading;
- writing.

Oral speech is taught as a means of communication in a foreign language, and written speech is taught on the basis of oral material. Teachers know several positive features of the audiolingual method from school experience. For example, the application of speech patterns to the level of language teaching unit, the advancement of oral speech, the teaching of reading and writing in oral material have been adopted with appropriate changes in grades V-VII. The fact that some of the laws of the audiolingual method do not apply to our conditions is taken into account in school textbooks. For example, it is

unusual to teach speech patterns without the involvement of the mind and without any rules. Distinguish between active and passive language material and are indifferent to their acquisition. This is also a misguided method. An audiovisual method that differs from the audiolingual method in a number of respects special attention is paid to the traditions of lexical material in accordance with the methodological guidelines of the representatives (P.Guberina, P.Rivan). 1,500 words have been selected for free thinking on life topics, and various technical means have been given a major place in the educational process. In addition to the commonality of the two methods, there are also differences. For example, the audiovisual method teaches speaking, writing, and finally reading. Reading is taught after writing. These methods are used positively in our schools. In the first years of high school, foreign language teaching is taught before writing, then reading before writing, and reading in the upper grades before all types of speaking activities. Reproductive and receptive foreign language teaching methods have also left a significant mark on the history of the methodology.

V. Conclusion

During the application of the methods, information exchange exercises (i.e. skills development) are performed. The method used by students in oral and written communication works best. Methods of performance, in turn, are used in practice through methodological actions. For example: the method of revealing the meaning of vocabulary without translation, the method of obtaining information from the text, the method of lexical teaching of grammatical units, the teaching of pronunciation by imitation, etc. A set of specific methods constitutes a process method. Methodical teaching represents an action that is evident in the study of the material. In the methodological literature, there are up to seven cases where methods are given under the names "Demonstration, Explanation and Exercise" or methods. No matter what the names or how many they are, the methods are focused on introduction, skill building, and skills development.

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PEDAGOGICAL-PSYCHOLOGICAL CLASSIFICATION OF ABILITY

Abstract: *ability - a person's individual-psychological characteristics, ability to perform certain activities and successful performance of work is the sum of individual mental qualities that represent subjective conditions. Identifies differences in the dynamics of acquiring the necessary knowledge, skills and abilities. Abilities are an individual-psychological feature because of the other qualities and characteristics of the person, i.e. the mind qualities, memory and character traits, emotions should not be opposed, but should be put in line with them. Ability is not innate, a gift of nature, but is formed throughout one's life.*

Key words: *ability, individual-psychological characteristics, knowledge, skills, mind qualities, memory and character traits, emotions.*

Language: English

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Introduction

Howard Gardner called abilities a set of intellects and highlighted its seven aspects. We are from these aspects of intellect we can analyze six of them in terms of improving the pedagogical skills of teachers. This is the psychologist Olga Matveeva modifies and enhances aspects with psychological technology emphasizes the importance of the teacher's professional career and demonstrates the following skills.

1. Ability to communicate. Teacher students with lessons and extracurricular activities, a positive mental climate in the classroom can create.

2. Ability to anticipate events. This type of ability is internal to the psyche of the students can be seen in the world. Then the teacher can predict who is capable of what.

3. Ability to hear and feel. He/she had that ability people love music, feel the melody well, recitation based on good reading of prose and poetry, memorizing what they hear preserves, especially loves to listen to poems and songs.

4. Kinesthetic (skin-muscle) ability. The teacher's ability to coordinate his or her own

behaviors while feeling the tone of the action directs, feels time through action, life for himself can create comforts, knows how to enjoy the blessings of life.

5. Logical ability. Philosophical reflections, numbers loves math, solving complex problems, causation and has the ability to understand the consequences of the consequences, in reality can distinguish the primary from the secondary.

6. The inner ability of a person. The ability to know, understand and feel perfectly, the inner ability of a free person is perfect develops, strong-willed, determined, has his own opinion in any situation can freely express their opinion.

II. Literature review

Ability characterizes the individual capabilities of the teacher. In the same way, talented teachers are talented in their work they achieve more than lower ones. Ability is faster in both general and specific development of an individual moving forward, most of his executive and creative activities ensures high results. A talented person can quickly acquire a specialty and achieve high skills and work output, innovation in science or culture. Ability is different

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from knowledge. Knowledge is the result of scientific reading, and ability is inherent in the psychological and physiological structure of man is a feature that ability is a necessary condition for learning at the same time, it is a product of a certain level of knowledge. In the process of acquiring general and special knowledge, as well as acquiring professional skills, the ability is perfected and developed. Concepts that are closer to ability are skills and competencies. Skills are the perfect way to work based on the experience and knowledge gained in the course of a teacher's professional career.

III. Analysis

Skills are a set of automated components of professional intellectual activity created in the process of a teacher's conscious activity. They form the basis of the mechanism of the teacher's professional activity processes, along with the ability to achieve pedagogical skills as a result of which teachers achieve great success in their professional careers. Talented, but with skills and abilities A teacher who doesn't have one can't achieve much. Ability occurs in the deep acquisition of skills and competencies. Indeed, the skills and abilities of a gifted person will be multifaceted and perfected. Skills and competencies may be supplemented by a lack of ability or a lack of ability can fix. Generalization of skills is also called mastery. Mastery is also a skill. This means that ability is formed in the process of developing your skills and competencies.

In pedagogy, the ability of the teacher is an opportunity, the necessary level of his skill is developed only in the process of teaching and education, and lays the foundation for success. Innate abilities are called intelligence. Talent, talent, genius the creative activity of man are stages in the development of skills acquired in the process. Abilities, like character, are qualities that a person has only in certain activities. Ability in psychology is the ability of a person to acquire professional knowledge, skills and abilities without difficulty, easily and perfectly is said to deal successfully with. He/she is a teacher by profession in his/her work. The qualities of professional activity that determine the content of education are reflected in the creativity of the teacher. Creativity is qualitatively new, is an activity that creates an original and unique innovation. Any problem identified in productive creativity is solved successfully; teachers who are capable of creativity in the main part these aspects are manifested. Heuristic creativity refers to professional activities that take place in society it means the bold assimilation and promotion of innovation, i.e. its to intensify the process of generating ideas (hypotheses) based on and consistent their proximity (probability, reliability) to reality the ability to exercise and act boldly in a new situation, the development of thinking based on the process of thinking is observed. In creative work, the

teacher has a social significance creates new theories, comes up with their own ideas and suggestions, is a master and only experienced, qualified teachers can gain knowledge. Signs of natural anatomical-physiological ability forms the physiological basis, which then becomes an ability The set of signs of ability is called human talent. The sum of the processes of signs of knowledge and ability in man, the pinnacle of his/her talent is his/her intellect.

