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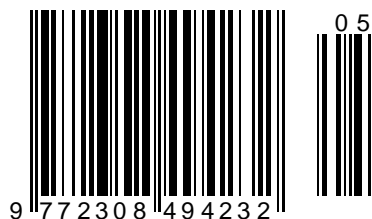# International Scientific Journal
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Annaguly Rejepovich Deryaev
Scientific Research Institute of Natural Gas of the State Concern „Turkmengas"
Doctor of Technical Sciences, Senior Researcher,
Corresponding Member of International Academy of
Theoretical and Applied Sciences,
Ashgabat, Turkmenistan
annagulyderyayew@gmail.com

OPENING OF FORMATIONS AT ABNORMALLY HIGH RESERVOIR PRESSURE, RULES FOR INSTALLATION AND OPERATION OF BLOWOUT EQUIPMENT AT DIRECTIONAL WELL № 707 WEST CHELEKEN FIELDS

Abstract: The article discusses the opening of formations at abnormally high reservoir pressure (AHRP), the rules for the installation and operation of blowout equipment for the production column of an inclined directional production and evaluation well for the purpose of successful drilling of well No. 707 at the Western Cheleken field in the coastal zones of the coastal waters of the Caspian Sea. For the design of the opening of reservoirs at the AHRP, the rules for the installation and operation of blowout equipment were carried out according to the "Instructions for testing wells for tightness", "Safety rules in the oil and gas industry", as well as calculations for tightness were carried out in accordance with the "Instructions for calculating casing strings for oil and gas wells" (RD 39 - 7/1 - 0001 - 89, Vnitneft) and "Instructions for testing wells for tightness".

This work on the design of the opening of reservoirs with AHRP, the rules of installation and operation of blowout equipment can be used in order to avoid complications, accidents, gas and oil occurrences and to perform tasks when drilling directional wells and in extremely difficult mining and geological conditions at abnormally high reservoir pressures.

Key words: repression, hydraulic fracturing, wellhead, drill string, blowout equipment, trap, torch, forged corner, coil, pressure testing, manifold.

Language: English

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Introduction

The creation of repression during the opening of productive formations allows you to maintain safe conditions for drilling a well from the point of view of preventing gas, oil and water shows. This method of opening layers is the main (traditional) in world and domestic practice. In order to avoid disrupting drilling technology and reducing the technical and economic indicators of drilling, the amount of repression is regulated by the "Safety Rules in the Oil and Gas Industry".

Formations with abnormally high reservoir pressure (AHRP) are characterized by an increased anomaly coefficient ($ka \geq 1.2$).

At the same time, as a rule, the higher the anomaly coefficient, the smaller the difference between reservoir pressure and hydraulic fracturing pressure or reservoir absorption pressure. The opening of such formations is carried out using drilling fluids of such density that the minimum necessary repression on the formation is provided (from 5 to 10%, depending on the depth) [1].

Usually in such cases, weighted and super heavy drilling fluids are used. When drilling formations with AHRP, formation fluid from the drilled rock can get into the drilling mud, due to diffusion, mass transfer. Therefore, it is important to monitor the density of the outgoing solution, the content of oil and gas. On the surface, the drilling mud should be well cleaned and degassed. To reduce the danger of oil and gas occurrences, the speed of lifting the drill string during descent and lifting operations (the effect of reciprocating) is limited, the viscosity of the drilling fluid is lowered, the time of finding the well without flushing is limited. In case it is necessary to replace the drilling fluid in the well, there should be a reserve of it in the amount equal to one and a half to two times the volume of the well [2, 3].

An essential condition for opening formations with AHRP is the possibility of sealing the wellhead in case of possible oil and gas occurrences. To do this, on the column from under which the productive layers are being opened, blowout equipment (BE) is mounted in advance according to the schemes approved by GOST 13862-90.

This equipment ensures the sealing of the wellhead both with the drill string lowered into the well and without it. It consists of 1 to 4 preventers of various types (spot, universal, rotating), a killing and throttling unit, diverting working and emergency switch-off lines. When drilling oil wells with a large gas factor and gas wells, the composition of the BE harness includes a trap installation and a torch for burning gas.

The most commonly used BE installation scheme for an oil well is shown in figure.

The most important rules for the installation of BE are as follows:

1. The top of the column on which the BE is mounted must be at least 30 cm above ground level (for the possibility of capturing the column when the open fountain is forcibly silenced).

2. A coil is installed above the upper preventer to install an additional preventer if necessary.

3. The flip-out lines should be directed in different directions. It is allowed to turn the killing line to 1800 with the use of forged corners.

4. The length of the ejection lines should be at least 30 m (and in case of possible blowing - at least 100 m). All lines must have a slope away from the wellhead (to free the lines from the liquid by gravity).

5. The main control panel of the preventer installations and manual control of the spot preventer is carried out at a distance of at least 10 m from the wellhead. An auxiliary control panel must be installed at the driller's workplace.

6. The preventer is pressed to a pressure exceeding not 20-50% of the maximum expected at the wellhead during oil and gas discharge.

The flipping lines of the preventer installations are also pressed at a pressure of 100 kgf / cm^2.

7. In winter, the preventer must be heated.
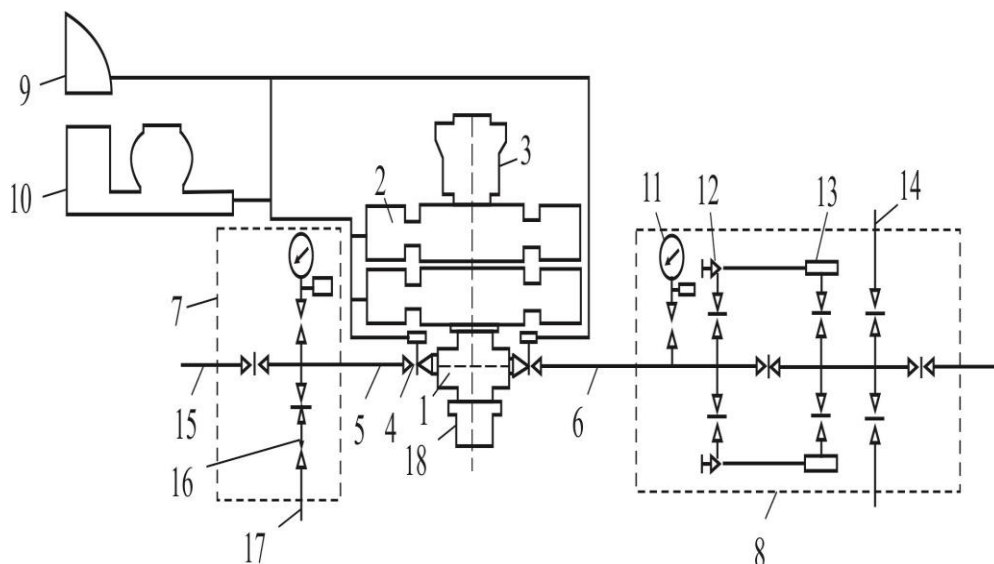
**Figure 1. Diagram of blowout equipment with 3–preventers 1-crosspiece;
2–spot preventers; 3-universal (rotating) preventer;
4–hydraulic valves; 5–killing line; 6–throttling line;
7- killing unit; 8–throttling unit; 9–auxiliary control panel;
10–main hydraulic control panel; 11–pressure gauge; 12–adjustable throttle;
13–flow dampener; 14–outlet to the separator; 15–discharge line; 16–check valve;
17–tap for connection of pumping units; 18–wellhead.**

When drilling in the intervals of formations with AHRP, a check valve is included in the drill string (under the lead pipe).

When the production column is lowered into the well, the dies in the die preventer must be replaced in accordance with the diameter of the casing pipes, or there must be a translator on the drilling rig to connect the casing pipes to the drill pipes for which the dies are installed in the preventer.

Blowout equipment is installed on the conductor and intermediate column, when drilling below which gas and oil occurrences are possible, as well as on the production column, when working in it with an open productive reservoir [4].

Casing strings are tied together with the help of a column head.

The working pressure of the preventer block and the manifold must be at least the pressure of the pressure column for tightness, calculated at each stage of drilling the well based on the condition of complete replacement of the drilling fluid with reservoir fluid and sealing the wellhead with open blowing.

Blowout equipment is not installed when the section being opened by the well has been studied and has no collectors or is represented by collectors saturated with water with a reservoir pressure not exceeding hydrostatic.

The choice of a preventer installation, manifolds (throttling and killing lines), a hydraulic control station, a throttling panel of a trap-flare installation is carried out depending on specific mining and geological conditions for performing the following technological operations:
- sealing of the wellhead with and without lowered drill pipes;
- leaching of fluid from the well according to the accepted technology;
- suspension of the drill pipe column on the dies of the lower preventer after its closure;
- cutting of the drill string;
- monitoring the condition of the well during its killing;
- pacing of the drill string to prevent its seizure;
- lowering or lifting of a part or the entire drill string with the wellhead hermetically closed.

When the well is opened by the studied section, represented by oil and water (with dissolved gas) formations, with a pressure not exceeding hydrostatic, after the descent of the conductor or intermediate column, the mouth should be equipped with two preventers, including one universal.

Three or four preventers, including one universal and one with cutting dies, are installed on the well when opening gas, oil and water horizons with abnormally high pressure, as well as in the presence of hydrogen sulfide with a volume content of up to 7% [5, 6].

The need to install a preventer with cutting dies at the expected excess pressure at the wellhead below 100 kgf / cm^2 is determined by the drilling company in coordination with the anti-spontaneous service and the bodies of the Main State Service "Turkmenstandardlary", based on the characteristics of the formation (porosity, permeability, fluid composition, flow rate, etc.).

The requirement for installing preventers with cutting dies enters into force after providing drilling organizations with them.

Four or five preventers, including one with cutting dies and one universal, are installed at the mouth in cases of:
- opening of formations with abnormally high reservoir pressure and a volume content of hydrogen sulfide of more than 6%, as well as with the presence of hydrogen sulfide up to 7% and excess pressure at the mouth exceeding 350 kgf / cm^2 (in the presence of hydrogen sulfide, a preventer in a sulfur-resistant design is installed);
- opening of strata at sea;
- using the technology of lowering and lifting pipes at excessive pressure at the sealed mouth.

The discharge lines to the flares from the killing and throttling units must be securely fixed on special supports and directed away from industrial and domestic structures with a slope from the wellhead.

The length of the lines should be:
- for oil wells with a gas factor of less than 200 m^3/m^3 - not less than 30 m;
-for oil wells with a gas factor of more than 200 m^3/m^3, as well as gas and exploration wells - at least 100 m.

The lines and the valves installed on them must have an internal diameter equal to the internal diameter of the crosspiece bends; after the block of valves, an increase in their diameter by no more than 30 mm is allowed.

The distance from the ends of the ejection manifold to all communications and structures not related to the drilling rig facilities should be at least 100 m for all categories of wells.

For wells constructed from a bulk base, stationary offshore platforms and restricted sites, the length of the lines from the killing and throttling units must be established by the contractor in agreement with the customer, the bodies of the Main State Service "Turkmenstandardlary" and the anti-spontaneous service.

At wells where the expected pressure at the wellhead exceeds 350 atm, a factory unit with three adjustable throttles is installed: two with remote and one with manual control.

In all other cases, at least 2 adjustable throttles with remote control are installed.

The installation of a high-pressure separator as part of the strapping of the manifold of blowout equipment is carried out depending on specific conditions and is decided by the management when

approving the strapping scheme and the installation of BE.

When opening layers with the presence of hydrogen sulfide more than 6% by volume, a trap-flare installation is included in the manifold line of the blowout equipment.

Pressure gauges installed on the throttling and killing units must have an upper limit of the measurement range 30% higher than the pressure of the joint crimping of the casing and the blowout equipment [7].

The scheme of installation and strapping of blowout equipment is developed by the drilling company and approved by a higher organization in coordination with the customer, the anti-spontaneous service and the bodies of the Main State Service "Turkmenstandardlary".

Blowout equipment must be assembled from factory-made components and parts of domestic or imported delivery.

In agreement with the anti-spontaneous service, it is allowed to use individual parts and assemblies manufactured at the production service bases of enterprises in accordance with approved specifications.

Manufactured components and parts must have passports.

To control the preventers and hydraulic valves, the main and auxiliary consoles are installed: the main one - at a distance of at least 10 m from the wellhead in a convenient and safe place; the auxiliary one - directly near the driller's console, which is included in the operational readiness mode when opening productive or gas-oil-producing formations.

The handlebars for manual fixation of the preventer dies are installed in an easily accessible place.

When opening reservoirs saturated with oil and gas, it is necessary to have two ball valves on the drilling rig. One is installed between the working pipe and its safety adapter, the second is a spare.

When opening gas formations with abnormally high pressure, hydrogen sulfide-containing formations and when drilling wells at sea, the drilling rig must be equipped with three cranes. One ball valve is installed between the working pipe and the swivel, the second - between the working pipe and the drill string, the third is a spare.

All ball valves must be in the open state.

In addition to ball valves, it is necessary to have two check valves on the drilling rig with a device for installing them in the open position, one of which is working, and the second is a backup.

The manual backup steering wheel of the preventer should be placed in a mobile metal booth or behind a shield with a canopy of boards with a thickness of at least 40 mm.

In front of the steering wheel in the booth or on the shield, the direction of rotation and the number of revolutions required to completely close the preventer at the last turn of the steering wheel must be indicated.

For drilling rigs of universal mounting capacity, it is allowed to place the hand controls of hydraulic preventer units on the outside of the longitudinal beam of the tower-winch unit.

The preventers, together with the crosspieces and root valves, are pressed with water to the working pressure specified in the passport before installation at the wellhead, and after repairs related to welding and turning of the housing, to the test pressure.

The preventer with cutting dies must be pressed on the stand for working pressure with the dies closed, and the operability of the preventer is checked by opening and closing the dies.

The results of the crimping are formalized by an act.

After the installation of the preventer unit or the descent of the next casing, including the countersunk, before drilling the cement cup, the preventer unit to the end valves of the high-pressure manifolds must be pressed with water or nitrogen to the pressure of the casing pressure.

The discharge lines after the end valves are pressed with water at a pressure of:

50 kgf / cm^2 - for blowout equipment designed for a pressure of 210 kgf / cm^2,

100 kgf/cm^2 - for blowout equipment designed for pressure above 210 kgf/cm^2.

After the installation and crimping of the preventer unit together with the casing, as well as the crimping of the cement ring, further drilling of the well can be continued only with the permission of a representative of the emergency service [8].

Preventers should be periodically checked for serviceability, closing and opening. The frequency of inspection is set by the drilling company.

When the pressure horizons are opened, the operability of the preventers for closing and opening should be carried out every time after the tool is lowered into the shoe of the column. The results of the check must be reflected in a special journal.

When replacing the parts of the preventer that have come out of standing or one of the components of the preventer assembly and changing the dies at the mouth, the preventer installation is subjected to additional crimping by the pressure value of the column test.

The dies of the preventers installed at the wellhead must correspond to the diameter of the drill pipes used.

Blind dies are installed in the lower preventer when there is no preventer with cutting dies in the assembly.

With a multi-sized tool on the bridge, it is necessary to have a special crimped drill pipe, painted red, with a translator and a ball valve in diameter and strength characteristics corresponding to the upper section of the drill string used.

Before the descent of the casing string in open formations with a possible gas-oil occurrence, the dies of one of the preventers must correspond to the diameter of the descending column. There should be a drill pipe with a translator and a ball valve (painted red) on the catwalk.

For unhindered access of maintenance personnel to the blowout equipment installed at the mouth, a solid flooring must be constructed under the drilling rig.

All schemes of blowout binding of the wellhead in the upper part should include a pressed flange coil and a detachable chute to facilitate work on the elimination of open fountains.

The blowout lines of the preventer should be straight, at least 30 m long, with the possibility of blowing the well with gas - at least 100 m, firmly fixed and directed away from the carriageways, power lines, boiler houses and other industrial and household structures.

Turns of the switch-off lines of the preventer strapping are allowed in exceptional cases and only with the use of massive forged corners with threads or tees with a buffer device, pre-pressed to the maximum pressure of the crimping of the preventer installation.

Laying of switch lines under the receiving bridge and overhead structures is prohibited.