Basic qualities and characteristics of pedagogical ability. In pedagogical psychology, the ability of the teacher is limited, there are no species. Types of pedagogical abilities can increase and change depending on the development of science and society. Ability in philosophy long-term "unchanging heredity" is a process that is passed down from generation to generation interpreted as. As a result of many years of research and observations by scientists, the following of pedagogical ability. The main qualities are highlighted:

1. Love of profession, ability to love students.
2. Excellent knowledge of the subject, interest in it.
3. To have pedagogical tact (decency and beauty).
4. Ability to integrate into the children's community.
5. A creative approach to their work.
6. A sense of responsibility.
7. Acquisition of educational knowledge.

Specific systems of pedagogical ability in teaching there is. The ability system is distinguished by the following features:

- key features;
- basic features;
- leading features;
- auxiliary features.

IV. Discussion

Pedagogical skills are only effective in pedagogical activities without expressing its existence and conditions, but in many respects it is also the result of successful work. In pedagogical ability, the characteristics of the teacher related to the exchange of ideas play a key role. The main features of the following pedagogical abilities are constantly formed as a result of high pedagogical and psychological knowledge of the teacher:

1. Communicative ability: the teacher's interaction with the teaching staff and parents, the community, their mental understanding their circumstances and empathizing with them as they engage in communication pure volunteering. The teacher must have psychological knowledge, should form a culture of behavior on a regular basis.

2. Perceptual ability: perception, perception of the external world and environment, that is, observation plays an important role. It develops and improves as a result of the teacher's enthusiasm. The

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teacher perceives the psychology of the student, his mental state, the state of the class gives a fair assessment of the pedagogical situation.

3. Empathic ability: stemming from love for children to feel the feelings, psychological states of students from the heart, understanding, comprehending, empathizing with them.

4. Ability to alternate the learning process: the teacher's own conveying knowledge to the reader's mind and thinking at the expense of less effort to achieve the goal in a timely manner in education and upbringing ability.

5. Didactic ability: in-depth communication with students, in-depth study of pedagogical laws and methods of pedagogy is the ability to teach effectively while mastering. Also a lesson to world standards, modern on the basis of pedagogical technologies must meet the requirements.

6. Organizational ability: is an integral part of pedagogical ability. She/he has been involved in various community activities by the class teacher, is active in engaging every student in the class community in engaging in clubs is reflected in the provision of the situation.

7. Constructive ability: the teacher's educational activity a professional pedagogical situation that arises on the basis of careful planning be able to anticipate the steps.

8. Ability to know. The teacher is deep in his/her subject and other subjects to know, master and demonstrate in practice.

9. Ability to comprehend: the teacher's intelligence and resourcefulness, deep understanding of events and happenings, and fair treatment of them.

Basic features of pedagogical skills observation:

- This is the ability to see the specific side of an individual thing, the starting material for creative activity;

- The observation of the artist, from the observation of the naturalist;

- The difference is obvious. Their observation varies each has its own way of thinking and thinking.

- A leading feature of talent is creative imagination. This feature is only available to artists, math teachers, and literary critics not only specific, but also applicable to all science teachers. It takes skill to master the secrets of any profession perfectly.

Pedagogical ability is formed only in a healthy teacher. However can be high, medium and low. These are different levels some of the qualities and attributes that are embodied in abilities plays a supporting role. Ancillary features included in the system of pedagogical skills and attributes include:

- certain types of perception;
- responsiveness;
- to shortcomings critical attention;
- stability;
- teacher's speech: oratory, vocabulary depth;

- acting features: facial expressions and pantomime, imaginary to be able to use fantasy, to control mental emotions;

- pedagogical tact and pedagogical decency.

Pedagogical influence is the ability to communicate as the main method. After gaining socio-political independence in the Republic of Uzbekistan, in all spheres of life, including education radical reforms are taking place and huge changes are taking place. Reforms serves to build a democratic, humane, legal society recognized as the path of development and progress of the republic. The task of building a democratic, humane, legal society is the responsibility of the younger generation. Law of the Republic of Uzbekistan "On Education", "National Training Program" and speeches of the first President I.A. Karimov and Education and upbringing in a number of works declared a priority in the field of development, its goals and objectives defined. Pedagogical influence is an important communicative tool for the teacher is one of the skills, primarily based on the culture of the teacher's appearance, attitude and speech culture in the process of conducting regular educational activities with students appears.

Pedagogical influence - the development of conscious discipline and independent thinking skills in the pupil, the purpose of education regular and systematic influence on the individual for the proper development, comprehensive development of the individual by approaching the socio-historical experiences of society, improvement of his behavior and worldview, upbringing of the younger generation on the basis of specific goals, social consciousness and behavior of the rich ideologies of our people to form on the basis of is a process of focused activity. On the basis of pedagogical influence the pupil's consciousness is formed, spiritual wealth and feelings are developed, in which the social connections necessary for social life are formed. Behavioral habits are formed that serve to the pedagogical impact that society places on the individual formed moral skills and habits that meet ethical requirements is done. To the mind, emotion, and will of the student to achieve this affected. If any of these are overlooked, it will be difficult for the teacher to achieve his or her educational goals. The educational process is led by a teacher. It defines the activities of students, creates conditions for their participation in the pedagogical process. The essence of education is expressed in the context of pedagogical influence and its content comes from the social goals of the country based out. The essence of upbringing is expressed differently in different periods. However, they represent similar ideas in terms of orientation. After all, the development of any nation, the strength of states depends in many ways on the upbringing of generations has long been proven. In any social society, the upbringing of the younger generation is organized on the basis of a specific goal. The purpose

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of education is the development of social society, its direction of development, the content of social relations determined by origin. Today in the Republic of Uzbekistan the main purpose of organized education is to bring up a perfect person maturity. The main pedagogical methods of pedagogical influence are from life, based on the way of life of the nation, national traditions and customs is selected. They aim to educate students pedagogically chooses in terms of appropriate organization. Pedagogical influence is the socially useful work of students activities in accordance with a pedagogically specific goal consists of a system of tools used to organize. This the tools are targeted at the learner and the learner shapes behavior. Pedagogical influence of the teacher in the process of teaching and education main methods of presentation: demand, prospects, incentives and punishment, public opinion.