After installation, inspection and testing of blowout equipment, drilling of the well can be continued with the permission of a representative of paramilitary units and detachments to prevent the occurrence and elimination of open gas and oil fountains.

The drilling foreman is obliged to personally check the operability of the installed preventers and valves at least once a week, and enter the result of the check in the log of checking the technical condition of the equipment. When passing formations with oil and gas occurrences, the serviceability of preventers and valves should be checked before each descent of drill pipes into the well and lifting of the tool from the well.

Drilling in intervals with possible oil and gas occurrences is allowed only with dies installed in the preventer corresponding to the diameter of drill pipes in the well.

When a well appears and a gas-oil fountain occurs, the management of the drilling enterprise, a higher organization, the bodies of the Main State Service "Turkmenstandardlary" and the anti-spontaneous service must be notified. Measures should be taken in accordance with the instructions for the prevention and elimination of oil and gas occurrences and the plan for the elimination of accidents

The preventer should be closed when the drill string is suspended on the talus system and only when the valves on its ejection are open.

The pressure at the blowout of the preventer, created during the sealing of the well, should be reduced gradually (3-4 kgf / cm^2 in 1 min); venting pressure at the gas outlet should be continued until the liquid appears at the mouth.

The preventer is pressed to a pressure exceeding not 20-50% of the maximum expected at the mouth during oil and gas discharge.

The ejection lines of the preventer units are also pressed at a pressure of 100 kgf/ cm^2. In winter, the preventers should be heated [9, 12].

When drilling in the intervals of formations with AHRP, a check valve is included in the drill string (under the lead pipe).

When the production column is lowered into the well, the dies in the die preventer must be replaced in accordance with the diameter of the casing pipes, or there must be a translator on the drilling rig to connect the casing pipes to the drill pipes for which the dies are installed in the preventer.

The wellhead equipment listed in Table 1 (Specification of wellhead equipment and BE) was selected at directional well No. 707 of the West Cheleken field.

The test of conductors and intermediate columns for tightness is carried out by crimping with filling them with water from the mouth to a depth of 20-25 m, and in the rest - with drilling mud, which was used to sell the plugging mixture. Before crimping, it is allowed to completely replace the entire selling liquid with water or a liquid of a lower density compared to the mixture used for selling during the cementing process.

The production column is tested for tightness by crimping with preliminary replacement of the drilling fluid with water. In wells, at the mouth of which there may not be excessive pressure, the production column must additionally be tested for tightness by lowering the water level.

In the process of testing the columns for tightness by crimping, the internal pressure created on the pipes must exceed by at least 10% the possible pressure arising from the elimination of oil and gas occurrences and open fountains, as well as during testing and operation of the well.

The conductor and intermediate columns, together with the blowout equipment installed on them, after drilling the cement cup and exiting from under the shoe by 1-3 m, are repeatedly pressed by pumping water into the bottom in a volume that ensures its rise by 10-20 m above the shoe.

After drilling the cement cups in the conductors, intermediate and secret columns and deepening the well 15-20 m below the shoe, it is necessary to test the open part to determine the possibility of hydraulic fracturing.

Table 1.

Casing string		Mark diagram of BE	Pressure leak test of wellhead equipment and BE in kgf/cm^2		Name and type of wellhead equipment and BE	Quantity	Working pressure kgf/cm^2
The order of descent of casing columns	Title		Before installation	Before the opening of the AHRP formation			
2	Conductor	1	140	140	OP1 – 350x350	1	350
3	Technical column	2	280	280	OP2 – 280x350	1	350
4	Operational column	-	305	305	AFC 6-80/65-350	1	350
			305	305	OKK2-350-140x245x340	1	350

Note: Casing leak test pressure may vary according to actual conditions

The pressure of pressure testing is determined by the need to ensure tightness under the shoe of the column when closing the wellhead during open blowing.

In gas, gas condensate and oil wells with a high gas factor (200 m^3/m^3 and above), as well as other wells with an excess pressure at the wellhead exceeding 100 kgf /cm^2, the wellhead part of the column together with the column head after crimping with water is compressed with inert gas (nitrogen) at the same pressure as when hydraulic testing.

The inter-column space at the wellhead is pressed with water at a pressure not exceeding the residual strength of the previous column.

Leakproofness testing works should be carried out according to the "Instructions for testing wells for tightness", "Safety rules in the oil and gas industry".

After installing the BE, drill 1-3 meters from the casing shoe to test the cement ring on water.

On the conductor Ø 339.7 mm – perform a test on a drilling mud of 1.47 g/cm^3 with an overpressure of 11 kgf /cm^2;

On an intermediate technical column Ø 244.5 mm – perform a test on a drilling mud of 1.74 g /cm^3 with an overpressure of 7 kgf/cm^2

In all cases, when tested in an open barrel, slowly bring it to the design pressure within 15-20 minutes.

The tightness of the wellhead and BE Ø 339.7 mm of the column conductor is carried out in an appropriate way with a packer or the installation of a cement bridge and is carried out by regulations. The leakproofness test must be carried out once a month [11].

The tightness of the mouth part and the BE Ø 244.5 mm of the intermediate technical column is carried out in an appropriate way with a packer or the installation of a cement bridge and is carried out by regulations. The leakproofness test must be carried out once a month. The leakproofness test must be carried out once a month every 200 m.

Before opening the productive layers, it is necessary to test the tightness of the wellhead and the BE of the casing string [10].

Table 2.

Name of casing strings	Name of the test object	Depth of the well test, m	Type of equipment used for testing		Maximum pressure generated during the test, kgf/cm^2	Duration of work, hour
			Type	Quantity		
Operational column	Drill string	2745	AC - 32	2	300	13,1
Conductor	OP1–350 x 350	800	AC - 32	2	140 on the water	1,53
	Conductor		AC 105/70	1	105 1,47 g/cm^3 on solution	1,53
Intermediate technical column	OP2–280 x 350	2119	AC - 32	2	280 on the water	1,53

	Intermediate technical column		AC 105/70	1	143-1,68 g/cm³ on solution	1,53
Operational column	AFK6-80/65 – 350	2764	AC -32	2	305 on the water	1,53
	OKK 2 - 350 - 140 x 245 x 340		AC 105/70	1	100-1,81 g/cm³ on solution	7,00
	Operational column		SD	1		
Testing of cement stone for tightness						
Conductor	Cement Ring	800	AC - 32	1	11-1,47 g/cm³ on solution	1,53
Intermediate technical column	Cement Ring	2119	AC - 32	1	7-1,74 g/cm³ on solution	1,53

The leakproofness testing work must be carried out according to the current safety rules, the guiding documents and with the guidance of responsible employees.

The test results are recorded and approved by acts in accordance with the established procedure.

Calculations were carried out in accordance with the "Instructions for the calculation of casing strings for oil and gas wells" (RD 39 - 7/1 - 0001 - 89) and "Instructions for testing wells for tightness".

The leakproofness test and the technique used to perform on the directional operational evaluation well No. 707 at the Western Cheleken field are indicated in Table 2.

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Annaguly Rejepovich Deryaev
Scientific Research Institute of Natural Gas of the State Concern „Turkmengas"
Doctor of Technical Sciences, Senior Researcher,
Corresponding Member of International Academy of
Theoretical and Applied Sciences,
Ashgabat, Turkmenistan
annagulyderyayew@gmail.com

ANALYSIS OF TYPES AND METHODS OF RESERVOIR TESTING DURING DRILLING

Abstract: the article discusses the types and methods of testing formations in the process of drilling a well in order to successfully drill a well without accidents, complications and accurately determine the characteristics of productive formations. Testing of formations during drilling makes it possible to determine the parameters of reservoir pressure and reservoir productivity in the future for accurate design of well construction during the development of a new field where prospecting and exploration work is carried out.

This analysis of the review by types and methods of testing formations during drilling in this article is carried out to accurately select them (type, method) for testing formations in an open bore during drilling. And also in order to avoid complications, accidents, gas, oil and water shows and to fulfill the tasks set to determine the characteristics of productive layers of wells in extremely difficult mining and geological conditions at abnormally high reservoir pressures.

Key words: inflow, testing, incision, fluid, collector, test, mode, sampling, tightness, topping up, fitting, packer, choke.

Language: English

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Introduction

Formation tests are understood as a complex of works that ensure the flow of liquid and gas from the formation, sampling of reservoir fluids and gas, identification of the gas and oil content of the formation, determination of the main hydrodynamic parameters of the formation. The test is carried out both during the drilling of the well, and after the end of drilling, descent and cementing of the production column.

Testing and testing of formations during drilling is carried out in the sequence of drilling of promising horizons (the "top-down" method) [1, 3].

Testing of formations after completion of well construction is carried out in a fixed (cased) hole in a bottom-up sequence, taking into account the results of testing in an open hole. Therefore, usually the number

of objects tested in the column is less than when tested during drilling.

The advantages of testing formations during drilling are that data on the hydrodynamic characteristics of the formation are obtained more objectively, because the bottom-hole zone of the formation is not yet intensively contaminated with drilling and cement mortars and it takes less time to conduct research than to test in a cased hole.

There is a distinction between testing and testing of productive layers.

Reservoir testing is usually limited to sampling reservoir fluids.

Testing of formations, in addition to sampling of reservoir fluid, provides for hydrodynamic studies [2, 4, 5].

The objectives of reservoir testing are:

1. Assessment of the productivity of the object (reservoir).

2. Sampling of reservoir fluids for research.

3. Assessment of reservoir properties of the reservoir.

4. Assessment of the degree of contamination of the bottom-hole formation zone (BFZ).

The essence of the formation test is as follows:

1. Isolation of the formation (or its section) from the rest of the well section.

2. Creating depression on the formation and causing the inflow of reservoir fluid.

3. Registration of changes in pressure and inflow of reservoir fluid in various sampling modes.

To assess the oil and gas potential of formations during drilling, testers are used, lowered into the well on a cable, or dumped inside the drill string.

Well surveys by pipe formation testers

Well studies by pipe formation testers (PFT) should be carried out immediately after the opening of the object in accordance with the well construction project and updated GTR (geological and technological research), GIS (geoinformation system) data justifying the need to perform PFT.

The GTR data are crucial for establishing the number and intervals of PFT studies.

The representative of the drilling company specified in the work plan is responsible for the execution of the work and the general manager. Responsible for compliance with the technical and technological requirements of the PFT well research process is a representative of the geophysical enterprise - the head of the batch, the well testing master.

The Customer is obliged to provide:

- preparation of the well, drilling tools, drilling and blowout equipment, the wellhead and its binding with the manifold of the preventer installation, drilling pumps, as well as the ability to monitor the inflow activity;

- the drilling team performs all work with the test equipment at the well (unloading, assembly, descent, testing, lifting, disassembly, loading);

- conducting, together with the contractor's representatives, an operational analysis of the results obtained.

The contractor is obliged to provide:

- selection of the testing technology of the object and the layout of the nodes PFT.;

- technical means for testing the well (test tool, instrumentation, wellhead with an emergency crane for strapping the upper rough, transport for the transportation of equipment;

- technical control and management of the PFT well research with the direct participation of the test master;

- assessment of the quality and operational analysis of the results of the PFT wells study, as well as the issuance of a preliminary conclusion on the object of the study at the well;

- processing of PFT data and issuing a final conclusion on the object within the time limits set by the contract.

The research technology should be selected taking into account geological and technical conditions, goals and objectives of the test. The standard technology provides for testing the object at the bottom of the well immediately after opening it by drilling with the insulation of the object from above with a packer or with a pressure drop on the packer of more than 300 ks/cm2 - with double packers with a shank support with a shoe on the bottom of the well. The tests are carried out without releasing the top-up liquid or reservoir fluid to the surface with the maximum possible depression in a two-cycle mode. The technology of testing the object in difficult geological conditions must be applied in complicated wells:

- if it is necessary to flush the well during the descent- lifting of the PFT;

- when testing an object with an increased risk of emergency gushing (highly productive gas and gas condensate reservoirs, reservoirs with abnormally high reservoir pressure (AHRP));

- when testing formations with a high content of hydrogen sulfide and layers of reduced stability, as well as when testing wells filled with drilling fluid with increased shear stress.

Selective tests should be carried out with an excessively large interval opened by drilling, a significant distance of the test interval from the bottom of the well, with repeated descent of the PFT for additional testing of the collector in the upper part, as well as in the presence of foreign metal at the bottom [6, 7].

The technology of testing with complete initial depression is used to study formations with a polluted near zone and objects opened with increased (more than 100 kgf/cm^2) repression. The technology is also applicable for wells with a pressure in the range of studies up to 50 kgf / cm^2.

The technology of testing an object with the release of reservoir fluid to the surface is used during the re-descent of the PFT to assess the industrial significance of a gas- or oil-saturated reservoir.

In general cases, a standard test technology should be used, while a non-standard one should be used only in case of complications in the well or in order to solve additional (special) tasks.

The PFT application must contain the information necessary to select the type of PFT, its layout, the size of the packer seal and determine the main characteristics of the testing technology of the object.

To conduct research of PFT wells, the customer, together with the contractor, draws up a plan that reflects:

- deposit (field) and well number;

- technical data of the well;
- characteristics of the test object;
- preparation of the well for testing;
- arrangement of the shank and the tester;
- description of the test process;
- conclusion on the readiness of the well for testing
- technology of testing;
- type and layout of the PFT;
- diameter of the downhole fitting;
- planned pressure drop on the packer;
- the height of the column and the density of the pre-topping liquid;
- type (scheme) of strapping of the mouth (upper pipe) and anti-blowout equipment;
-the permissible (safe) duration of the PFT stay at the face (if it is less than 90 minutes, a single-cycle test is provided);
- number of test cycles;
- the maximum permissible load on the hook when walking the tool with PFT.

The diameter of the packer seal should be determined depending on the condition of the wellbore by the packing coefficient K (K = D_{well} / D_{pack}). K = 1.08 1.10 under normal conditions.

In order to avoid oil and gas occurrence after removal of the packer at the planning stage or before the descent of the PFT, the back pressure on the reservoir should be calculated based on the conditions of complete replacement of the solution in the test interval with reservoir fluid [8, 9].

In the process of the latter, before the descent of the PFT (hollowing and descent and lifting operations), the serviceability and operability of the descent system-lifting, anti-blowout and hydraulic strapping, lighting, inflow degassing systems, well topping, the serviceability of installed equipment and tools, the presence of a regulated volume of solution and chemicals should be checked and ensured. It is necessary to check the compliance of the threaded connections and ensure the tightness of the drilling column.

The surface equipment of the well should provide direct to reverse circulation of drilling fluid with back pressure at the mouth (throttling) through the wellhead and a special manifold.

When testing a well with the output of reservoir fluid to the surface, it is necessary:
- calculate the drill pipe string for excessive internal and external pressures that may occur during the test;
- check the drill string for tightness;
- equip the drill string with a ball valve and a head, press them to the expected pressure;
- to tie the mouth with the manifold of the proventor installation and drilling pumps with metal pipes on hinged joints;
- to provide the possibility of direct and reverse injection of the solution into the well by drilling

pumps, to coordinate the scheme of tying the mouth with the anti-spontaneous service and the bodies of the Main State Service "Turkmenstandardlary";
- equip the wellhead to ensure vertical movement of the pipe column by 4-6 m together with the manifold.

It is allowed to study a well with a wellhead installed 4-5 m above the rotor. In this case, it is necessary to prepare means (a special platform, a ladder) for emergency closing of the emergency crane on the head before the start of the study.

Testing of a well by reservoir testers in an open hole and column without equipment of the wellhead with a preventer installation is prohibited.

It is forbidden to test wells with the withdrawal of reservoir fluid to the surface in the presence of hydrogen sulfide in it.

The following documentation must be prepared prior to the start of the drilling rig test:
- technical data sheets for the weight indicator, tow rope, drill pipes, blowout equipment and strapping;
- the act for the crimping of the anti-blowout equipment and the last casing string;
- plan for the elimination of possible accidents and fire;
- the act of readiness of the well and drilling equipment for the research of the PFT well;
- well exploration plan;
- the act of crimping the wellhead and drill string.

It is allowed to test the PFT well in the absence of a level at the mouth (with the absorption of drilling fluid), the presence of foreign objects at the bottom. Such tests should be carried out according to a special plan with the adoption of additional measures to ensure safety and trouble-free operation.

During the well testing, it is prohibited:
- the presence of persons at the well who are not related to the work performed;
- repair of drilling equipment;
- carrying out work using an open flame;
- turning on (stopping) the winch drive motors during the inflow and registration of pressure recovery curve (PRC);
- lifting the tool until the air or gas outlet from the pipes stops.

Well testing is prohibited in the following cases:
- malfunctions of drilling equipment and tools;
- absence of anti-blowout equipment or its malfunction;
- in the presence of inflow from the well of any intensity;
- the absence of a full-time shift or the use of students (trainees) as shift workers;
- absence of the responsible representative specified in the work plan;
- lack of documentation necessary for the work.

The test master, together with the responsible representative of the drilling company, must instruct

the watch before the start of the PFT (with its repetition for each newly starting watch).

When testing a gas-saturated or gas-condensate reservoir of high activity and the possibility of receiving an inflow with gas emissions, warning signs should be installed on roads located in the well area and posts should be set up at a distance of no closer than 250 m from the well.

It is necessary to monitor the radioactivity of the extracted fluid at wells (areas) where studies with the use of radioactive isotopes were previously carried out.

Testers lowered on a logging cable

When planning and carrying out work, as well as when interpreting the data obtained, it is necessary to take into account the features of this type of testers. These include:

1) accurate linking of the tested layers to logging diagrams;

2) high selectivity – testing is carried out on a very small section of the formation (spot testing) – and the possibility of studying closely located areas;

3) small time spent on the operation; even in deep wells, 2-4 hours are spent on one operation;

4) there is no need to specially prepare the well; testing can be carried out after intermediate logging by the same logging batch;

5) obtaining an inflow of oil and gas from a reservoir of different permeability due to high depression and a small volume of samples taken; even minor inflows of hydrocarbons can be sampled with instruments;

6) the possibility of oil and gas occurrences and open gushing is completely excluded.

The use of testers lowered on a cable contributes to increasing the reliability of interpretation of field and geophysical research data, the isolation of oil-bearing, gas-bearing and aquifers, the establishment of oil-water and gas-liquid contacts. The results of testing with devices on the cable allow us to evaluate the properties of the formation, to study its permeability.

The domestic industry has mastered the production of logging layer samplers of three types: OPK7-10; OPK4-5 and heat-resistant OPT7-10. The first two types of devices are similar in design and principle of operation and differ only in size. In the OPT7-10 device, a spool switch is used to control the operation of the hydraulic system instead of powder charges, which is actuated by an electromagnet.

The devices operate on a three-core, and when installing a special head on a single-core cable with standard ground equipment for field and geophysical work.

The design of the OPK device provides for the possibility, before creating a pressure drop, to make the channel a cumulative perforator placed in the tester. The object of testing is chosen based on the results of drilling, and this largely depends on the

experience of geologists. If oil and gas occurrences are noticed during drilling (gas logging, sludge, hydrocarbon outputs with drilling fluid), then, as a rule, intermediate logging is carried out to study the exposed zone. Interpretation of the logging results can be the basis for planning the formation testing. In this case, cavernometry is required to determine the interval where the device can be installed, since if it gets into the cavern, the sealing and clamping devices may not work, and the process will be unsuccessful.

To install the device, it is necessary to select a well section without cavities.

The less time has passed after the opening of the formation by drilling before the start of testing, the more reliable the result can be expected. The success of the process also depends on the magnitude of the reservoir pressure of the tested interval. The higher the reservoir pressure, the less time it takes to fill the cylinder. Usually the balloon is kept open for 5-20 minutes.

Without considering the complex of preparatory and final works when testing the formation with a device lowered on a cable, three stages can be distinguished that are directly related to the behavior of the formation during testing [10]:

1) occurrence and propagation of hydrodynamic disturbance in the formation;

2) reduction of pressure in a certain volume of the reservoir due to the movement of liquid and gas from the reservoir into the cylinder;

3) restoration of reservoir pressure in the testing area after the flow has stopped.

It is of interest to determine the distance that the sampling process may affect, or the drainage radius. The drainage radii for various formations were determined by the work performed by the reservoir testing laboratory of the Volga-Ural Branch of VNIIGEOPHYSICS.

It is estimated that for layers of greater capacity when using cylinders with a capacity of up to 10 liters, the drainage radius is 50 cm. The drainage radius is significantly affected by the porosity of the formation. When testing the interlayers, the drainage radius is larger. Due to the heterogeneity of the layers, it can be assumed that it can be 80-100 cm.

Practice shows that the cylinders are filled with reservoir fluids and gas, drilling mud filtrate, drilling mud. The ratios of their volumes are different. Depending on the volume of the reservoir fluid, the method of its use is chosen. So, if the volume of oil is more than 0.5 liters, a full oil analysis is carried out. For samples of a smaller volume, they are limited to measuring density, viscosity and luminescent studies. The method of determining the characteristics of reservoir water and gas depends on their volume and the availability of laboratories for research [11].

When using this tester, simultaneous sampling of the soil and the liquids saturating it is possible, and the sample is not polluted by gases formed from

explosives. The presence of two cylinders (upper and lower) allows you to take both contaminated and cleaner samples of reservoir fluid. The tester is lowered into the well on a cable cable using a winch of a self-propelled drilling station.

Testers dumped inside the drill string

The testers dumped inside the drill string are used in the rotary drilling method.

The sampler dumped inside the drill string allows you to cause an influx immediately after opening the productive reservoir and take a sample of the reservoir fluid. To do this, a special packing device is installed in the bottom-hole assembly (BHA) with a bit, which does not interfere with the circulation of drilling mud through the ring annular space during drilling. After the sampler is lowered into the packer device, channels open through which the drilling fluid is supplied under pressure under the packer element and causes its expansion up to full contact with the walls of the borehole and overlap of the annular gap. Thus, the bottom-hole zone of the well is isolated from the rest of the hole.

With an increase in pressure inside the drill string, the valve in the sampler opens. Due to the fact that the sampler is filled with air at atmospheric pressure, the pressure in the sub-packer zone decreases sharply, as a result of which the reservoir fluid penetrates into the well and enters the sampler. At the same time, the pressure recovery curve in the sampler is recorded by the recording pressure gauge. After the time allotted for testing the formation, the pressure in the drill string is reduced (reset), as a result of which the valve in the sampler closes and the packer gradually returns to its original position.

Investigation of wells by pipe formation testers.

The devices lowered into the well on a string of drill pipes are called pipe formation testers. They have become most widespread when testing formations during drilling (such as CII, MIG), because they make it possible not only to take samples of reservoir fluid, but also to conduct hydrodynamic studies.

In this case, the formation can be isolated from above, from above and from below, with support on the face or on the walls of the well.

The filter-shank of the reservoir tester is designed to support the bottom when creating a compressive load, placing devices and to delay the solid phase during the inflow of reservoir fluid. The length of the shank to prevent loss of stability during compression usually does not exceed 50 m.

The safe lock is designed to disconnect the drill string and the reservoir tester in case of possible seizure of the filter-shank due to collapses of the walls of the well at high depressions.

The reservoir tester includes an inlet (main), equalization valves and a hydraulic time relay, which allow testing of the reservoir in the inflow mode.

The shut-off and rotary valve can be of single or multi-cycle action, it allows stopping the flow of reservoir fluid into the drill string and exploring the formation in the pressure recovery mode [12, 13].

The circulation valve is designed to restore fluid circulation during the lifting of the drill string and the washing out of it of the selected reservoir fluid.

The technology of reservoir testing using the layout of the MIG multi-cycle tester is as follows.

After assembling the layout, it descends into the face on a string of drill pipes. Since the inlet valve of the reservoir tester and the circulation valve are closed during descent, there is no self-filling of the column, this forces the column to be topped up with water or drilling mud from above to a depth that is calculated based on the necessary depression on the formation during the test.

The packer in the transport position has a diameter of 0.8-0.9 of the diameter of the well, which under certain conditions can cause high pressure pulses on the walls of the well (the effect of reciprocating) and hydraulic fracturing of weak formations. To reduce this phenomenon, the design of the formation tester provides that the openings of the equalization valve are open at the descent and lifting operations. This allows a portion of the liquid to flow from the sub-container space through the equalization valve.

After reaching the bottom, a compressive load is created on the layout, sufficient to open the packer. When the rubber element is pressed against the walls of the well, the tested formation (object) is isolated from the overlying section of the well.

Simultaneously with the packing, when creating a compressive load, a hydraulic time relay is activated, which opens the intake valve of the formation -tester after 3-5 minutes. The delay in opening the intake valve is necessary to prevent it from opening when the tool is lowered in the case of layout landings on ledges and cavities in the well.

When the inlet valve of the formation -tester is opened, the message of the sub-packer zone (zone of the test object) with the cavity of the drill string occurs. This leads to a sharp drop in pressure in the sub-packer zone to the pressure of the liquid column in the drill pipes, a depression is created on the formation, which is a necessary condition for the inflow of reservoir fluid.

If the pressure in the bottomhole zone has decreased and has become lower than the reservoir pressure, then the bottom - hole formation zone is cleaned and the reservoir fluid enters through the filter and the inlet valve into the drill string. The first open inflow period begins. The liquid level in the column increases, the pressure on the bottom increases, which is recorded by the depth gauges installed in the lower part of the layout.

The duration of the first open period is 3-5 minutes. After this time, the shut-off and rotary valve is closed by rotating the drill string by 10 revolutions. The flow of liquid (gas) into the drill string stops. The

first closed reservoir testing period begins. During this period, there is a rapid recovery of pressure in the sub-packer zone up to the reservoir. The duration of the first closed period is 10 – 40 minutes.

Then the drill string is rotated again for 10 revolutions, the shut-off and rotary valve opens, the second open period of the inflow of reservoir fluid into the drill string begins. The pressure of the liquid column in it is growing, the flow curve is recorded on the diagrams of the depth gauges.

The duration of the second open period is from 15 minutes to 1 hour or more. The presence of an inflow can be judged by the volume and rate of air escape from the drill string. It is usually not allowed to release reservoir fluid to the surface during the formation test, but the wellhead binding should provide for such a possibility.

At the end of the second open inflow period, the shut-off and rotary valve is closed, rotating the column for the next 10 revolutions. The second closed test period begins, during which there is a rapid increase in pressure in the sub-packer zone, the final pressure recovery curve is removed.

However, this recovery is slower, because the reservoir is drained to a greater depth and not always at the end of this period the pressure in the sub-packer zone reaches the reservoir.

The total time spent by the formation tester layout at the bottom should not exceed the permissible time of leaving the column without movement in the well, which is determined in advance.

After completion of the formation testing process, a tensile load is created on the layout. At the same time, an equalizing valve opens first, which communicates the sub-packer zone with the annulus cavity above the packer, pressure equalization occurs in these zones, i.e. the pressure of the drilling fluid column in the well with the necessary repression begins to act on the formation again, the formation is crushed.

With the further creation of the tensile load, the packer comes to the transport position, and the extraction of the drill string with the layout of the formation tester to the surface begins. If difficulties are felt when releasing the packer, then first they work with a hydraulic jar, if this does not help to release the layout, they disconnect from the seized part in a secure lock. When the drill string is lifted with the shut-off and rotary valve and circulation valve closed, the liquid in the column together with the selected reservoir fluid moves to the mouth. After the liquid level in the drill string of the surface is reached, the pressure inside the drill string increases with the help of drilling pumps or central unit (CU), and the circulation valve opens. Backwash is performed by washing out the selected fluid from the drill string with sampling. Further lifting of the drill string takes place with an open circulation valve.

Qualitative analysis of depth gauge diagrams

The layout of the test equipment lowered into the well on a string of drill pipes (CII, MIG) includes from 2 to 5 depth gauges. The greatest information is carried by the diagram of the pressure gauge installed in the filter area.

According to the results of the interpretation of the diagrams of the depth gauges, it is calculated:
- productivity coefficient:

$$k_{pr} = \frac{Q_{av.}}{P_{res.} - P_{end.p.}}$$

- blockage coefficient:

$$k_3 = k / k_{eq.},$$

- skin effect:

$$S_к = (k_p - 1)\ln\frac{R_{c.}}{R_{w.}},$$

The following designations are used in the above formulas:

P_{res} - reservoir pressure;

$P_{end\,p.}$ - pressure in the well at the end of the open period, inflow;

$Q_{av.}$ - average flow rate (inflow) of fluid in the open period;

k is the permeability of an uncontaminated reservoir (reservoir);

$k_{eq.}$ is the equivalent permeability of the reservoir within the limits of the supply circuit (polluted and uncontaminated zone);

R_c- radius of the power circuit;

R_w is the radius of the well

Testing of formations using an ejector formation tester

The technology of reservoir testing using an ejector multifunctional formation tester (EMFT) is as follows.

A layout is lowered into the well on the tubing string, including:
- funnel (expander) – installed no closer than 20 meters from the roof of the formation under study;
- packer – installed depending on the tasks to be solved at a distance of 50-100 meters from the roof of the object under study;
- ejector pump – installed on two pipes (15-20 meters) above the packer;

After packing, the fountain fittings are installed and its binding is made with a pumping unit, separator, measuring tank in accordance with the scheme.

The check valve is installed in the discharge line at high reservoir pressures.

The number and type of pumping units are determined depending on the geological characteristics of the formation and the tasks to be solved.

A filter must be installed in the injection line of the working fluid in order to avoid clogging of the nozzle of the jet pump.

After installing the packer in the tubing column, a pressure gauge is lowered on the logging cable. A sealing unit is movably installed above the pressure gauge on the cable. The pressure gauge is installed in the reservoir interval, and the sealing unit sits in the EMFT body, separating the discharge and suction channels of the jet pump. Autonomous devices can be lowered on a wire.

When pumping a working fluid (process water, oil or salt solution) through the EMFT, a vacuum is created on the nozzle section, as a result of which the liquid is sucked out of the sub-packer space, respectively, the pressure under the packer decreases. The magnitude of the depression depends on the speed of passage of the working fluid through the nozzle and is regulated by the pressure of the pumping unit. As a rule, CU –320 or 4AN – 700 units are used for work. Pressure reduction under the packer to the design value occurs in 0.5 – 3 minutes, depending on the volume of the sub-packer space.

After the downhole pressure is reduced to a value below the reservoir pressure, the reservoir fluid flows, which is mixed with the upward flow of the working fluid and comes to the surface. In the wellhead strapping, the outgoing mixture is sent to the separator, where the gas is separated, and the degassed solution enters the measuring tank.

The sealing unit does not prevent the movement of the pressure gauge in the interval of the sub-packer space. In the event that there is no need to descend the remote device, it is possible to work with a depression insert discharged into the tubing cavity. To extract the depression insert, a catcher with a jar lowered on a cable or wire is used. An autonomous pressure gauge can be attached to the bottom of the depression insert.

After stopping the operation of the ejector pump (stopping the pumping of the process fluid), the check valve on the suction line closes and the reduced pressure created by the jet pump remains in the sub-container space. After that, the pressure recovery process begins in the sub-packer space due to the energy of the formation. The pressure gauge records the pressure recovery curve.

After restoring the pumping of the process fluid through the jet pump, the pressure in the suction line decreases, the check valve opens and the inflow from the reservoir is called again. Thus, testing of the reservoir using the EMFT complex can be carried out in a monocycle mode.

During the entire test cycle of the formation using pipe formation testers CII or MIG, various loads act on the drill pipe string – stretching and compressing, crushing, bending, both static and dynamic. The calculation of the drill string and the shank is carried out for the maximum loads arising during the formation test.

The drill string is calculated for tension during unpacking with rotation, for crumpling at its maximum emptying and for excessive internal pressure if the discharge line from the drill pipe column is closed during the inflow period.

The verification calculation of the drill string consists in determining the correspondence of the actual loads and stresses with the permissible ones [14].

The most dangerous section when walking the column during unpacking is the top of the column.

In Turkmenistan, during the construction of oil and gas wells, mainly during exploration drilling, formation testing is carried out using pipe testers of the CII type or core sampling is carried out with subsequent analysis of the selected rock in special laboratories. This gives a detailed study of the characteristics of the formations, in order to successfully conduct subsequent wells when drilling in difficult mining and geological conditions at abnormally high reservoir pressure.