Requirement - the teacher in the process of teaching and educating the pupil in a relatively personal relationship. The student is either this behavior is under the control of the teacher and the positive aspects are encouraged or, conversely, the negative behaviors are stopped. Perspective is an effective pedagogical method that is independent of students improves thinking, a sense of freedom to pursue a particular goal, a dream. These goals are in their personal aspirations, interests and will be reflected in the This method is personal to school students develops a sense of purpose, which is one of the most important human qualities. Incentives and punishments are the most traditional form of education is a method that has a positive effect on student behavior. Good manners, useful work and behavior, moral character, assignments the student is encouraged to do it unconditionally. Misconduct, disorder, and misconduct can be remedied through punishment are given. This method provides a moral impact, to apply it extreme caution, sensitivity and vigilance from the teacher in the process required. Public opinion is the most important factor in the regular educating method, which is manifested in the regular encouragement of students based on the results of their socially useful activities. To carry out the educational tasks of the team in a certain direction

provides a friendly relationship between students. The most effective use of pedagogical methods an important condition requires a teacher's approach from a humanitarian perspective. These methods are a lively response of living people to a single aspiration that feels professional responsibility. Pedagogical the impact is focused on an incomprehensible area of the student's psyche that is in close contact with the educator and the learners that they will trust each other, that they will understand each other the content of the impact, the practical impact on the overall state of the individual implies.

V. Conclusion

Thus, the impact is educational effectiveness guidance in improving at the level of modern requirements encourages student activism by creating. The teacher is aware of the interactions between students, their interactions and activities the existence of a link between, determines its effectiveness must not forget. The teacher to the class team and the individual student in order to succeed in pedagogical influence, it is necessary to rationally plan the system of pedagogical relations between students and change the psychological environment in a positive way. In order to create a system of pedagogical relations that is organized and perfect in all respects, aimed at preserving the minds of the younger generation, educating them in the spirit of national and universal values, the teacher should have a deep understanding of the psyche of each student, be aware of their inner potential, provide information, exchange ideas, understand their grief, feelings, and empathy. To succeed in the pedagogical approach, the teacher must analyze the following:

- be able to model future relationships with students;
- predict the class community properties to be treated to know;
- establish a relationship based on direct sincerity and solidarity;
- has an advantage in the relationship, based on democratic requirements rational management;
- positive and negative aspects of the relationship.

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PSYCHOLOGICAL PROPERTIES OF THE EARLY CHILDHOOD PERIOD

Abstract: early childhood period analysts develop mentally faster during this period because of improved performance and the ability to move freely. As you know, in the early childhood period, children not only walk and crawl, they also have the opportunity to run, jump, and climb high and low obstacles. The ability of preschoolers to engage in different activities from morning to evening creates a great opportunity to meet the needs of the environment.

Key words: the early childhood period, ability, mental processes, emotions, imagination.

Language: English

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Introduction

As a child of an early childhood period, he/she has little or no experience in life. In his/her daily routine, he/she imitates adults and begins to learn to dress, eat, and wash independently. A kindergarten-age boy does not hesitate to check his or her right hand during his daily activities. As a result, he learns a lot of novelty, develops his intuition and perceptions, his imagination and memory, his thoughts and speech, his emotions and imagination - all of his mental processes. At this age, the development of senses is associated with the constant improvement of analyzers. The senses of a child over two years of age (such as sight, hearing, smell and taste, skin and movement) develop as a result of his or her daily interaction with various objects.

II.Literature review

Normal development of the senses provides the basis for the growth of the child's perception. Although the perception of the child in early childhood period is quite advanced, it still differs greatly from those of older adults. Firstly, because children have no experience of life, their perceptions are also unclear. They encounter many things for the first time. Therefore, many things that children

perceive are new to them, that is, their initial impression. Secondly, children's perceptions are often voluntary, that is, the perception of a network does not yet have a specific purpose. Therefore, their perception fluctuates from one thing to another. However, because children are emotionally involved in this age, they perceive things that are intriguing, exciting, and emotionally stimulating. Another distinctive feature of children's perceptions of this age is that they cannot generalize what they perceive. They perceive the environment as it is. This feature is evident in the way they perceive images. For example, when a two-year-old boy is shown a picture with a horse's head, he is surprised and asks where is the horse. Words are important in improving children's perceptions. Words are essentially summarized, which allows you to summarize things. The child simply begins to divide things into groups by using words.

III.Analysis

Although children of early childhood period are beginning to speak, they still do not have a clear understanding of complex concepts such as time and space as they do not yet have experience in life. Such sophisticated concepts are gradually formed during

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daily life. When children under the age of one are extremely unstable and involuntary, the attention of two-year-olds can begin to appear. As he grows older, his attention becomes more stable. As the focus becomes less stable, it can be seen that the child is able to engage in long-term interests. He understands words when he is two years old and when he is three years old. As the vocabulary progresses, the original language of the child becomes a real language. The thinking of children of this age has their own characteristics and specific character. At the same time, they can think very carefully about what they perceive. In addition, children of this age have a lot of action elements in their thinking processes. That is why their thinking is sometimes called action thinking. In early childhood period, we see mental operations of thought, that is, analysis and generalization. They analyze, manipulate, palpate, and distort their toys or objects in their hands. But they are not yet able to synthesize. By the end of this age, speech plays an important role in the growth of thinking.

The child learns new words as much as he can and uses them in his thinking. This will help you to grow your thinking. The child has the first signs of word analysis and synthesis, abstracting, and summarizing. Another important step in the development of thinking is that by the end of early childhood period, the child will be able to learn some concepts and master the most important signs of these concepts.

A child who is about three years old knows that all adults are going to work. When a child of this age is told "your dad won't go to work sooner", he is surprised. Because his dad, who is a grown man, does not understand his job. In his understanding, all grown-ups should go to work early. So, without thinking, "Is my dad an adult?" The answer is: children begin to use the concepts and draw simple conclusions. They can use simple judgments to make simple, big, small, high, low, multiple, and small sentences that can help to develop thinking. In early childhood period, the imagination, which is one of the most complex psychological processes, begins to develop. But this is basically an illusion. They have not yet volunteered for a specific purpose. When the child is two years old, his game is undergoing serious changes. The child's play will be accompanied by simulated actions. The boy begins to imitate what he saw in adults. During this time, the child will be able to perform the driver's actions, not just moving the car or sliding down the hill. The car engine imitates the sound, implements the car, and so on. Speech growth can have a profound effect on a child's imagination. As children understand what adults have to say, they will listen to different fairy tales and stories. Children listen to stories they know and are familiar with. When you hear each story, the child will have different ideas. The child has the ability to imagine using these

images. The child expresses his thoughts by hearing stories. Words can help the child to perceive things differently, to identify their similarities, and to create new images and pictures based on similarities. As all the mental processes in early childhood period develop to a certain extent, it generally contributes to their mental development. As a child develops a language, his / her cognitive and intellectual thinking becomes more and more conscious of his surroundings. The child begins to understand his or her different needs and begin to shape his personality. According to the famous physiologist I.M. Sechenov, the child begins to understand himself from that point on, separating his senses from the surroundings. In the vocabulary of this age, the word "I" is often used. In this way, the child becomes self-aware even though he is very elementary. Consequently, from that time on, the individual characteristics of early childhood period begin to grow.