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Clarivate Analytics indexed

A.T. Yermuratova
Taraz Regional University named after M.Kh. Dulati
Republic of Kazakhstan, Taraz

S.M. Ussenova
Taraz Regional University named after M.Kh. Dulati
Master of Psychology

A. Musaeva
Taraz Regional University named after M.Kh. Dulati
Master of Psychology

WAYS TO SHAPE THE COGNITIVE ENGAGEMENT OF MUSIC EDUCATION STUDENTS

Abstract: This article analyses interactive teaching methods that have an effective impact on the formation of cognitive activity of music education students. The paper substantiates the idea that in the process of training specialists with music education the principle of holistic and harmonious intellectual-emotional, emotional-volitional and effective-practical formation of personality in the process of learning musical literacy should be taken into account. To identify the results of learning, upbringing, spiritual development of music education students article offers four groups of tasks aimed at: "students' awareness of the musical picture of the world", to identify the motivational, emotional and emotional needs sphere of the students, "awareness of spiritual and moral qualities". The experimental work allowed us to come to reasonable conclusions that interactive teaching methods used in the learning process contribute to the creative understanding of music and the formation of cognitive activity of music education students.

Key words: interactive methods, music, motivational, emotional need sphere, musical worldview, logical thinking, creative thinking, cognitive activity.

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Introduction

The radical changes in the socio-economic, political, spiritual and moral spheres of society in recent years have placed new demands on a person's personal qualities and values. In the current context of implementation of the strategic goals and tasks of socio-economic development of the Republic of Kazakhstan, increasingly strengthening its state independence, growth of international prestige, strengthening of integration processes into the world economy and culture, education of a multicultural personality is the most important component of the development of Kazakh society.

The education of a creative personality also directly affects the socially important aspect of shaping the culture of professional activity of a specialist. The social progress of our society largely depends on the level of creative potential of the individual specialist. Therefore, it becomes crucial to amass all the valuable experience accumulated in the field of music education to introduce into the teaching process methods that lead to the improvement of students' learning and upbringing.

The requirements for the personality of the future music teacher and the functions he or she has to fulfil in the process of professional activity are

currently changing.The modern school needs a teacher who is capable of carrying out creative activities, who has an innovative style, a desire for self-realisation, which in itself is not possible without intensifying the cognitive activity of music students.

Main part.

In our opinion, during the preparation of the future music teacher it is necessary to put the following purposes: formation in the future teachers of music a world outlook orientation in knowledge of "the musical and semantic picture of the world", cognitive abilities to analyze, compare, generalize and estimate musical phenomena; education of spiritual and moral feelings, expansion of "field" of aesthetic emotions, "borders" of the spiritual world of the forming personality of students. At this stage too, the principle of holistic and harmonious intellectual-emotional, emotional-volitional and active-practical formation of personality in the process of training and education implied the simultaneous development of all essential forces and potentialities of students, taking into account an individual and differentiated approach. At this stage, we applied a subgroup of teaching methods according to the logic of thinking: inductive teaching methods (the logic of revealing the content of the studied material from the particular to the general) and deductive teaching methods (the logic of revealing the content of the studied topic from the general to the particular) combined with a subgroup of teaching methods according to the degree of independence and activity of cognitive activity of students - reproductive and problem-searching teaching methods.

It is important for the teacher's system of work to stimulate the cognitive activity of students in learning to bear in mind that there are three levels of thinking activity: the level of understanding, the level of logical thinking and the level of creative thinking.

The system of cognitive stimulation should include, first and foremost, a system of techniques to guide the students' thinking activity as they perceive the material presented by the teacher. It is also important to have a clear idea of which teaching techniques ensure the deepest understanding and contribute to the comprehensive development of learners' thinking. Obviously, the choice of explanatory techniques is determined by the developmental level of the learners and the nature of the material being presented.

The next stage is logical thinking. At this level of cognitive activity, students should be able to independently analyse the objects being studied, compare their properties, compare the results of individual experiments, draw generalised conclusions, make classifications, prove, explain, etc. The teacher, therefore, when organising the students' thinking activity at this level, should select tasks that involve the performance of one or a combination of the above-mentioned mental activities. The more independent actions the students have to take when completing the task, the more difficult it is.

Creative thinking. According to modern thinking, the process of scientific creativity takes place in three stages.

Stage I is characterised by the emergence (in the course of cognition or practical activity) of a problematic situation, an initial analysis of it and the formulation of the problem.

Stage II of the creative process is about finding a way to solve a problem.This search is done through a detailed analysis of the problem based on existing knowledge. If necessary, knowledge of the object of study can be supplemented by studying the relevant literature or by carrying out the necessary experimental studies.

Stage III of creative cognition - a contradiction is found (or guessed), a principle for solving the problem is found and tested. At this stage, the solution principle is realised in the form of individual creative outputs: solving a new problem, justifications and developing theories, etc.

The considered structure of creative activity allows us to highlight the essential features of creative thinking. Creative thinking is characterised not only by the development of logical thinking, the vastness of knowledge, but also by flexibility, critical thinking, rapid updating of the necessary knowledge, the ability to make intuitive judgements and to solve problems under conditions of complete determinism.

In the learning process, it is advisable to classify as creative all those tasks for which the principle is not specified and often not explicitly known to the learners.

It should be formulated by them themselves, in the course of analysing the task, on the basis of their existing knowledge and experience in solving non-standard tasks.

The three conditions for thinking activity can form the basis of the teacher's system of work to stimulate students' cognitive activity.

The starting point for this work should be to ensure that learners have a thorough understanding of the learning material presented by the teacher or in a book (Level I). It is only through systematic work that ensures students' deep understanding of the material that various techniques and tasks can be applied that require students to independently solve the cognitive tasks of the lesson at levels II and III (i.e. on the basis of logical or creative thinking). Our work can only be successful if we make adequate and rich use of interactive teaching methods. According to K.B. Kholikov, "In higher education institutions, interactive forms and methods of teaching should occupy between 40 and 60 per cent of classes".[1,57]

By working with a first year student on the spiritual and moral problems of the 'musical and semantic picture of the world' by comparing eras,

styles and identifying their 'essential attributes', we taught the student to grasp the lessons of spirituality in a personal, active way rather than by the verbal example of the teacher. The pedagogical prerequisite for us was a trusting, participatory resolution of issues and problems without the teacher's dominant authority or the desire to impose his or her creative solution on the student.It should also be emphasised that music has a powerful educational impact. As Rakhimov R.N. pointed out, "Making music with others helps build a culture of tolerance and acceptance".[2, 57].

We developed the capacity for inner observation, introspection, by entering into a dialogue with the teacher: "How did you find this?", "What do you hear in this music - what mood does it evoke in you?" etc.

The meaning of aesthetic emotions lies in an artistic awareness of the ordinary, a profound reflection on life. The need to enrich one's personality with such emotions is satisfied by music.

Aesthetics and psychology, stating the relationship between feelings and needs, define the leading role of aesthetic feelings in the formation of needs. It is known that classical music - the works of Johann Sebastian Bach, Wolfgang Amadeus Mozart, Franz Beethoven, Franz Chopin, Pyotr Tchaikovsky and others - has a psychological and lasting emotional impact on the human soul. Listening to several purposefully selected pieces of classical music with a pronounced "homogeneous" emotional state, helped the students to anchor this emotion in the emotional memory of the "soul". As Saidi S. observed. "Music, perhaps more than any other art, can affect and create mood".[3, 217]

Through examples of the lives and works of great composers, students learned that experiencing negative emotions is just as necessary because, in the words of the great pianist Vladimir Sofronitsky, "Without grief, there would be no such vivid sense of happiness". The students were beginning to realise that the happiness of an artist-composer or an artist-is composed not only of the joys but also of the torments of creation.

Studying a piece of music, students and I tried to understand what "semantic" unit it represents both in the composer's work and what "specific weight" and semantic load it carries in the "musically semantic picture of the world", because when a student performs, for example, a Beethoven sonata, one can feel whether he knows only this one sonata or knows all 32 Beethoven sonatas", so "quantity transforms into quality". Therefore, along with the thematic principle of studying music by identifying similarities in musical phenomena, we used the historical principle of studying heritage by era (Renaissance, Enlightenment, etc.) and movement (classicism, romanticism, symbolism, realism). This principle contributed to an understanding of the historical regularities of the spiritual development of mankind. Such excursions "into the depths of centuries" developed the inner spiritual world of students - subtlety of emotional states, aesthetic emotions, moral thoughts and feelings.

Thus, the study of the "genealogical tree" of the "musical and semantic picture of the world" helped the students not only to feel the "unique flavour" of the composer's music, to generalise about the vital and semantic priorities of his era, but also to link these "milestones, knots" into a coherent view of a single planetary civilisation. For example, the music of the "titans of thought" - Johann Sebastian Bach and George Handel was perceived by the students as a "majestic monument of musical architecture" of the Baroque style; Mozart - as the "sun" of reason, beauty, eternal harmony of the "classicism" era; the unique spiritual world of the great romanticists - Schubert, Liszt, Chopin... revealed not only the spiritual loneliness of the genius, but the spiritual connection of the times. In reflecting on the "milestones" of the "musical sense picture of the world", the students and I were struck by the idea of how genius feels about genius. Each is unique, each is a pinnacle in its own right, and such a 'union' in the overall 'musical and semantic picture of the world': how everything in the world is interconnected and continues each other.

Understanding deep ideas, thoughts and feelings also required an effort of will on the part of the students. Through the great examples of Mozart, Tchaikovsky and Scriabin, the students realised that "art is a burden on the shoulders" and that inspiration is born only from work and in the course of work. Thus, together with the students, we generalised that music not only "codifies" the atmosphere, spirit and events of a particular historical era and humanity, but also influences the spiritual world of posterity.

In this way, we have set ourselves the task of creating an attitude of self-education, broadening the scope of knowledge and organising forms of work that require students to independently seek knowledge and stimulate interest. This is the kind of creative competition-game "Who knows more, who knows little known and unusual facts about the biographies of composers, performers, amazing facts of history". We agree with A.K. Asimov, who states that "the development of creative abilities is realised through thought activity ... and the development of these abilities should begin at an early age".[4, 27].

The analysis of the research results convincingly showed that the problem-research approach in teaching encouraged students to search for new options for creative solutions of music interpretation, awakening cognitive activity, thinking processes, brightness of worldview, imagination, which consolidated the knowledge - awareness of the "musical and semantic picture of the world".

We traced students' mental development, ways of thinking formed by learning and cognitive activity, development of their motivational, emotional and need-based sphere - we proceeded from the target,

content aspects and didactic means of lessons: how the object and subject of learning and cognitive activity of students are reflected in the content of lessons, what ways of organizing students' activity, what methods are used to develop cognitive activity of personality, what psychological impact the lesson had on the students. The systematic organization of logical and emotional "components" into coherent, artistic images of the work created the conditions for the perception of the moods, feelings, experiences and thoughts of the author.

Emotional storytelling by the teacher, recreating the composer as a musician and a human being, can arouse emotions and arouse a desire to learn more about the composer and his music.

Such a verbal method as storytelling, conversation - reflection should be supported by an indispensable teaching tool - visualization - the teacher's own performance on the instrument, in which everything - facial expressions, finger and hand movements reveal the meaning of music.

In this case, the activation of cognitive activity is not determined by the method of conversation itself, but by the nature of the questions asked. The conversation activates cognitive activity if the questions are designed for the students' thinking, their analytical-synthetic activity, if they are aimed at reaching an inductive or deductive conclusion. Call it a heuristic because it leads learners to new knowledge.

When introducing new material inductively, the teacher poses questions so that the students can independently identify the common features of the observed objects and come to a generalisation during the analysis. In the deductive inference of new knowledge or the theoretical explanation of an experimentally established fact, the teacher, having outlined the essential features of the model in question, involves the students in a mental experiment and asks them to predict the changes that will be observed during the experiment. The development of students' thinking during a heuristic discussion depends on the teacher's skill at asking questions.

In testing the experimental work, we tried to base the learning process on meaningful questions, conversations and reflections between the teacher and the student at the musical instrument, which facilitated the development of attitudes, judgments and beliefs. This method of teaching is, in our view, akin to the "sharpening" of beliefs, the comprehension of wisdom in nature talks by the philosophers of antiquity.

The student's exposure to different 'points of view' and the teacher's own position, offered to the student not as dogma but as a convincing opinion and defence of their positions, honed the student's 'polyphonic' view of music performance.

Therefore, such experimental creative games as "I am a composer-Kyushi", "I am a modern performer", etc., aimed at revealing the essence of a musical work, composing a comparative series of

musical and historical eras, styles, served as a means of theoretical thinking, creative attitude to the acquired knowledge, development of image-emotional "field" of aesthetic emotions.Flexible forms of individualisation and differentiation allowed for the development of active and independent learners through ways of learning.Observation of each student helped to record their cognitive selectivity and mental development.

Thus, we conducted an experiment in order to identify a pattern of more active spiritual comprehension and deeper understanding of classical musical works.

Verification of the experimental work confirmed our assumption that active and interactive creative teaching methods, aimed at knowledge of musical art, contributed to the education of aesthetic taste, spiritual and moral feelings and personal qualities of students, the development of such cognitive mental processes as attention, imagination, memory, creative thinking, general musical development of students.

To summarise the results of the experimental work, we conducted four groups of learning tasks to identify the results of the students' learning, nurturing spiritual development and spiritual-value orientations. The first group of tasks included a questionnaire on knowledge - awareness of the "musical and semantic picture of the world" by era, direction, style and genre of music. The second group of tasks was aimed at identifying the motivational, emotional and demanding sphere of the learners, the "world of feelings and emotions". The third group of tasks identified the students' active attitude to learning and their level of cognitive activity.The fourth group of assignments was aimed at awareness of the spiritual and moral qualities of musical images and the creative understanding of music (compositions, essays, illustrations, musical competitions, quizzes, concert discussions). This group of tasks took into account learners' self-actualisation and their interaction with the educational sphere. These four groups of tasks were aimed at identifying all four components of students' cognitive activity that we had identified and determining the pedagogical results of the experimental work. The assessment criteria were the depth, content, originality of thinking, qualitative composition of the accumulated emotional, aesthetic and spiritual-ethical "thesaurus" of the students' personality, its self-reflexivity and self-actualisation. The students were also presented with questions of personality and outlook: what is a personality, can a person be a personality without striving to help another person, can a person be kind but not a personality, can a person be good-looking but not beautiful?

The creative assignments involved knowledge - the pupil's awareness of the musical composition in the context of a historical era, its relationship to other

art forms, not only of that era, but also in the context of philosophical generalisations.

As a result, data characterising the degree of manifestation of the components of cognitive activity of music education students were obtained.

The results of the experimental work have led to the following conclusions.

A comparative analysis of the quality of musical and aesthetic knowledge, musical and technological cognitive abilities and skills and the general level of learning, education and development of students conducted in the control and experimental groups revealed that the index of "creative" attitude to lessons in the experimental group was higher than in the control group.

The students in the control group had selective knowledge - awareness of the "musical and semantic picture of the world", its emotional and active, creative comprehension.

Although students in both groups participated in collective forms of music-making and competitions, the implementation of spiritual and moral development using more traditional, reproductive methods, the study of highly specialized musical concepts, work on the play apparatus and the lack of psychological and pedagogical work on the holistic perception of the "musical and semantic world picture", gave lower results of professional development of students in the control group. At the same time, as a result of targeted work using innovative technologies, the students in the experimental group showed progressive dynamics of personal professional development.

The results of our experimental work should be seen not only in its external manifestations: knowledge, skills, abilities of the students, but more in the professional results of music education and training - the development of emotional world, views, judgments, validity of assessments and beliefs, the desire for active knowledge of the world through music.

Conclusion.

Thus, the experience of introducing the results of the study into practice shows the effectiveness of the developed model for enhancing the cognitive activity of music education students.

1. the experimental work confirmed our assumption that music training and education, built on the principle of a systematic approach to the formation of cognitive activity of music students by mastering knowledge - awareness of the "musical and semantic picture of the world", the development of cognitive, motivational, emotional and volitional sphere, creative abilities and positive spiritual and moral qualities of students contribute to a better and more productive solution of this problem.

2. Professional-competent pedagogical interaction of teachers with students, expressed in the ability to find and reveal the gift of the student, systemic, personal-activity, individual-differentiated and problem-research approaches, as well as creative methods of active and developing, nurturing learning, were the optimal, leading conditions for the development of essential forces, sphere of behavioural reactions, spiritual growth of students' personality.

3. A considerable amount and quality of the systematic musical knowledge, skills and abilities acquired gives the students an awareness of the "musical and semantic picture of the world". The experiment proved that specially organised classes, the content and methods of which are built on the basis of content generalisation, knowledge from the general to the specific and from the specific to the general, the use of active and interactive teaching methods can significantly affect the formation of cognitive activity of students in all components.

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V.V. Lunyova
Institute of Fine Art, Academy of Sciences of the Republic of Uzbekistan
Doctor in Art History, Chief Researcher
Tashkent

O. Yu. Aripjanov
Institute of fine Art Studies of the Academy of Sciences of the Republic of Uzbekistan
Doctor of Philosophy (PhD) in Art History, Senior researcher
Tashkent

THE ROLE OF IRON IN THE CULTURE AND ART OF CENTRAL ASIA (ANTIQUITY, EARLY MIDDLE AGES)

Abstract: The article deals with archaeological finds made of iron. Labor tools (axes, knives, nails, daggers, arrowheads, spears, keys, scissors), warrior armor (armor, helmets) objects of arts and crafts (rings, rings, bracelets).
Key words: Iron, axe, dagger, ring, bracelet, decoration, armor, scissors, helmet.
Language: Russian

РОЛЬ ЖЕЛЕЗА В КУЛЬТУРЕ И ИСКУССТВЕ ЦЕНТРАЛЬНОЙ АЗИИ (ДРЕВНОСТЬ, РАННЕЕ СРЕДНЕВЕКОВЬЕ)

Аннотация: В статье рассматриваются археологические находки, изготовленные из железа. Орудия труда (топоры, ножи, гвозди, кинжалы, наконечники стрел, копья, ключи, ножницы), доспехи воина (панцири, шлемы) предметы декоративно-прикладного искусства (кольца, перстни, браслеты).
Ключевые слова: Железо, топор, кинжал, перстень, браслет, декор, панцирь, ножницы, шлем.

Введение

В Постановление Президента республики Узбекистан Ш.М. Мирзиёева «О дальнейшем совершенствовании системы поддержки развития культуры искусства» говориться, что очень важно в целях дальнейшего совершенствования деятельности Фонда развития культуры и искусства, укрепления связей с зарубежными государствами и организациями в сфере культуры и искусства [17].

Наша статья в определенной мере служит реализации задач, поставленных в Указах и постановлениях Кабинета Министров Республики Узбекистан от 21 апреля 2021 года

№ ПП-4688 «О мерах по дальнейшему повышению эффективности изобразительного и прикладного искусства» [16].

В данной связи хотим отметить взаимное сотрудничество Узбекистана с Францией. Это экспонирование двух выставок в Париже (ноябрь 2022 г.) организованными фондом развития культуры и искусства при кабинете министров в музее Лувра и Институтом арабского мира. На выставках представлены многие предметы исламского периода (Коран VIII века) и артефакты из археологических раскопок Узбекистана. Это керамика, ювелирные украшения, скульптура, предметы художественного ремесла. Среди последних

привлекает внимание железный доспех средневекового воина, не имеющего аналогов нигде о котором будем повествовать позже. Железные изделия в Средней Азии, в частности, в Узбекистане известны с давних времен. Следуя заветам Президента для достижения данной цели, мы хотим познакомить с ценными железными артефактами некоторых регионов Средней Азии, найденных в археологических раскопках античности и средневековья (Кампыртепа, Орлат, Шахрухия, Лявандак, Мутхона, Айртам, Тепаи-шах, Кой-Крылган-кала, Старый Термез, Согд и др.). Южной Бактрии (Тиллятепа), и Казахстана (Курган Иссык, Курган «Тенлик»).

«Родиной железа», по словам древнегреческого драматурга (525) – 456 до н.э. Эсхила, автора трагедии «Прикованный Прометей», стало древнее государство Урарту, существовавшее на современной территории Армении. В середине второго тысячелетия до нашей эры железо еще ценилось выше золота и даже считалось денежным эквивалентом…» [15, с. 140].

В Узбекистане по письменным источниках железо добывалось в Фергане и восточнее Самарканда (X в.), но вроде как ферганцы не могли обрабатывать железную руду, их научили китайцы [14, с. 16]. Исследователи отмечают следы обработки производства железа в древнем Термезе. Но основные материалы дали раскопки квартала металлистов этого городища и относятся к эпохе развитого средневековья. Металлобрабатывающие мастерские известны в Согде (Афрасиаб и Пенджикент) [19, с. 6].

Первое железо было метеоритным под названием «кантимурташ» (камень кровяного железа). Из него изготавливали предметы путем скалывания. Для изготовления изделий из железа мастера применяли молотки, проволоку, зубила, тесла, теши, лопаты, шилья, отместки, долото, ножи, ножницы.

В древности среднеазиатское население такой металл как железо применяли в лечебных целях. Его клали в кувшин с водой на некоторое время, а далее давали пить при многих заболеваниях. А наконечник стрелы, изготовленный их кантимурташа, считался оберегом и «приносил счастье владельцу» [14, с. 7].

В Абу Али Ибн Сина в разделе Лечение труднозаживающих язв и хойрад есть описание как он пишет *Хорошое лекарство*… «Берут медных опилок и железных опилок, замешивают на квасцовой воде, обмазывают красной глиной и сжигают в хлебной печи, а потом вынимают, растирают и употребляют в виде присыпки или приготовляют из этого пластырь с окисью свинца…» [1, с. 343]. А в упоминаниях краски

для волос есть другой любопытный рецепт под названием *Описание хорошой краски* «Берут хны – часть васмы – две части, жжёной меди, квасцов, андаранийской соли, поджаренных галлов и железной окалины – одинаковые количества, растирают с уксусом и оставляют стоять, пока [состав] не забродит, и потом употребляют…» [1, с. 528] и таких примеров множество.

Возможность расширить ассортимент изготовления изделий из железа дала его плавка на огне [14, с. 8]. «Процесс изготовления сыродутного процесса сложный. Нужно было нагревать железо многократно до высоких температур с последующими энергичными проковками и при этом умело пользоваться сварочными флюсами, которые разжижали, шлаки пропитавшие губку» [19, с. 54]. На монументальной живописи Пенджикента изображена сцена работы мастеров в кузнице (рис. 1).

В группу металлопроизводства кушанской Бактрии входят различные изделия. Для исследования химическим анализом из Кампыртепа взяли восемь предметов из железа. Фрагмент кольца, ключ, фрагмент ножа, накладка с заклепками и пластина. Найдены моток проволоки, пружинные ножницы и долото. Выяснилось, «учитывая уровень чистоты металла и отсутствия включений углерода и кремния, можно предположить, что это железо получено сыродутным способом. Более уверенно реконструировать технологию получения металла можно по шлакам. Кроме того, его находка практически указывает на то, что на этом месте занимались выплавкой железа из руды» [20, с. 25-26]. «Возможно, в юэчжийско-кушанский период (I в. до н.э. – I в. н.э.) на поселении осуществлялся полный цикл работ с железом – от его выплавки из руды до производства готовой продукции, так как именно к этому времени относятся прямые свидетельства местного металлопроизводства – шлак и сопло. Это не единственные находки такого рода на Кампыртепа – в районе пристани были обнаружены также крица, фрагменты шлаков и инструменты для измельчения руды или глины, которые безусловно, служат дополнительным доказательством гипотезы о существовании собственного металлопроизводства» [20, с. 29].

По преданиям «…Боевой шлем из железа как знак величия и достоинства носил и Александр Македонский, выделяясь среди своих солдат, имевших бронзовые доспехи…» [15, с. 140]. В крепости Узундара найдены железные нащёчники этого времени (рис. 2а, 2б) [7, с. 108-113].

Головной убор в виде стреловидной шапки иссыкского знатного воина был украшен деталями из золота и железа. Вот какое есть описание деревьев на головном уборе. «Каждое состоит из железного стержня (ствол), обтянутого листовым золотом, прикрученных к стержню в два яруса золотых проволок с концами, свернутыми в кольцо (ветви). На верхние концы стержней посажены птицы» (рис. 3; рис. 4-реконструкция головного убора) [2, с. 90, 91].

Изделия из железа не только декорировали золотом, но и инкрустировали камнями самоцветами. В захоронении знатного воина Тиллятепа (Южная Бактрия) найден железный нож украшенный золотыми обоймочками и вставками бирюзы и лазурита, а также кинжал и ножны украшенные золотом (Рис. 5) [21, с. 59, илл. цвет. С. 32]. Кинжалы и мечи из железа инкрустированные золотом найдены в Кургане Иссык, жезловидный предмет с обкладкой из листового золота известен из находок в Семиречье (рис. 6-9) [2, табл. 22, 24, 41].

Пожалуй, нет ни одного музея Средней Азии, где нет в экспозиции изделий изготовленных из железа. Так древние светильники, из железа и ножницы относящиеся к эпохе железа украшают витрины ташкентского геологического музея. Полное название которого звучит так «Государственный комитет Республики Узбекистан по геологии и минералогическим ресурсам (Госкомгеология). Вообще ножницы с пружиной появились в Средней Азии (Туп-хона) в I в. до н.э. – I в. н.э. [11, с. 22].

Большую группу составляют железные ножи. Их можно увидеть в экспозициях музеев Ташкента [10; 8]. Разнообразием отличаются железные ножи хранящиеся в музеях Ферганы. Б.А. Литвинский даже произвёл классификацию таких изделий [11, с. 10-25]. Самые миниатюрные ножи были длиной от 75 мм до 130 мм, средние от 145–157, крупные 165–180; 250–270. Они были с деревянными ножнами с железной обоймой реже в кожаных ножнах. Ножи подвешивались на железных крючках кожаными шнурками.

Кинжалы из железа в основном найдены двулезвенные. На одних сохранились фрагменты ножен с бронзовым декором (Лявандак. Бух. Область. I-II вв. н.э.). На других сохранились остатки дерева от ножен (Айртамский могильник, погребение 1. I в. н.э.) [8, №19]. В Орлатском могильнике найден кинжал с нефритовой рукояткой (Орлатский могильник. Курган 2. I-III вв. н.э.) [8, № 251].

Интерес вызывают такие изделия как мечи. Они обнаружены в согдийских курганах Кую-мазарского и Кызылтепинского могильников,

мечи найдены и в Орлатском могильнике (Согд). «Слева от погребенного лежал двухлезвенный меч, линзовидного сечения. Длина его боевой части – 70 см, прямоугольной рукоятки – 14 см» [18, с. 127]. В Бактрии в курганах Тулхарского и Айртамского могильника.

Бируни описывает процесс изготовления мечей «железо для них было из нармахана, он посыпал его каким-то лекарственным средством в виде мелкого порошка красноватого цвета; затем он клал железо в горн, заставляя его смаиваться (с этим порошком) в огне и после некоторого времени вынимал и молотком долго бил по нему, и повторял он посыпку и обработку несколько раз…» [5, с. 240].

В единственном экземпляре в захоронении Тиллятепа обнаружено железное складное креслице, очень похожее на современное по конструкции. «Креслице состояло из двух гнутых одинаковой формы половинок, обтянутых сверху кожей и скрепленных втулкой – шарниром. Это было явно походное кресло, которое владелец возил с собой в дальние военные походы» [21, с. 67].

Однако найденные изделия, как правило очень сильно проржавели. Так почему же делийская колонна простоявшаяся многие века не ржавеет. Считают, что дело все в технологическом процессе. «Чудо – потому что весящую шесть тысяч килограммов колонну индийские кузнецы отковали из отдельных криц, пользуясь лишь ручными молотками (что почти доказано)… сталь сравнительно чистая, то есть содержит сравнительно мало шлаковых включений; содержание углевода, хотя и колеблется, но невысоко… да и колонна покрыта защитным слоем жира» [4, с. 196-197].

Вернемся к доспеху воина, состоящего из железа найденного в Шахрухии, ташкентской области. Датируется XIV – XV вв. Вес доспеха 70 кг. (рис. 10) [8, № 333; 24; 24]. Это панцирь, кожаная рубаха и шлем. Панцирь состоял стальных пластин. При изучении такого редкого экспоната научно-исследовательском институтом химии и ядерной физики выяснилось, что доспех «состоял из кованного железа, полученного из углеродистой стали (булат) путем кузнечной сварки стальных полос с различным содержанием углерода» [6]. «Чтобы изготовить один панцирь, нужно было выковать сотни пластин, пробить в них отверстия и смонтировать. Изготовление одного панциря и по количеству материала и по трудоемкости можно приравнять к изготовлению сотен ножей [19, с. 65].

Панцирные пластины найдены не только в средневековых, но и в более ранних археологических памятниках. Так на юге Узбекистана археологи нашли в крепосте

Узундара воинские доспехи такие как выше упомянутые панцирные пластины и два железных нащечника от шлемов псевдоаттического типа [7, с. 113].

Железные поясные пряжки найдены в Орлатском могильнике (Согд). Округлые и кольцевые, с крючком для застегивания и с продолговатым язычком. Такие пряжки обнаружены в могильниках Лявандакском, Тулхарском, Аруктауском, Бабашовском, Кенкольских курганах [18, с. 145].

Как отмечалось выше железные изделия такие как кинжалы и мечи, кольца, перстни декорировали орнаментами, вставками из золота, бронзы, кости, накладными бляшками, минералами.

Приведем пример, так «У левого бока, упираясь золотым навершием рукоятки в предплечье, лежит длинный железный меч в деревянных ножнах. У правого бедра на кожаной портупее, украшенной золотыми фигурными бляшками, подвешен железный кинжал, золотые ножны которого, бесспорно являются шедевром мирового эллинистического искусства. Они отлиты в горельефной технике и по краю украшены растительным орнаментом в виде вьющихся побегов, инкрустированных мелкими бирюзовыми вставками…» [21, с. 80].

Рассмотрим такие предметы как найденные кольца и перстни. Познакомимся с некоторыми экземплярами. Один железный перстень, инкрустированный зеленовато-голубым украшением сделан «из пластинки которая с задней стороны переходит в проволоку, расширяющийся впереди, с небольшим уступом, переходящим в площадку…». [12, с. 156]. Перстни известны с круглыми и овальными щитками, изготовленными из бронзы в которые заключали разноцветный глазок. Средние размеры диаметра 21-22 мм, а инкрустации 5 мм. Железный перстень и бирюзой найден на Кампыртепа [13, рис. 5/11]. Кольца без орнамента и вставок из минералов, возможно, носили новобрачные в эпоху железа, когда такой металл было наравне с золотом. «Известно, что в древнем Риме, где железо стало главным металлом оружия и орудия труда, именно железное обручальное кольцо служило знаком неразрывного союза…» [9, с. 59].

Браслеты железные из Кампыртепа. Железный браслет. Диаметр – 68 мм, сечение – 3 мм. Несомкнутый, изготовлен из проволоки круглого сечения, с зауженными концами. [13, рис. 5/1,8]. Другой железный витой браслет. Размеры – 58х62 мм, сечение – 5 мм. Аналогичные витые браслеты из золота с изображением змеи найдены в Бактрии, в Амударьинском кладе III в. до н.э. [23, с. 18].

Известны железные прямоугольные бляшки, покрытые золотой фольгой. Иногда и пряжки покрывали такой же золотой фольгой [18, с. 229].

В период средневековья железные изделия наверно менее ценились у представителей власти по сравнению с золотыми. Вот пример изделия из железа покрытые золотом упоминает А.Навои в своем произведении «Бахрам в Золотом дворце». Где один мастер по прозвищу Зед-Захлаб-ювелир сказал шаху, что он изготовит ему из его золота (который храниться в его казне) идолов. На самом же деле он их делал из железа

«И до утра в пещере мастерил:
Он из железа идолов творил,
Их легкой позолотой покрывал,
Друзей своей работой поражал.
От монастырского не отличим,
Был каждый идол с виду золотым!
И, довершая сходства, ювелир
Венчал камнями каждый свой кумир:
Но то не камни рдели так светло,
То было разноцветное стекло!» [3, с. 132].