IV. Discussion

Development of attention in children. In children, attention begins to develop very early. Although no signs of attention may appear in babies one or two weeks later, voluntary attention spans are evident from one month to the next. This means that during a month, the child's attention is attracted by various powerful stimuli (such as loud noises and excessive light). At the age of two or three months, children begin to listen to the whistle (whistling). Children of this age are also attracted to the bright colors. The more colorful a child's right eye, the more attention the child will have.

Preschool children are characterized by a high degree of unstable attention. For example, if you give a child a new toy, he or she will be very interested in the toy. But at the same time, if you play another toy, you throw the first one and move on to the other. Initial attention in early childhood is physiologically related to the fact that they are still weak in braking processes. The braking process does not stop the widespread movement. That is why the attention of little children can be distracted. The fact that the attention of children in early childhood is very unstable is due to the very few experiences in life. Children tend to be distracted from one thing to another, as everything seems new. The child may be distracted by what seems to be the right thing for the child. For example, according to N.M. Menchinskaya, Sasha (1 year and 8 months) listens to the fairy tale "The Goat and its children". When the wolf comes knocking on the door, Sasha hits the wall, trying to see how the wolf is knocking, but sometimes she gets so addicted that she forgets the fairy tale completely. In early childhood period, the distribution of attention is very weak and narrow. Children of this age can focus only on what is clearly visible in their eyes. Speech plays an important role in the development of early childhood period attention. The fact that a child starts

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speaking in a language not only communicates with an adult but also gives them an opportunity to follow their instructions. As we mentioned earlier, young children like to look after adults and, when possible, get involved in their work. They are willing to handle adult requests and tasks, take care of simple self-service tasks, and look after their parents' household chores. All this requires a certain concentration and focus. This creates the basis for the development of voluntary attention in children. From early childhood period, children develop voluntary attention. However, voluntary attention prevails in kindergarten children. The day-to-day activities of the children of kindergarten and the variety of activities of the game gradually improve the attention of the volunteers. Observance of the rules of the community in the kindergarten, unconditional adherence to the rules of the game, the patience and diligence of adults, develops the kind of attention that is given to children of kindergarten. The role of play in the development of voluntary attention in children is very important. Because at various games, children come together and set specific goals for themselves. The rules of the games themselves can be determined by the rules themselves. To avoid deviating from the rules of the game, they are trying to adjust their actions to match the rules of the game and track the actions of their teammates. In these games, voluntary attention is actively involved, thus creating conditions for children to play. It is important to remember that voluntary focus is on the will, so children often do not have this type of attention independently. Initially, it is important to develop a particular type of attention by asking different questions and tasks. In preschool children, certain features of attention, such as the strength and stability of attention, begin to develop. We can see this from the fact that children (especially middle and senior group children) can sit on one job for a long time, play some games for hours and endure learning activities, is possible.

Methods and means of stabilizing the child's attention. Early childhood period development depends not only on the condition of the garden, but also on the family situation. That is why children's attention is poor and uneven. Some children are unable to regulate their behavior because of inadequate control of the family or because of excessive sexual behavior. Such children are unauthorized to touch everything, to stay quiet and not to listen when called to discipline. These children are so unstable that they cannot focus on anything. Failure to keep focus, or to focus on something for a period of time, can lead to disciplinary actions and interference with others. That is why educators need to develop an

individual attitude (such as a variety of responsible assignments, etc.) to teach such children the power of attention and stability. In kindergarten, children are more likely to have more attention than before. The size of the child's attention is still very narrow compared to those of older people. For example, while adult attention can currently accommodate 5-6 items (unrelated letters or numbers), the level of attention of kindergarten children is only 1-2 items (subgroups). In the middle group, there is 1 child and in the senior group, there are 2 children. Even though small groups try to focus on two things, they just can't. For example, if a 3-year-old boy is ordered to bring a cup of water, he will certainly spill it out. It is not because of his inadequacy, his vacuum, but because he cannot focus on two things at the same time. The child cannot be brought to the bowl without splashing and splashing water. Therefore, children should not be abused in such cases. Width is a feature related to accurate perception. This feature is especially important for children's reading activities. Therefore, in the kindergarten, it is important to take full advantage of this opportunity and to pay close attention to developing this feature. Tours, scenarios, interviews with pictures from all walks of life play a big role in this. Volunteer attention for school education is enhanced through didactic activities and story reading. Kindergarten children are often concentrated on their interests and feelings, focusing on something. This is why the distribution of attention of the child at this age is almost undeveloped. Children of pre-school age often have difficulty in remembering and remembering some things because of their fragile nature and the small size. For example, kindergarten children often hear the same story over and over. The reason for this phenomenon is that the amount of children's attention may not immediately capture the story's plot and characters. So they keep listening to stories and fairy tales over and over.

V. Conclusion

Thus, during early childhood or kindergarten, attention grows much faster. During this period, the main type of neglect is developing. However, the systematic increase in kindergarten-age activities and, in particular, didactic and occupational activities, can lead to voluntary attention span. It is well known that the schooling process cannot go one step without the attention of the volunteers. Therefore, a variety of compulsory activities in the kindergarten should aim to develop the basic characteristics of voluntary attention and attention in children. Further attention will be paid to school education.

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USING TECHNIQUES AND METHODS OF THE CLIL SYSTEM IN THE PROCESS OF TEACHING ENGLISH

Abstract: *the article deals with the role of the subject-language integrated teaching students of non-linguistic specialties of higher educational institutions. The main features of the work of the profile subject teachers and foreign languages teachers in the system of subject-language integrated teaching are considered. The prospects of its application in the sphere of higher professional education are also studied. There are given main peculiarities of using CLIL methodology in a higher educational institution.*

Key words: *methodology of language-based integrated learning, professional communication, integrated training, integration, professional competence, foreign language for non-linguistic specialties.*

Language: English

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Introduction

The processes of globalization, changes in all spheres of human activity are changing the requirements for higher professional education. The education system must meet the new requirements of society. As a rule, a teacher teaches only his subject, in isolation from all others. But this approach does not form the complex of knowledge that students must master for successful professional activities.

Therefore, new approaches to learning are needed. Scientists have confirmed the need to create fundamental pedagogical structures, the task of which will be to form a common culture of students, prepare for successful professional activities and develop a holistic worldview. The integrative approach, formed in the domestic and foreign methods, seems to be the most productive and effective in this regard. So, the structure of an integrative approach to teaching foreign languages will be considered here.