В заключение отметим, что изделий из железа в Средней Азии большой ассортимент. Они пользовались большим успехом. Железо крайне необходимо в жизни общества и изготовлении различных предметах. Например, в украшениях Кампыртепа (Северная Бактрия) специфическая особенность такая, что в составе металла прослеживается постоянная трехпроцентная примесь железа (этого нет в других археологических находках Северной Бактрии ни в Дальверзинтепа, ни в Ялангтуштепа, ни в Айртаме). Отметим, что большой знаток минералов Николаев С.В. пишет «92 процента всего металла, используемого ныне человеком, состоит из железа и его сплавов» [15, с. 140]. Вот что по этому поводу пишут:

«В ювелирном магазине по витрине скачет взор –
Аметист, Сапфир, Цитроны, Гематит, Гелиодар!
Если в камнях драгоценных всё железо отобрать
То они лишатся цвета, их никто не станет брать [22].

Мастера по изготовлению изделий из железа использовали различные материалы: золото, минералы, дерево, кожу, ткань. Очень удачно сочетали в каждом предмете все эти материалы. Приемы изготовления также свидетельствуют о применении всевозможных техник в их изготовлении: литья, штамповки, гравировки, плавки. Применяли зооморфные, фантастические, мифические, эллинистические

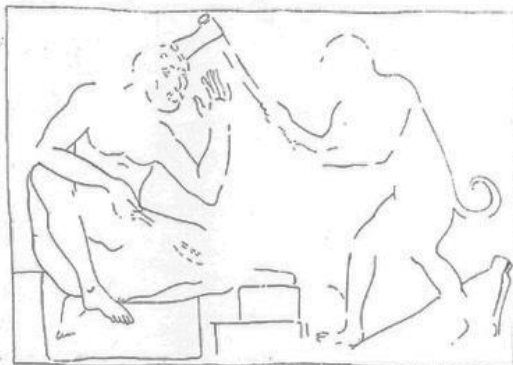мотивы, которые так характерны для Центральной Азии.

Рис. 1. Сцена работы мастеров кузницы

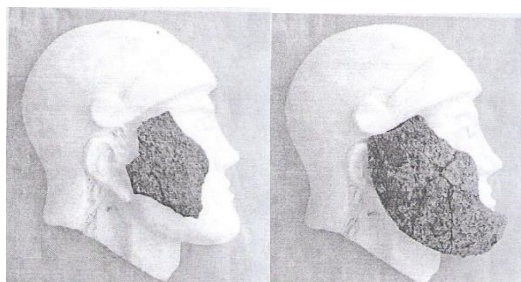**Рис. 2а; 2б. Нащечники**

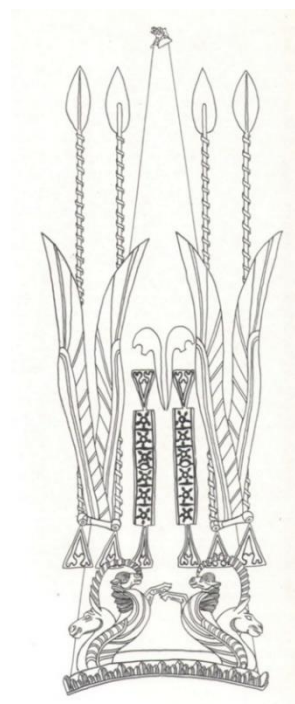
Рис. 3. Детали головного убора (стреловидные украшения

Рис. 4. Реконструкция головного убора

Рис. 5. Ножны и кинжал

Рис. 6. Фрагмент кинжала

Рис. 7. Кинжал
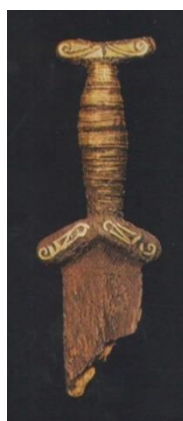
Рис. 8. Фрагмент меча

Рис. 9. Жезловидный предмет

Рис. 10. Доспех воина

Clarivate
Analytics **indexed**

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Almaz Temur Mammadzada
Azerbaijan State Agrarian University
The dissertator at the Azerbaijani Language Department

CONCEPTUAL MEANING IN CULINARY PHRASEOLOGY

Abstract: In the article, culinary phraseology is considered from the aspect of cognitive linguistics. Issues of cognitive linguistics focused on phraseology are considered through culinary phraseology. It is noted that examples of culinary phraseology are language units with wide possibilities in the study of some issues of cognitive linguistics. The understanding of the concept is considered in the cognitive direction. Culinary phraseology is studied mainly from the conceptual meaning aspect of cognitive linguistics. Conceptualization of culinary phraseology by frame concept type is shown. It is stated that the semantics of the lexical units in which the components of culinary phraseology are expressed constitute the conceptual meaning. Several lexical units expressing the components of culinary phraseology are given as examples and the concepts formed by them are shown. Examples of phraseological units that make up the concept are given. The conceptual meanings of culinary phraseology are explained.

Key words: culinary phraseology, cognitive linguistics, conceptual meaning, frame concept type, concept, archetype, semantics.

Language: English

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Introduction

Phraseology is a branch of Azerbaijani linguistics and is mainly studied from the aspect of structural linguistics. Along with structural linguistics, it can also be studied in terms of cognitive linguistics. Through cognitive linguistics, the meaning of integrity and expression of culinary phraseology as a linguistic unit can be clarified as a result of historical and cultural influences. In terms of meaning integrity, stability and expressiveness are the most important features of the formation of phraseological units. To better clarify these features, it is appropriate to concentrate on the conceptual meaning available in cognitive linguistics. Conceptual meaning is quite useful in explaining the fact that culinary phraseology is a secondary nominative unit.

In cognitive linguistics, linguistic units are studied, which reflect the historical processes of a certain nation, and the influence of its customs and traditions. When the phraseological system in the language is examined according to the conceptual meaning, the people's outlook, wisdom, perspective on life, and national psychology can be partially clarified with examples of phraseology. Semantics is the leading criterion in cognitive linguistics, and culinary phraseology organizes and encompasses conceptual meaning based on semantic meaning. It is possible to conceptualize culinary phraseology by looking at its semantic meaning.

The field of modern linguistics mainly studies the concept in 3 directions: 1. linguistic direction, 2. cognitive direction, 3. cultural side of the sign (8.206). Here, in the study of culinary phraseology, the concept is considered more in a cognitive direction.

Conceptual meaning is a concept that requires shared background information (9.575), and examples of culinary phraseology have corresponding background information with a variety of semantic meanings related to the profession of cooking that they represent. Culinary phraseology reflects the way of life, living and culture of our people related to nutrition and cooking.

In cognitive linguistics, certain concepts are studied and shown in the form of various concepts and archetypes. The phraseology of the Azerbaijani language is also suitable for research in cognitive linguistics and includes universal patterns corresponding to concepts and archetypes. Archetypes

are created from the denotant of lexical units and phraseological units, and that denotant should have a universal character. Culinary phraseology can organize concepts and archetypes through the denotants of lexical units and phraseological units on the sphere of nutrition, which is the basic need of people and is expressed in the language. The concept cannot bypass the lexical units and phraseological units that reflect the processes of nutrition, cooking, etc., which are a reality of life.

The conceptual meaning of phraseological units comes from two directions. The first is derived from the denotant possessed by the lexical units, in which the components of all phraseological units are expressed. Secondly, the single meaning expressed by the components of phraseological units together can form a conceptual meaning due to the aspect of expressing a relation as a secondary nominative meaning.

A. Mammadli notes that the concept may not be fully reflected in one word. He shows that conceptual content is a broader concept and it can be a broader concept than lexical units or phraseological units which are linguistic units (9.576). It means here, the study of conceptual content that can be expressed in the form of phraseological units.

Archetypes are universal patterns through which universal thought- forms formulates similarities in the languages of the world people. The lexical and phraseological units used by the Azerbaijani people mostly fit those archetypes. Because the denotant of archetypes is universal. For example: denotant of lexical units as *bread, salt, water, oil, honey,* etc., have the same meaning in many languages. Phraseological units whose components are bread, salt, water, oil, honey and other lexical units also indicate universality in content.

There is a frame concept type in cognitive linguistics (8.203). The frame is expressed by the verbal means of the language and expresses itself with the situation within the text. Frame concept type is studied with two approaches: 1. linguistic-cultural approach, 2. semantic cognitive approach (9.204). The first one, it is approached from the aspect of culture-human, human-culture. In the second part, human understanding, the sem, sthe emem, the semantic structure of the word, idea image and other issues are studied. Lexical units and phraseological units can be clarified by the frame concept type as a linguistic sign. In general, the semem is the smallest unit of semasiology in linguistics, it is both the content and the meaning of the word (10.461).

Lexical frames are the realization of the common and important features of objects and events in human thought that are perceived in our consciousness, or rather, a conceptualization (8.204). In the 1980s, for the first time, Charles Fillmore brought the concept of frame semantics to linguistics. (8.205). He showed the idea that the frame is formed during the

comprehension of the text. That is, the frame is the concrete situation in the text itself. The frame gives structure to the lexical units and phraseological units, and the frame ensures their diversity in the future. In general, a frame is a cognitive unit rather than a linguistic unit.

The frame concept type in Azerbaijani linguistics looks at the semantics of phraseological units in two ways: 1. the issue of universality, 2. issues related to the general Turkish language. That is, the semantic side of any phraseological unit in the Azerbaijani language is compatible with universal understandings and resonates with the content of general Turkish thought (8.207-208).

Culinary phraseology is characterized by the fact that it covers various concepts in terms of conceptual meaning. A few can be reviewed.

The concept of *"çörək"*(bread) involves purely culinary phraseology. Bread is a flour product made from grain products such as wheat, rye and etc. Bread is an integral part of our people's daily food intake. The fact that bread is the main food of Azerbaijani cuisine is also a sign of good life. According to the Azerbaijani tradition, the existence of bread is equated with employment. The lack of bread has a negative meaning, it is equated with the meaning of being unemployed or poor.

Here are some examples of phraseological expressions where *bread(çörək)* is associated with provision of employment: çörək ağacı (7.391)(a bread-winner), çörək dalınca qaçma, bilik dalınca get (7.391)(to prefer knowledge to money), çörək vermək (to employ someone) (6.77), çörəyi çıxmaq (to lose job)(7.393), əli çörəyə çatmaq (7.569) / əlini çörəyə çatdırmaq(7.584) (to make his bread), ağzı çörəyə çatmaq (7.71)/ ağzını çörəyə çatdırmaq(5.24) (to make his bread), çörək yiyəsi olmaq(7.393)(to earn money), çörəyi sazdan, sözdən çıxmaq (7.394)(to earn money by doing some job), halal çörək (7,716) (to earn money fairly), adamın öz yavan çörəyi özgənin plovundan yaxşıdır(7.32) (to earn money without any forced thanks to anyone), çörəyi çörəkçiyə vermək (6.78) (to trust to experts).

Examples of phraseological expressions of bread that mean unemployment or impoverishment can be: yol çörəyi, yaylım əppəyi baldan şirin olar (7.1515) (the supply is not a burden), çörək tapanda ayran tapmamaq, ayran tapanda çörək tapmamaq (7.392)(to be very poor), çörəyinə bais olmaq (6.78)(to fire someone), dişə vurmağa çörək qalmamaq (7.473)(have nothing to eat), hər şeyi bir qarın çörəyə satmaq (7.747)(to be a traitor for nothing), xəsis uşaqlarına çörək verib, atam xeyratına deyər (7.777)(to be stingy and spend twice as much), qapazı başına vurub, çörəyini əlindən almaq (7.921)(to take advantage of someone), qarın dolusu çörək yeməmək (7.935)(to be hungry and poor), son parça çörəyini boğazından çıxarıb aparmaq (7.1262)(to lose your last chance), boğazından çörək ötməmək (7.308)/

boğazından çörək getməmək (7.308)(to worry about something), bir qarın çörəyə möhtac olmaq (3.60) / çörəyə möhtac olmaq (7.393)(to be in need of food), çörəyinə haram qatmaq (6.78)(to earn money unfairly), çörəyi daşdan çıxmaq (6.78)(to work hardly).

Eating bread with another person means friendship, companionship, and being a friend. For example: çörək kəsmək (1.498) (to break bread with someone).

Disagreement in friendship is shown again with expressions related to bread.Çörəyi ayaqlamaq (6.78)(to disrespect someone), çörək itirmək (6.78)/ çörəyini yeyib, ayağından çəkmək (7.395)/çörəyi dizinin üstündə durmaq (1.498)(to know on which side his bread is buttered), çörəyinə təpik atmaq (6.78) (to underestimate).

Bread has many other meanings. Çörəkdən düşmək (6.77)(to be very ill not to eat) means to be sick. Çörəyə əl basmaq(6.78)(to swear) means swearing. It can be used in the sense of not being respected by people, not being appreciated. Çörəyini it yeyər, boynunu bit (6.78) / çörəyinin duzu olmamaq (6.78) (to be disrespected).

"Duz" (salt) creates a separate concept in culinary phraseology as a food that is mentioned more often than spices. In the psychology of the Azerbaijani people, salt makes the food tasty, as well as carries the semantics of being meaningful. The presence or absence of salt indicates the existence of meaning and logic. Duzunu qaçırmaq (6.98)/ duzu qaçmaq (6.98) (not to be funny), duza getmək (6.98)(to fall into the habit).

Most often, it forms phraseological combinations together with the word bread. Bread with salt is the basic food served first when the table is set in Azerbaijani cuisine. The word salt and bread means friendship, and companionship: duz-çörək acı olmamaq (7.493) (giving importance to spirituality), duz-çörək kəsmək (6.98) /duz-çörək yemək (7.494) (to break bread with someone), duz-çörəklə gözləmək (7.494) (to respect).

Some of the phraseological expressions that are said about a person when they are not worthy of friendship are used with the lexical units of salt and bread. Duz-çörək tutsun (it is a word for traitors)(7.494), duz-çörəyə xəyanət etmək (7.494) (to betray friendship), duz-çörəyi itirmək (7.494) / duz-çörəyi tapdalamaq (7.494) / kəsdikləri duz-çörəyi basmaq (7.870) (to disregard friendship), duz-çörək itirmək (5.91) (to lose a friendship), duz-çörək unutmaq (4. 405)(to forget friendship).

"Yağ" (butter), which is one of the products used in cooking, can create a certain concept as a dairy product. Among Azerbaijani people the semantic meaning of the word "butter" means people, are in a good state of well-being, they are in security. It also means that everything is in order.

An example of the culinary phraseology where the lexical unit of *butter* means that the state of well-being is good and it is used in the sense of good living are these ones: daşdan yağ, yağdan duz çıxarmaq (7.417)(to be shrewd), yanağından yağ dammaq (7.1480)/ kipriklərindən yağ dammaq (7.876) / tüklərindən yağ dammaq (6.254) (to be very healthy), payına yağlı tikə düşmək (7.1190)(to have a good fortune), yağlı yerdən yapışmaq (6.270)(to benefit from good opportunity), yağlı ov (7.1467)(profitable thing), ağıldan yava, cibdən yağlı (7.54)(to be wealthy but brainless), birisi yağ gölündə üzür, birisi ağartıya tamrzı qalıb (7.302)(the one is fortuned, another is unfortuned), böyrək kimi yağ içində bəsləmək (7.320)(to be surrounded by care), canavar yağlı tikəyə yüyürən kimi (7.344)(as opportunist gets the opportunity), tərə yeyən də çıxar yaza, kərə yeyən də (7.1343)(once everyone will die), bəylərlə cücəplov yemir ki, bığı yağa batar (7.266)(to miss chance because of useless detail).

There are several examples of culinary phraseology that contain the word butter to mean that there are no problems, obstacles, that everything is in order, that things are in order, and that you are satisfied with the progress of the work. İşləri lap sarı yağ kimi getmək (7.832)(to have no problems), kərə yağı kimi canına yayılmaq (7.870) / sarı yağ kimi cana yayılmaq (7.1227)/ sarı yağ kimi yayılmaq (4.39) / adamın canına sarı yağ kimi yayılır (7.31) (to like very much), yağ içində böyrək kimi bəsləmək (7.1463) / yağla yatıb, qaymaqla oyanmaq (7.1466) (to be surrounded by care), ürəyinin yağı ərimək (7.1416)(to be upset), yağdan tük çəkən kimi (7.1465)(too easy), yağı yağ üstə çıxır, ayranı ayranlıq olur (7.1465) (to have what one deserves), yağın çoxluğundan plova ziyan dəyməz (7.1465) (many do not harm), yağlı aş bişirmək (7.1466)(to punish).

The meaning of being in the order expressed by the word butter may not always have a positive meaning, sometimes it can be part of a phraseological unit with a negative connotation: yağ da yesə, dirilməz (7.1463)(to be dead at all), yağ yağ ilə qarışıb, yarmalar yavan qalar (7.1464) (to have what one deserves), it qursağı yağ götürməz (7.837)(not being able to become a nobleman), hamı öləcək: kərə yeyəndə, tərə yeyən də (7.720))(once everyone will die), yağlı əppək olub göyə çıxmaq (6.270)(to disappear), yağla şora fərq qoymamaq (7.270)(not differ good from bad).

The lexical unit *butter* is used in compounds in the form of greasy and means a well-made lie: yağlı dil ilə (7.1466)/ yağlı dil tökmək (7.1466) / yağlı vədələr vermək (7.1467)(to make false promises), yağlı dilə aldanmaq (7.1466) / yağlı dilinə uymaq (7.1466)(to believe a false promise), yağlı dillə danışmaq (7.1467)/ yağlı dilini işə salmaq (6.270)(to flatter).

The semantic nuances of meaning of the word butter listed above all originate from the content of being in order, in place.

The concept of "su"(water) does not only cover culinary phraseology. The word "water" is used in different fields and its semantic meaning is used in the meaning corresponding to those fields. Water is only used in culinary phraseology as the water we use to drink when we are thirsty. In the profession of miller, agriculture, fishing and in other areas the word water is used in other background content. For example: sudan quru çıxmaq (4.157) (getting away with less damage).

Water is the basic need of human beings, water is indispensable for human life as life without water can not exist. Daily consumption of water is very necessary for people. There are many examples of culinary phraseology in the sense of drinking water, not technical water. Suyu şirin gəlmək (7.1297) / suyu şirin olmaq (7.1297)(to make a good impression), təzə bardağın suyu sərin olar (7.1350)(the new is better), yeyib,üstündən də su içmək (7.1513)(misappropriating someone else's property), ağzına su alıb oturmaq (7.77)/ ağzına su alıb susmaq (7.77)(to be silent), ağzında su ilinməmək (7.79)(to reveal the secret), gözü su içməmək (7.679)(not to trust), gözünə su ver (7.687)(take a lesson), gülab suyunda yuyunmaq (7.697)(to give up bad deeds), xəlbirlə su daşımaq (7.774)(no time to waste), su girdi qaba oldu içməli (7.1289)(the result must be accepted), su görəndə susuyur, çörək görəndə acır (7.1289)(to expect a share of everything), su içdiyin quyuya tüpürmə (7.1289)(not to be ungrateful), su içəndə boğazında görükür (7.1290)(to be a white), su sənəyi suda sınar (7.1292)(things happen because of the things you do).

Whether the water is hot or not means that the situation will be solved not easily, but with difficulty. Suyu üfürə-üfürə içmək (7.1297)(to be very careful), qaynar qazana soyuq su çağıldatmaq (7.943)/ qaynar qazanın aşına buzlu su qatmaq (7.943) (to be a hindrance to another), sanki başına bir qazan qaynar su tökdülər (7.1225)(to be affected by bad news).

Among the nuts, the walnut fruit is more often used in phraseological combinations and creates the concept of "qoz"(walnut). Walnut is a fruit with high nutritional value, but its inside can sometimes turn out to be rotten or useless. Therefore, when our people express their attitude according to the degree of the orderliness of the work, they use expressions on the nut. The concept of nut mainly creates phraseological units with negative connotations. It means that the expected effect of work is absent.

This can be seen with examples: sanılı qoz kimi (7.1225)(to be OK), çürük bir qoza dəyməmək (7.396)(to be worthless), qarğa, mən də qoz var (7.932)(to manifest oneself), qoz qabığına soxmaq (3.195)(to criticize), qoz qayaya dəyib qayıdan kimi (7.997)(not understanding the advice), qoz-qoz oynamaq (3.195)(to compete), qozunun üstünə qoz qoymaq (3.195)(to i ncrease the problem), nə qoz ye, nə də meşəbəyinin üzünü gör (7.1094)(to try not to cause trouble for yourself), aldım qoz, satdım qoz (7.92)/ aldım qoz, satdım qoz, məndə qaldı şaxşaxı(7.92)(to remain unprofitable), başında qoz sındırmaq (7.232)(to oppress), başını yarıb ətəyinə qoz tökmək (7.241)(to conduct a dual policy).

"Aş"(pilaf-rice meal) is a dish cooked with rice. In ancient times, the word "aş" meant the general name of all dishes in all Turkic languages. In the Azerbaijani language, the word "aş" later underwent semantic narrowing and only means the name of pilaf dish. Pilaf is considered the king of all dishes in the cuisine of the Azerbaijani people. "Aş" means excellent work, well-done work. The emergence of problems in the preparation of pilaf means that things are not in order, the semantics of things are lagging behind.

The word "aş" indicates the background information that the work is in order. There are many examples of the concept of cooking: harda aş, orda baş (7.724)(a profiteer), nazirlərlə plov yemir ki, bığı yağa batar (7.1085)(to have a high opinion of himself), aş bişirmək (7.156)/ aşı bişirilmək(7.157)/ aşının suyunu vermək (7.157) (to punish), aş olmaz, bozbaş yeyərik (7.156) (living within means), aş yoldaşı çox, baş yoldaşı yox (7.156)(having many friends but not having a friend who advises), aşından ki yeməyəcəksən, tüstüsündən niyə kor olasan? (7.157) (to suffer harm instead of benefit), azacıq aşım, ağrımaz başım (7.188)/ azca aşım, ağrımaz başım (7.189)(to be satisfied with less), bilmirsən aş harada bişib, deyirsən bir kəfkir qoy (7.272)(expressing an opinion without knowing the conversation).

The word "aş" always means background information that the work is in order. If the phraseological units using the word "aş" mean that the work is not in order, it is not because of the word "aş", but because obstacles and problems arise as a result of interfering in the matter later. The word "aş" in phraseological combinations means work that is in order. Əli aşa çatanda başına daş düşmək (7.566) /ağzı aşa çatanda başı daşa çatmaq (5.7) (to face failure after achieving what you want), isti aşına soyuq su qatmaq (7.823)/ şəkərli aşa duz tökmək (7.1311)/ buzlu suyu qaynar qazanın aşına qoyma (7.336) (to intentionally obstruct affairs), Əli aşından da olmaq, Vəli aşından da olmaq (7.566)(to lose all opportunities), nə tökərsən aşına, o da çıxar qaşığına (7.1096) (to face the consequences of one's actions), nə yemisən, turşulu aş (7.1098)(to beat a lot), söz ilə plov olmaz, yağ-düyü gərək (7.1272)(you need to do things, not talk), yetimin ağzı aşa çatanda, başı daşa çatar (7.1512)(when an orphan builds his own life, his life ends), az aşın duzu deyil (7.187)/ azacıq aşcığazın duzu olmamaq (7.188)/ azacıq aşın duzu olmamaq (7.188)(to look calm but be cunning).

Clarivate Analytics indexed

The concept of "xəmir" (dough) has a certain place in culinary phraseology. All flour products preparation starts from the form of dough and it turns into a food to be consumed after cooking. The word dough has the semantic meaning of the base, starting stage, building material or core of a certain work. Bu xəmir hələ çox su aparacaq (7.326)/ xəmiri suya doymamaq (7.776) (it's not easy to solve the problem for a long time), xəmiri küt getmək (7.775)/kündəsi küt getmək (7.897)(not to resolve cases from the initial stage).

Dough has other meanings due to the semantics of meaning the base of a work. Through dough, the characteristics of human character are expressed in phraseological units. Dough is understood as the basis of human character. For example: xəmiri bir yerdən götürülüb (7.775)/ xəmirləri bir torpaqdan yoğrulmaq(7.776) (husband and wife have the same character), xəmiri hiylədən yoğrulmaq (7.775)(to be dishonest), xəmiri yoğrulmaq (7.776)(to be in accordance with something), xəmirinə özgə mayası qatmamaq (2.445)(to earn money fairly), mayası başqa xəmirdən olmaq(7.1040), xəmirəsi tərsə məzhəb yoğrulmaq (7.775)/ xəmirləri ayrı cür yoğrulub (2.445) (to be in accordance with evil thing).

Also, the dough is soft, and due to this feature, it also means that a person behaves lightly in communication and exhibits an unexpected character. Xamırağız olmaq (7.766)(weak-willed), xəmir yeyənə etibar yoxdur (7.775)/ xəmir yeyənin fağırı olmaz (7.775)(no trust in man), xəmir kimi(2.445), xəmiri yumşaq (2.445).(unreliable)

It is also used in the sense of criticizing the character:xəmirini yoğurmaq(7.776)(to criticize).

As a lexical unit, "bal" (honey) means the name of a very sweet, useful, valuable food that is a product of beekeeping and should be consumed by everyone.

The word *honey* means being valuable, and a person who does not know the value of honey is understood as someone who has no understanding of value and benefit. There are phraseological units in which the word honey is used in the good, valuable sense: dil var bal gətirər, dil var bəla gətirər (7.453)(about good treatment or bad treatment), eşşək nə bilir bal nədir? (7.532)(not understanding the subtlety), xaldan qara, baldan şirin (7.764)(about the definition of goods), arının qəhrini çəkməyən, balın qədrin bilməz(7.148) (not knowing the value of the hard earned), ağzına bal sürtmək (5.18), sözünə bal qatmaq (5.222).(to please, gratify someone)

Sometimes the word honey is used ironically in the composition of phraseological units: əli bala bulaşmaq (7.567)(to be succesful), müftə sirkə baldan şirin olur (7.1072)(what is earned without effort is dearer), zəhəri də bal dadır (7.1542)(challenges become easy), bal istədin, bəlaya düşdün (7.199) (not being able to achieve one's dream), beş barmağın bal eləsən, ağıdır (7.250)/ beş barmağın beşini də bal elə, deyər zəhərdir (7.251)(to be an ungrateful person), sözünü bal ilə də yemək olmamaq (5.222).(unable to accept, unacceptable)

For the understanding of the concept, the semantic meaning of a specific lexical unit should be able to perform the function of reporting a pieace of common background information in the formation of several phraseological units. That background information participates in the creation of phraseology covering the psychology of the Azerbaijani people related to specific traditions.

Therefore, the emergence of culinary phraseology in the Azerbaijani language is mainly explained from the point of view of semantic meaning, and it is correct to study culinary phraseology from the perspective of cognitive linguistics.

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Maftuna Djahangirovna Mirzajonova
Tashkent State University of Economics
Assistant, (Uzbekistan)
maftunakhan1304@gmail.com

THE ESSENCE OF THE CONCEPT OF MARKETING COMMUNICATION IN MARKETING

Abstract: *This article describes the current role of marketing communication, the main means of communication with consumers of a modern company. In order to understand the essence of marketing communications, the scientific approaches of foreign and local scientists were studied. The main goals, elements, several classifications of marketing communications and the main types of communications have been studied, divided into separate groups. As a result of the conducted research, it is scientifically and practically based that the complex of marketing communications consists in developing and combining the actions of the organization to achieve marketing goals. In order to open wide opportunities for marketing communication of modern companies, scientific-theoretical proposals have been developed to improve the marketing management of enterprises in any field, and at the same time, to properly organize traditional marketing communications.*

Key words: *marketing communication, communication complex, model, encoding, decoding, feedback, cognitive level, advertising, personal selling, branding, internet marketing.*

Language: *English*

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Introduction

In the conditions of global competition, high market saturation, in order to ensure competitiveness, each manufacturer must develop and continuously maintain relationships with its target audience. The main means of a modern company to ensure communication with the consumer are marketing communications. In a general sense, marketing communications is the process of transferring information about products to the consumer.

There are many approaches to understanding the essence of marketing communications. So, Pankrukhin A.P., considers marketing communications as "…a set of means and specific actions to search, analyze, generate and disseminate information that is significant for the subjects of marketing relations" [1].

Burnet J., Moriarty S. marketing communications are considered as the process of transferring information about the product to the target audience [2]. A broader interpretation of marketing communications is given by Eriashvili N. D., Korotkov A. V., Sinyaeva I. M. "…a set of signals coming from enterprises to various audiences, the complex impact of a company on the external marketing environment to create favorable conditions necessary for successful and profitable activity in the market" [3].

In modern conditions, it is not enough for companies to simply produce products and set a price, it is necessary to convey to potential consumers information about the product, its functional and quality characteristics, as well as the profitability of the acquisition. To do this, marketing communications are used to arouse interest in a product or service, convince them to make a purchase and maintain interest in the company in order to retain regular customers. Marketing communications carry out the transmission of messages to consumers in order to make the products services of organizations attractive to the target audience.

Marketing communications is a complex system of market interaction between an organization and the public, associated with the movement of goods, the exchange of information, technology, knowledge, and experience. The complex of marketing communications consists in the development and integration of the organization's actions to achieve its marketing goals [4].

Marketing communications is a set of external and internal communications for the transfer of messages from the producer to the consumer to meet his needs and receive the planned profit.

Marketing communications are designed to convey information about the company's products and the conditions for their sale to potential consumers, as well as to convince consumers to buy this particular product (service) or purchase it in certain stores (from specific firms). In addition, marketing communications allow you to manage the attention of buyers, interest them in a specific product, and encourage the consumer to spend their money on the offered products [5].

The analysis of the presented approaches allows us to conclude that all marketing communications are aimed primarily at stimulating buyers to purchase their goods or services. At the same time, the considered approaches make it possible to highlight the benefits of using marketing communications, which, in addition to increasing profits and increasing product sales, should also include the ability to influence the audience, change its attitude to the company's products.

So, the main object of communicative influence is the target audience - the consumer, and the purpose of marketing communications is the impact on consumer behavior. To achieve the goal, the following tasks of marketing communications can be distinguished:

o informing the audience about the existence of certain goods and services, explaining their purpose;

o persuasion - the formation of a favorable attitude of the consumer to the organization and its brands;

o creating an image - the formation of an image of an organization associated with the differentiation by the consumer of the brands of the manufactured product;

o reinforcement - retention of regular customers [6].

The main objectives of marketing communications are:

1. target audience research;

2. determining the degree of readiness of consumers to make purchases [7];

3. identifying the desired consumer response;

4. writing messages for consumers;

5. development of a complex of marketing communications of the company;

6. development of the budget for the complex of marketing communications;

7. execution of a complex of marketing communications [8];

8. collection of information coming through feedback channels;

9. necessary changes in the complex of marketing communications.

Marketing communications are responsible for the success of enterprises in the market, so the toolkit is becoming more complex and expanding. Their role and purpose is to support the marketing plan by creating consumer understanding and confidence in the advantages of a given manufacturer over its competitors.

The marketing communications process is described using a model and consists of several elements:

1. sender is a party (manufacturer or seller) that sends a message to another party (consumer, client);

2. encoding is a set of characters that are transmitted by the sender [9];

3. means of dissemination of information - these are communication channels through which a message is transmitted from the sender to the recipient;

4. decryption is the process by which the recipient attaches meaning to the characters transmitted by the sender;

5. recipient is the party that receives the message from the other party;

6. response is a set of responses (reviews, comments) of the recipient that appeared as a result of contact with the message;

7. feedback is part of the response that the recipient brings to the attention of the sender [10];

8. interference is unplanned media interference or distortion, as a result, the recipient may receive a message that differs from that sent by the sender.