II. Literature review

Currently, the English language is of great importance in the system of intercultural communications of various peoples of the world - it is directly involved in the formation and development of

cultural, educational, political and socio-economic ties in the international arena. The role of the English language in the process of integration of educational and scientific organizations into the world community has been noticeably growing lately [1,117]. In this regard, there is a need to use modern forms and methods of teaching a foreign language, which provide the most effective implementation of the training program, including scientific researchers.

III. Analysis

Modern requirements of training a graduate of a higher educational institution - a future specialist - include not only a number of specific competencies, including: self-education, knowledge of innovative technologies, understanding the prospects and possibilities of their use, ability to make decisions independently, adaptability to new social and professional conditions, teamwork skills, ability to cope with stress, but also mastering one or more foreign languages in a high professional level [2, 182].

In most higher education institutions, according to the curriculum, intensive teaching of a foreign language (most often English) to students of non-linguistic specialties ends in the third year, but it is

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worth noting that, due to the lack of constant speech practice in the subsequent years of study, there is a gradual loss of communication skills. Therefore, there is a need to integrate a foreign language and professional disciplines throughout the entire period of study at the university, both for bachelors and masters.

Among teaching methods, including parallel teaching of both a foreign language and a specialized subject, we can distinguish the methodology of subject-language integrated learning (Content and Language Integrated Learning - CLIL), which can influence on the formation of the necessary competencies of technical, humanitarian and other students.

The term Content and Language Integrated Learning (CLIL) was introduced by the researcher in the field of multilingual education, David Marsh in the process of coordinating research on the state of language education in Europe in 1994 [4, 240]. This led to an all-European discussion, in which experts were representatives from Finland and the Netherlands. The issue of how to use the experience of advanced foreign language teaching, which was found in certain types of private schools, in the curriculum of public schools and colleges was discussed.

Now, after more than twenty years, the CLIL concept has become not only a way to gain access to additional languages, but also to introduce innovative practices in the curriculum integrally. CLIL as an approach is gradually being recognized in European countries. It seems that the trend in learning through the CLIL methodology will be more and more used in most European countries in the future [3, 6].

IV. Discussion

In 1994, the definition itself of subject-language integrated learning (CLIL) was also formed and approved: "Subject-language integrated learning or CLIL is a bidirectional competency-based approach to teaching, in which a foreign language is used to teach both the main subject and study the language itself" [3, p. 6].

Thus, CLIL integrates methods of teaching the subject and learning the foreign language itself. Using CLIL, students can study one or more subjects in a foreign language, often it is English. However, it is not assumed that students can initially speak a foreign language professionally before proceeding with the study of a specialized subject. They learn the language and specialized subject simultaneously.

Sophie Ioannou-Georgiou and Pavlos Pavlou confirm that among the features of the CLIL technique, the three main ones can be distinguished [3, 15]:

a) Learning a foreign language integrated into the content of the subject itself, such as science,

history, geography. Students learn a foreign language through the facilitated content of the subject.

b) CLIL has its origin in various socio-linguistic and political contexts and concerns any language, age and level of education: from preschool, elementary to higher, vocational training. In this sense, CLIL meets all European educational programs intended for all citizens, where it is believed that multilingualism and multiculturalism contribute to the integration, understanding and mobility among peoples.

c) CLIL is an approach that involves the development of social, cultural, cognitive, linguistic, academic and other learning skills, which in turn contribute to the achievement in the field of study of both the subject itself and the language.

Out of foreign languages English is widely used at universities and institutes of many countries. In this regard, a large number of researchers in the field of integrated learning of the subject and language (CLIL) distinguish this technique as a unique way of studying several subjects simultaneously.

Integrated teaching of a subject and language at a higher educational institution is a developing field of theoretical and practical research, and there is no single established concept of how a higher educational institution should implement such training. Each higher educational institution has its own specifics, depending on which it makes decisions about ways and methods of teaching students in a foreign language [5, 258].

The methodology of teaching the subject within the framework of CLIL does not imply the strict use of language material (differing from studying a foreign language), therefore, the teacher has the opportunity to select language tools that, from his point of view, are best able to implement the substantial part of classes [3, 12].

V. Conclusion

In conclusion, we can say that subject-language integrated learning (CLIL) is a relatively new teaching methodology that can be considered as a unique way of teaching content through foreign language, as well as teaching a foreign language through content. This technique is of great interest to teachers of foreign languages, as well as to a number of teachers who master a foreign language and teach their major subject at a high school. Thus, combining two directions, specialist teachers are able to teach not only their major subject in a foreign language, but also use important training aids of a language: teach grammar, vocabulary, etc., including elements of a communicative methodology of teaching a foreign language in their lesson. This helps to simplify and modernize the curriculum at higher educational institutions.

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FEATURES OF THE SKILL SET AND THE METHODS USED TO DEVELOP IT

Abstract: the article provides an overview of the various aspects of techniques and techniques used to develop listening and comprehension skills, as well as practical aspects of reading and writing skills.

Key words: communication, binder, application, iPad, poster; Requests: questions, memorization.

Language: English

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Introduction

One of the key skills involved in active communication in modern methodology is speaking. Each class is different, so think about some of the key words that your students need to know. These words are words that you encounter in everyday life, and make sure they are directly or indirectly identified. They may or may not know some of these words, so don't hesitate to call them and say a lot of words in the first week. Here are some tips to get started. Materials: desk, book, paper, pencil, notebook, binder, application, iPad, marker; Rules: Imperative grammar, judgment, should, must, can, render; People: students, teachers, classmates, principal; Classroom: clock, whiteboard, computer, calendar, poster; Requests: questions, need, water, feeling of illness; Honorable words: please thank you; Conversations and Scenes.

II.Literature review

A great way to introduce or repeat these words is to use them in conversations with pictures. It may take some time to create this or you can find the record already on the Internet. Practice different dialogs between two students, a teacher and a student, or the whole class. Practice the same conversation in each pair, then discuss the interviews as a whole group and answer any questions. Alternatively, different

conversations can be given to each pair first and then to the whole class. Make sure all students practice each of the dialogues. If your students have strong knowledge, give them scenarios rather than interviews. Make a written text or give a picture with two people and give them an interview. If you give each pair the same picture and the students present their dialogues for the class, hearing them, given the similarities and differences between the conversations, can lead to larger conversations about different speech.

III.Analysis

Spy: Another great room for low-income students to explore material in the classroom is the classic I-Spy game. If you want to test your language for more practice, rename the game to "I'm Seeing Something". Before you begin with the student level, you may want to consider some adjectives and descriptive words. If your students' knowledge is low to describe, change the game to Pictionary. A student goes out on a blackboard and you show them the word they want. The student draws a 9-word image on a blackboard and tries to find the words of other students. My corner in the classroom Describe the students: Divide the students into groups and place them in different parts of the room. Together, they should find and identify everything in their corners

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and then present all the objects in the classroom. They can use dictionaries if they want. Allow students to scroll around the room to allow them to visualize all the objects. Predicting their knowledge: If you do not have a clear idea of your students' level of knowledge, let them show you what they already know, so you don't have to repeat them. Divide your students into groups and let them describe the school using words they already know. Longest Listing Group - Winner! Alternatively, prepare multiple pictures of classroom words and groups should have as many characters as possible. Practice, practice, practice: Use words as often and as quickly as possible. Say, write, and put words in all the appropriate conditions. When the time comes, repeat the word with all students, not just you. Flawless Games: Another very important factor is to make students feel very comfortable using practical vocabulary. Use acting games to increase their familiarity and speed in dictionary memorization. One way to achieve this goal is to play hot potatoes. Pupils stand in a circle and shoot a small object around the circle. If the student accepts the object, he / she should speak within three seconds. If they stop or take more than three seconds, they have to leave the circle. To make it even more difficult, students must leave the circle, even if they repeat what other students have said. You can customize this activity to the level of your students, for example, by using words that start with a single letter or word.

In a traditional classroom practice, one person asks a question and another responds. The question and answer is structured and predictable and there is usually one correct, predetermined answer / 2; 32b./. The purpose of asking and answering is to demonstrate the ability to ask and answer the question. On the contrary, the purpose of real communication, the delivery of telephone messages, the information to perform a task such as receiving or commenting. In real communication, participants must manage uncertainty about what others are saying. Natural communication involves an information gap; each participant has the missing information. In addition, participants may be asked to clarify their meanings or to validate their own ideas to achieve their goals. In order to develop communication skills, teachers need to have a purpose and an information gap and have multiple forms of expression. It does not produce speakers, however. Teachers should integrate with communication activities that allow students to use the language more freely, and to improve accuracy and accuracy.

IV. Discussion

"Pedagogical skills" as a category has its own scientific basis. The scientific approaches of 1987-1997 led to the following conclusion regarding this extraordinary phenomenon: Pedagogical skill is understood as a bright manifestation of individuality in professional activity. The category of pedagogical

skills characterizes a person's individuality in terms of professional activity. The specifics of pedagogical skills in current research are grouped into the following categories: Pedagogical skills (A.S. Belkin, V.I. Zagvyazinsky, N.P. Lebednik, I.A. Zyazyun, T.F. Kuzina, N.V. Kukharev, S.B. Elkanov, A.K. Markova); Pedagogical creativity (V.V. Belich, V.I. Zagvyazinskiy, V.A. Kan-Kalik, N.D. Nikandrov, A.K. Markova, T.V. Frolova, T. Kaloshina, G.F. Poxmelkina, S.Y. Stepanov); Innovation (V.I. Zagvyazinskiy, A.K. Markova); Professional knowledge (I.A. Zyazyun, N.P. Lebednik, A.K. Markova); Method of work (A.K. Markova); Innovative activity (E.P. Morozov, P.I. Pidkasiy, N.V. Yusufbekova); Pedagogical technology (N.E. SHurkova, V.Y. Pityukov, E.A. Osipova); Mastery (N.V. Kuzmina, T.V. Frolova, T. YU. Kaloshina, G.F. Poxmelkina, S.Y. Stepanova). The use of different concepts to describe the same phenomenon in the work of different researchers has different meanings and content aspects. The lack of a single, recognized definition of pedagogical skill in the works of various authors leads to the conclusion that it is a living process of research. The variety of concepts and ideas testifies to the complexity and versatility of this phenomenon. In all definitions, emphasis is placed on the individual, thus reflecting the social nature of pedagogical skills. I.A. Zyazyun and N.A. Lebednik proved the interdependence of a person's social maturity and professional skills. The skill is gradually acquired by students depending on their level of social maturity. The components of social maturity are proportional to the components of pedagogical skills.

The components of a future educator's social maturity include:

- social self-determination;
- the expression of one's pedagogical abilities and beliefs;
- social activism
- improving the ability to work with people and educate others;
- social responsibility is the knowledge that becomes the knowledge of the teacher.

The components of pedagogical skills have been studied in the researches of N.V. Kuzmina, V.A. Slastenin, I.A. Zyazyun, V.I. Zagvyazinsky, G.I. Khozyainov, T.F. Kuzina, A.I. Myashenko, N.P. Lebednik, T. Neuner, Y. Babansky, N.V. Kukharev. They defined the main directions of pedagogical skills in a certain logical sequence.

The basics of pedagogical skills include:

- professional pedagogical knowledge;
- humanism;
- pedagogical techniques;
- experience in professional pedagogical activities;
- pedagogical personality.

Stages of skill development include:

- reproductive (elementary);

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- creative;
- creative-innovative.

Levels of pedagogical skills are a continuation of the teacher's level of work:

- reproductive (very low);
- flexible (low);
- local (limited);
- modeling (moderately satisfactory).

This level is characterized by high quality in some areas of educational work with students: consistent modeling (high). At this stage, high quality is achieved in all types of pedagogical activities; consistent modeling (higher). It shows a creative approach to all types of activities, looking for ways to increase the effectiveness of the educational process. The components of pedagogical competence reflect the qualitative perspectives required to perform professional duties. Researchers understand a qualification as the ability to perform a system of behaviors effectively in accordance with the purpose and conditions of its implementation. The following skill groups, which form the components of pedagogical skills, are distinguished: design; construction; organization; communication; cognition and reflectivity. In recent years, new views on the category of pedagogical skills have emerged. There was some deviation from the traditional interpretations of pedagogical skills (I.A. Zyazyun, N.V. Kuzmina, V.A. Slastenin). The St. Petersburg School of Pedagogical Researchers describes pedagogical skills as a special case of a person - that is, his / her profession is pedagogy, which in a broad sense is a specific area of work with people.

The basis of pedagogical skill is pedagogical knowledge. Pedagogical knowledge is an integral professional-personal description, defined by the ability and readiness to perform a pedagogical task in accordance with the norms, standards and requirements adopted in a particular historical period. Pedagogical knowledge implies the ability of a person skilled in the field of pedagogy to rationally use all the experience gained by mankind in the work of education and upbringing, which means that he must adequately master the appropriate methods and forms

of pedagogical activity and relationships. The main indicator of professional and pedagogical knowledge is the focus on the person. Professional pedagogical knowledge includes the ability to consistently understand the pedagogical reality and to act consistently in it. This quality allows to see the logic of the pedagogical process as a whole and in its entirety, to understand the laws and directions of development of the pedagogical system, to facilitate the construction of purposeful activities. Knowledge requires the mastery of modern pedagogical technologies related to three aspects that are very important for the teacher: interaction with people, cultural communication; be able to receive information in the field of science and process it in accordance with the content of teaching and use it in independent study; be able to share educational information with others.

V. Conclusion

Vocational and pedagogical knowledge has four main components characterized by:

- person-centered;
- consistent perception of pedagogical reality;
- science orientation;
- mastery of pedagogical technologies.

In today's world of education, there are three types of vocational education filled with component: knowledge, in general, is the activity of the world pedagogical culture. The ability to organize on the basis of experiences developed at the level of him and to be able to integrate into pedagogy in our country; interact with their peer experience and innovative experiences ability to communicate; be able to share their experiences and share them with others will be reflected in the qualification.

The professional knowledge of the educator is characterized by creativity. Creativity is a way of life, a multifaceted learning process and goals, content, new pedagogical at the level of technology is the desire and skill to create reality. Creativity is innovative for the teacher helps it adapt to the flow of change. A professional knowledgeable person of any level is capable of pedagogical reflection.

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PSYCHOLOGICAL CHARACTERISTICS OF CHILDREN'S ABILITIES

Abstract: when studying the psychological characteristics of abilities, we can distinguish between qualities that meet the requirements of not one, but several types of activities, and special qualities that meet the requirements of a narrow range of these activities. These common qualities can be very clearly expressed in the structure of some people's abilities. This shows that people have multifaceted abilities along with a common ability for a wide range of different activities, specializations and occupations.

Key words: special qualities, people's abilities, talents, types of activities, child's self-development, psychological characteristics, specializations, occupations.

Language: English

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Introduction

Talent is the level of development of any human ability, related to their development, but independent of them. This concept was first developed in the mid-nineteenth century by the English psychologist Francis Galton. Talent is usually divided into "artistic" and "practical". The early appearance of any ability in a child speaks volumes about his ability. B.M.Teplov described talent as "a qualitatively unique combination of abilities", which depends on more or less success in performing this or that activity. A charitable foundation does not succeed in any activity, it is only the ability to achieve it. In addition to a set of skills to do a job successfully, a person must have a certain amount of skills, knowledge, and abilities. It should also be noted that the ability can be specific (for one type of activity) and general (for different types of activity). Often they are combined with each other. For example, A.S.Pushkin wrote both poetry and prose, as well as perfectly described his works; Leonardo da Vinci was an artist, engineer, and well-known naturalist; Well-known scientist M.V.Lomonosov was engaged in poetry, as well as a good artist.

II.Literature review

The definition of the German psychologist W.Stern is the most common: "Benefit is the ability of a person to consciously focus their attention on new demands; it is the ability of the psyche to adapt to new tasks and living conditions." Despite the criticism of the English psychologist C.Spearman, who focused his objections on "adaptation," the definition given by W.Stern remains at the forefront of the modern interpretation of the problem of talent. For someone who is into math, just having a good memory and attention is not enough. People who have the ability to know math are distinguished by their ability to organize the elements needed for mathematical proof. The presence of intuition in this category is a key element of mathematical creativity. Musical abilities include: 1. technical (playing a given musical instrument or singing) 2. hearing (musical ear). Both groups are separate, that is, groups that are necessary for successful reading and are defined by the specific nature of the music. The natural discoveries of the organism alone do not clearly define human ability. They are an integral part of the system of conditions that determine the development of a person, his abilities. Perfection expresses the inner potential of an individual's development, not that of an organism. Charity is manifested only in connection with the conditions under which a particular human activity

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occurs. It expresses a person's internal knowledge and abilities, i.e., the internal psychological conditions of the activity in relation to the requirements this or that activity places.

III. Analysis

The acceptability of the level of requirements set during human activity is very important for the development of talent. For example, the requirements for the student in the curriculum. These requirements must be high enough to observe the dynamics. In addition, scientists highlight a particular ability. This is determined by the interrelationship of internal mental states with specific activity requirements. This ratio is not only abstract, but a real connection that determines the formation of ability. Specific abilities are determined by an individual's propensity for specific activities. Within certain specific abilities, a person's general ability is manifested, which is related to the general conditions of the leading forms of human activity.

Types of capacity. The systematization of types of talent is determined by the classification criteria. Quantitative aspects can be distinguished in capacity. Qualitative characteristics of ability refers to the specific characteristics of a person's mental ability and the characteristics that are manifested in certain types of activities. And quantitative - allows you to describe their level of weight.

Accordingly, scientists have identified the following types of abilities:

1. The intellectual type of talent. These types of teachers call students smart, fast. These students have in-depth knowledge and are able to acquire independently. These types of gifted children provide in-depth and accurate analysis of learning and supplementary materials. The intellectual type of talent can be divided into two main subtypes. In the first, general mental ability emerges and there is no specialization. In the latter, higher abilities are manifested in a single specific field of knowledge. Exactly this ability can be observed in modern geeks.

2. Academic type of talent. This species is characterized by high intelligence. This type of child reads very well. Later, true craftsmen are obtained from these students.

3. The artistic type of talent. This ability is felt in the high achievements of artistic activity: dance, music, sculpture, painting. The teacher, in turn, needs to realize these skills in a timely manner, as well as contribute to their development. Intellectual, artistic, and academic ability can identify a teacher without the help of a psychologist. There are such types of abilities to determine what a psychologist simply cannot do. These include: leadership (or social) ability, psychomotor ability, and creativity.

4. Creativity. The main feature of this type of ability is non-standard thinking. These types of skills are difficult to identify in school practice because

standard curricula do not allow gifted children to express their opinions.

5. Leadership (or social) talent. This talent is characterized by the ability to understand other people, to lead them. Leadership talent, according to scientists, means that a high level of intelligence and a sense of humor are no stranger to them. In life, we are faced with several options for leadership ability. These are emotional leaders (they consult, they love). There are action leaders (they can make decisions that are important to many people).

6. Sports (psychomotor) ability. Athletes are believed to have low mental abilities. But scientists have proven the opposite. Studies have shown that the intellectual abilities of famous athletes are very high. If school students who love sports create the appropriate motivation, they can learn perfectly. To help children develop and strengthen great abilities, it is important to know the classification of types of abilities.

TALENT. Talent is the inherent ability of birth that is manifested through the acquisition of ability and experience. The word "talent" comes from the weight of "talent". "Yangi Ahd" tells the story of three servants whose owners gave them a coin called a "talent". One buried his talent in the ground, another replaced him, and a third gained it. So, three phrases: buried, exchanged and multiplied, that is, developed talent. The word "talent" came from the Bible in a figurative sense: the gift of God, the ability to create something without neglecting it. Modern scientists distinguish certain types of talent that people have. The highest stage of skill development is called talent. Ability and talent are also an opportunity to achieve great success in high skill and creativity. Ultimately, creative achievements depend on the socio-historical conditions of human existence. If society feels the need for talented people, if conditions are prepared for their development, the emergence of such people will be possible. Awakening of talents is socially determined. Which talents are fully developed in the most favorable conditions depends on the needs of the time and the characteristics of the specific tasks facing the state. For example, it is possible to observe the birth of military skills during wars, and in peacetime - engineering, architecture.

Talent is a complex combination of human mental qualities that cannot be determined by any ability. Conversely, the absence or, more precisely, weak psychological research of any significant ability suggests that it may be offset by the rapid development of other abilities that are part of a complex ensemble of ability qualities. Genius is the highest level of development of abilities, which allows a person to achieve results that constitute a period in the development of society, science and culture. There is no such set of features that defines horror. People who express themselves as geniuses don't have to do it anywhere else. For example, a literary creation or

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the solution of complex mathematical problems may be a complete stranger to a genius composer. Classification of talents. It is common in psychology to distinguish eight types of talent:

- Oral linguistics. He is responsible for the writing and reading skills inherent in journalists, writers and lawyers.

- Digital. This type is common for mathematicians, programmers, that is, people who work with numbers every day.

- Audience. It depends on the musicians, the linguists.

- Spatial. This is typical for designers and painters, architects and fashion designers.

- Physical. This is unique to athletes and dancers because these people are easier to learn in practice.

- Personally, it is also called emotional. He is responsible for what a person says to himself.

- Interpersonal. People with this ability are largely connected to society throughout their careers. These are politicians, salespeople, actors.

- Environmental capability. This type of talent is often given to coaches and farmers.

This classification was proposed in the early 1980s by the famous American psychologist Howard Gardner. From the above, talent is a combination of abilities. That is, a solitary, isolated ability cannot be an analogue of a talent, even if it has reached a very high level of development and is pronounced. This is especially confirmed by examining people with phenomenal memory. At the same time, he is ready to see in memory, his strength and ability, the equality of many talents. The interdependence and difference of these events. Analyzing the problem of interdependence and differences between abilities, talents, we can conclude that the opinion on this topic is largely determined by the content included in these concepts. The great difficulty in defining the above concepts is related to the general understanding of these terms. If we turn to explanatory dictionaries, dictionaries of foreign words, we can see that the terms "talented" and "capable" are often used as synonyms and indicate the expressiveness of abilities. It should also be noted that the term "talented" defines a person's natural knowledge. Thus, in V. Dahl's explanatory dictionary, the word "capable" is defined as "all-inclusive or inclined, enthusiastic, comfortable, controversial, worthy, opportunistic." A talented person is one who is mentally gifted or advanced; He can do math, he can draw, he can understand." In fact, in this case, skill is understood as ability, but the concept of "skill" does not exist in the dictionary. The concept of "capable" is therefore defined by the success rate in the activity. In defining the concept of "talent" one must rely on its innate nature. That is, talent is an innate ability by God that ensures high success in human endeavors. In the dictionary of foreign words, talent is described as "an amazing natural ability ...". The benefit is that the state

of the talent is taken as its level of seriousness. It is no coincidence that talent does not exist as an independent concept in V.I.Dal, S.I.Ozhegov's explanatory dictionaries and in the explanatory dictionary of foreign words. As we look at the problem of identifying abilities, talents, as well as the interrelationships and differences between these phenomena, people today are increasingly faced with the question: "What are human abilities?" When reviewing the literature on each of these questions, one should try to find material that answers these questions correctly.

IV. Discussion

First of all, what are skills. When we consider the basic concepts of this phenomenon, the conditions for the formation of abilities, as well as their types, we can conclude from all the materials that such mental qualities are called abilities, through which a person acquires knowledge, skills and abilities relatively easily and successfully with any activity engaged. But there are many opinions and answers to this question, as there are scientists who have considered this problem. These are well-known psychologists and educators: Doctor of Psychological Sciences N. Leitez, Doctor of Pedagogical Sciences B.M. Teplov, A. Matyushkin and others. What is a talent. It was already easier to find a single text of the answer to this question. Benefit is a measure of a person's ability to genetically and experimentally adapt to life in advance. The answer to this question excites many scientists and ordinary people, so it will not be difficult to find an answer to it, but it is a difficult task to choose the most accurate definition of the true, correct meaning of this concept. Talent is an innate ability by God that ensures high success in any endeavor. In many cases, the terms "talented" and "capable" are used as synonyms and reflect the seriousness of the abilities.

Comparative method. Its full name is "Conscious Comparative Method". The founder of this method was A.V. Sherba, who adapted this method to the modern foreign language teaching process. The founder of the method was a corresponding member of the Academy of Pedagogical Sciences, Professor I.B.Rakhmonov, who successfully continued his work. The special principles of this method, such as comparing, working in the native language, teaching speech activities, were formed in the 40-50s and are widely used in practice. The practical, educational, and pedagogical goals of foreign language teaching were the first manifestations of this scientifically based method. From the 1960s until now, the comparative method has been modernized. In particular, comparisons are not a task for students in the classroom, but a matter for the methodist and the teacher to create a system of exercises. In the first form of the comparative method, the exercise is performed according to the rules. In the modern sense,

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the rule of practicality is generalized during the exercise. The student is not specifically involved in comparisons, memorization and narration of rules, or the acquisition of theoretical knowledge. Another way to express the term method is the methods used in the process of teaching a foreign language. They are three:

- 1) acquaintance
- 2) exercise
- 3) apply

V. Conclusion

From the above, we can conclude that ability, talent, differ on different grounds. When we talk about

ability, we emphasize a person's ability to do something, and when we talk about talent, we show that this person's quality (ability) is innate. However, both ability and talent are reflected in the success of the activity. The concepts of ability and talent are similar to each other because if a person has them, they are closely related to each other. This quality system is unique to successful, purposeful people. Thus, if an ability is an innate, genetic component of a person to display any ability; these talents have the same qualities, but with the difference that only one person has shown them throughout their lives.

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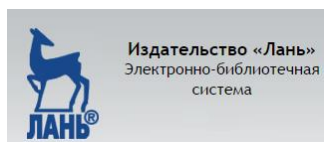
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