The basic elements of marketing communications are the sender, the message, the channel, and the recipient. In the process of communications, the impact on consumers (recipients of messages) is carried out at three levels:

- cognitive level - consumers must choose a product or service and determine its need;

- effective level - clients should express emotions and sympathy after receiving the message and believe it;

- behavioral level - the message should convince consumers to make a purchase.
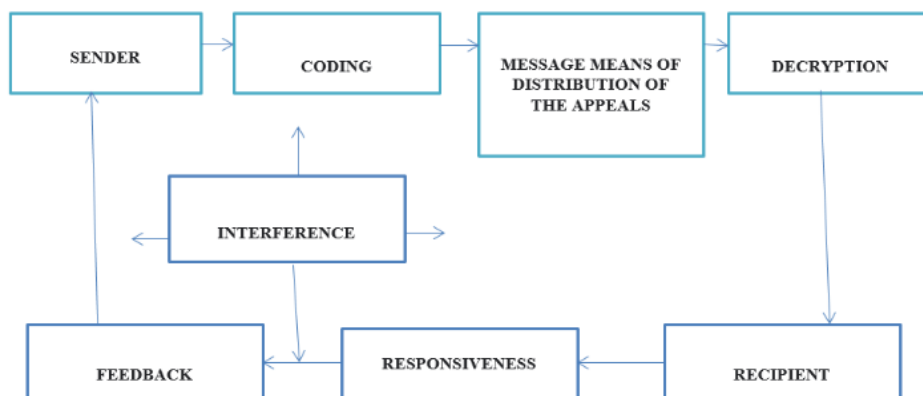
Figure 1. Marketing communications process

The main task of companies is not just to convince consumers of the need to purchase a product or service, but to inspire confidence that this product will satisfy their needs better than others. This means that the company is committed to turning the customer into a loyal customer.

To do this, you should follow three important stages of the marketing communications process:

- informing consumers about a product or service;

- persuading customers to purchase a product/service;

- a constant reminder to consumers of the existence of a product, brand or company.

There are several classifications of marketing communications. According to the type of organization of the process, direct communications and communications through an intermediary are distinguished. Direct communication is the process of communication between two or more people to get to know each other, discuss and promote a product or service. When using intermediaries in communications, there is no possibility of an individual approach to the consumer, since advertising messages are designed for the "average" buyer. In addition, the perception of information by buyers depends on the attitude towards the sender of the message, which must be taken into account when choosing the media.

These two groups of marketing communications are divided into subgroups:

- paid and unpaid communication;

- long-term and short-term;

- personalized and non-personified.

Accordingly, there are a lot of types and varieties of marketing communications. Distinguish between planned and unplanned types of marketing communications.

Table 1. Classification of marketing communications

Planned marketing communication tools	Unplanned instruments marketing new communications
Advertising	Behavior of operating personnel
Sales promotion	Post equipment
Public relations	Vehicles
Direct marketing	Company's response to clients' appeals
Personal sale	Crisis management
Special products at the point of sales	Investigations by journalists or state authorities
Package	
Souvenirs	
Sponsorship	
Licensing	
Service maintenance	

Therefore, it is not worth limiting yourself to only four basic or main types of marketing communications, and depending on the goals and planned results, choose a set of types and tools of marketing communications.

Marketing communications include a set of elements and methods of influencing consumers that contribute to the formation of a positive attitude towards the products offered by the company, thereby facilitating its sale. The main types of marketing communications are:

1. Advertising.
2. Sales promotion.
3. Personal selling.
4. Public relations (PR).

Advertising is a form of communication (non-personal), information brought to the consumer, designed to promote goods, services, draw attention to a particular product.

Sales promotion - a set of activities aimed at promoting products, short-term sales promotion measures or incentives designed to accelerate the response of consumers: coupons, discounts, free samples of goods, etc.

Public relations (public relations) is a set of activities, the purpose of which is to interact with the public to ensure the management of its opinion about the company, products: exhibition activities; sponsorship; public speaking, etc.

Personal selling is the establishment of personal contact (interaction, communication) with potential buyers in order to sell products. Personal selling is a type of direct marketing that involves a personal meeting between the seller and the buyer.

In addition, additional types of marketing communications include: branding; sponsorship, etc.

It is important to note that at present there is a decrease in the susceptibility of consumers to traditional marketing communications.

In the context of the intensive development of the information space, the global Internet, more and more modern companies are resorting to promoting their products using interactive technologies.

Internet marketing is the practice of using all the traditional elements and activities of Internet marketing to get a response from the audience: marketing research, product, price, distribution and communication policies, branding, as well as the general concept of marketing interaction.

Thus, the Internet allows you to quickly present all the necessary information about the product to a wide audience, form public opinion, build up and continuously maintain personal contacts, etc.

Thus, the Internet and modern information technologies open up wide opportunities for organizing marketing activities, allowing you to improve the marketing management of an enterprise in any industry, but at the same time, you should not forget about traditional marketing communications.

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Zafar Batirovich Abdurahmonov
Customs Institute
senior lecturer at the Department of Information Technologies and Mathematics,
Tashkent, Uzbekistan

Saidvali Shukrullaevich Yusupov
Customs Institute
Ph.D, Associate Professor, Department of Economic and Social Sciences,
Tashkent, Uzbekistan

ROLE OF DIGITAL TECHNOLOGIES IN THE DEVELOPMENT OF HIGHER EDUCATION

Abstract: *This article examines the issues of the widespread introduction of information and communication technologies into the higher education system in the conditions of the informative space and the implementation of large-scale digitalization through them. The problems observed in this direction are also highlighted, conclusions are drawn and a number of proposals for overcoming them are substantiated.*

Key words: *information society, information and communication technologies, digital technologies, education, digitalization of the education system, educational process, traditional didactics, innovative changes, development of higher education, Information culture, electronic provision of education.*

Language: *English*

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Scopus ASCC: 3304.

Introduction

The rapid development of modern information and communication technologies (ICT) in the conditions of the information society makes it possible to manage the educational process in educational institutions based on an innovative form. At the same time, it gives education its own attractiveness and modern aspects.

The main part.

If we look at the brief history of the application of information technology to the educational process (in the example of technical educational tools), at first the overhead projector or epidiascope was used to provide the opportunity to present educational materials, and at a later stage the use of computers, PowerPoint we can show electronic projector, electronic whiteboard, e-mail, internet, webinar, teleconferences and distance education technologies that allow to present the created visual materials.

Regional features of industrial production dynamics in the research of textile enterprises financial security in Uzbekistan were investigated by Zarova E. V. [7], Tursunov, B. O. [6] and others. But role of digital technologies in the development of higher education were researched not much.

Digital education should be based on the concept of technological education, which is different from the traditional approach to organizing the educational process, which has been widespread in recent centuries. Modern innovative communication educational technologies are mainly based on philosophical and psychological concepts developed since the middle of the twentieth century. These include pragmatism and instrumentalism, cognitivism, constructionism, connectivism[1].

Enrichment of the higher education institution with information media and technologies serves the student's adaptation to the rapidly changing digital world and the formation of his information culture [2].

The introduction of information and communication technologies into the educational process creates advantages:
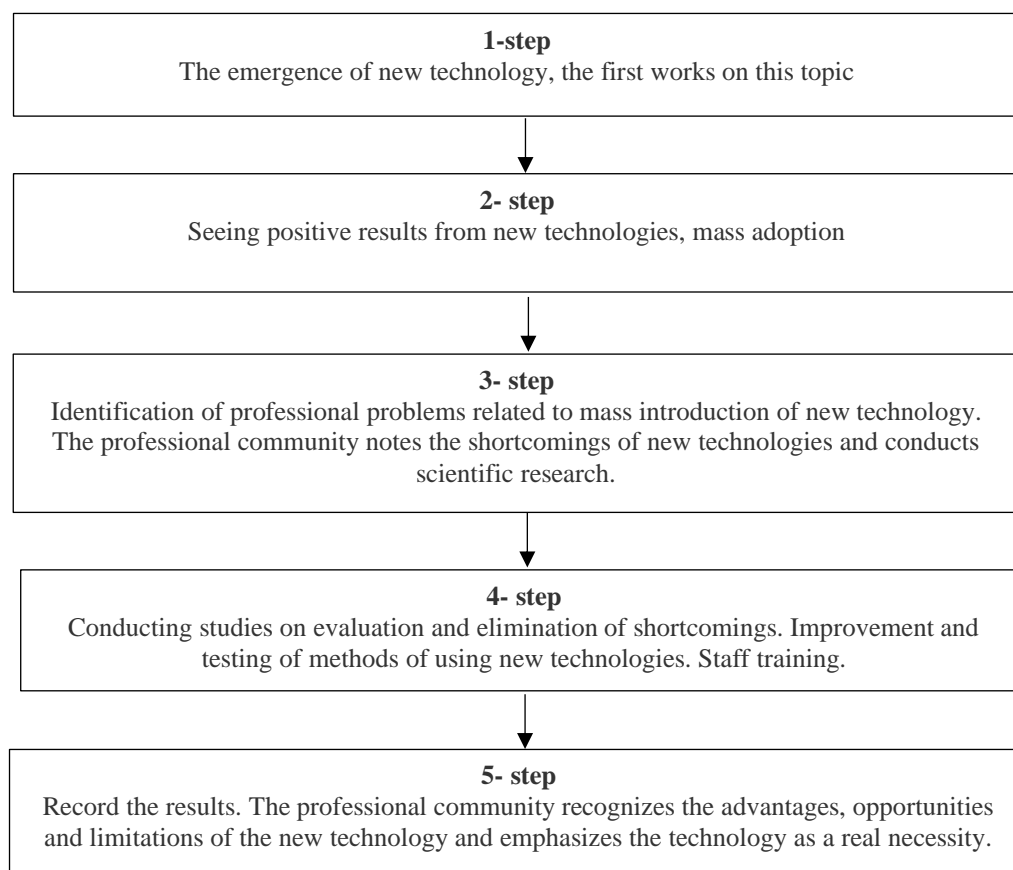
- makes the educational process more modern, diverse and enriched;

- significantly expands the possibilities of providing educational and educational information;

- allows working with large volumes of information, influencing different forms of human memory, different channels of perception;

- makes the educational process more interesting for students and makes it possible to increase their motivation;

- helps students and pedagogues to adapt to modern information space and to form information culture;

- makes it possible to more effectively implement the system of diagnostics and monitoring of the educational process;

- allows to increase the quality and efficiency of pedagogical work.

In recent years, we can admit that the new paradigm of education based on the interactive cooperation of teachers and students has taken priority positions in the theory and practice of pedagogy. Its goals and objectives are focused on active activities, increasing the effectiveness of teaching, developing students' intellectual (analytical, critical, creative, flexible), communicative (ability to work in teams, including international, interprofessional), informational (needful information search, information analysis and processing, summarization, systematization and information exchange) creates opportunities aimed at developing competencies.

Digitization of the educational process provides an opportunity to expand the boundaries of communication for its participants. Interactive communication in the process of information exchange opens up new opportunities for launching scientific debates, communicative culture, development of information and communication competences, formation of psychological relationships, teamwork environment [3].

According to a number of researchers, only when all information and communication technologies used in the educational process are formed in the form of a system that is interconnected and focused on a single goal (concept) and regularly when its effectiveness is monitored, it will bring the higher education institution to a new level in terms of quality. Solving this problem creates opportunities to activate different directions of the educational process [4].

1-step
The emergence of new technology, the first works on this topic

2- step
Seeing positive results from new technologies, mass adoption

3- step
Identification of professional problems related to mass introduction of new technology. The professional community notes the shortcomings of new technologies and conducts scientific research.

4- step
Conducting studies on evaluation and elimination of shortcomings. Improvement and testing of methods of using new technologies. Staff training.

5- step
Record the results. The professional community recognizes the advantages, opportunities and limitations of the new technology and emphasizes the technology as a real necessity.

Fig.1. Stages of development and application of technological innovation

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Axborot-kommunikatsiya texnologiyalari asosida zamonaviy oliy ta'lim muassasasida ta'lim-tarbiya A unified information space that allows for significant modernization of processes should include:

- information resources including regulatory and legal information and methodological and didactic developments;

- organizational and management tools and organizational center responsible for the operation and development of the virtual space, which ensures the processes that regulate the flow of information;

- methodological resources;

- software and technical support (telecommunication resources, set of technical and software tools);

- means of communication that enable rapid transfer of information and communication [5].

Like any innovation in educational and educational processes, the active application of digital technologies in the educational process faces a number of obstacles. During empirical research, it became possible to identify the factors that contribute to the adoption and use of these technologies by pedagogues in their pedagogical activities. These are the following:

- factors related to digital technologies themselves (uniqueness and novelty, reliability, usefulness and simplicity, simplification of thinking processes and planning, ensuring time saving);

- factors related to the organization of the use of digital technologies (support of the idea by the educational institution and the use of these technologies by their colleagues, technical support, information- creation of complete educational programs for working with communication tools);

- factors related to pedagogues introducing digital technologies (ability to use resources and confidence in improving the quality of education, compliance with the philosophy of digital education of this teacher);

- factors related to the lack of specific scientifically based procedures for pedagogical examination of the developed electronic educational resources (continuity of software tools within the framework of the implementation of educational activities, programs and events);

- directing electronic educational resources to the traditional educational and educational environment (in terms of goals, content, forms and methods). Factors related to orientation to the use of potential capabilities of electronic educational resources (visualization, control automation, model features);

- temporary factors (creating and testing quality educational resources takes a lot of time).

Along with the didactics of digital education, the concepts "digital transformation of education", "digitalization of education", "digitalization of teaching" and similar concepts appeared.

Any technological innovations can be considered in terms of the realization of their development stages and expected results, as well as the level of interest from experts and society.

If we analyze these stages from the point of view of digital technologies, it can be noted that we are currently in the third stage. Because, on the one hand, we have an objective assessment of the possibilities, advantages, and effectiveness of digital technologies, and on the other hand, due to the lack of serious scientific approaches implemented globally at all levels of education, the loss of achievements in traditional education, various risks we can emphasize that there are problems of failure to consider risks.

Digitization makes it possible to draw conclusions based on the analysis of the development characteristics and problems of higher education in the period:

First, the use of modern information and communication technologies allows to expand the scope of students' academic and extracurricular activities, to turn the educational process into an interactive, independent, creative activity.

Secondly, the modern level of ICT development expands access to educational, vocational and training resources, ensures the integration of the national education system into the world network, significantly facilitates the use of international resources in the field of education, culture and training.

Thirdly, ICT changes the foundations of the traditional education and training process. Their use leads to overcoming barriers of age, time and space, to the constant search for new and effective forms of organizing the personalized process of teaching, educating and socializing a student in higher education institutions.

Fourthly, changes to improve the educational process in modern higher education institutions require the development of new methodological approaches to teaching and, accordingly, the development of new educational technologies and organizational forms of building the educational process.

Fifth, the practice of introducing innovative models of education and new forms of organizing the educational process is based on the use of advanced information and communication technologies, network services and funds. They are implemented as part of an interactive educational space that provides a real opportunity to improve the consistency of the content, methodological and technological components of education and the quality of the educational space.

Sixth, the impact of information and communication technologies on the educational process is not limited to the modernization of teaching tools, forms, methods and technologies. This leads to the internal development of educational institutions

and their transformation into educational and educational communities.

Conclusions

In addition to these conclusions, the following recommendations are considered important for the successful development of the experience of using new information technologies in the educational process:

- creation of material, technical and organizational conditions for the introduction of ICT into the educational process;

- purposeful formation of a bank of digital educational resources, among which the author's methodology and software should occupy a special place;

- organization of wide use of computer equipment, corporate information-educational environment by students and teachers, providing access to the Internet global information network;

- creating conditions for regular communication with the participants of the educational process (including the use of its network forms) in order to exchange experience in the field of ICT application in the pedagogical process.

Thus, in the era of modern digitization, which is rapidly moving forward, the widespread introduction of information and communication technologies into education is one of the priority directions that ensure the transformation of a higher education institution into a high-quality educational and educational space.

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Khasan Y. Kalanov
Ministry of Higher Education, Sience and Innovation of Republic of Uzbekistan
Independent Teacher (PhD)
100174, Tashkent city, Almazor district,
University str., 7, Republic of Uzbekistan
Khasan_8484@mail.ru

OPTIMIZATION OF TRAINING IN A PROFESSIONAL EDUCATIONAL INSTITUTION AND ORGANIZATIONAL AND PEDAGOGICAL CONDITIONS

Abstract: This article is devoted to the topic "Organizational and pedagogical conditions for optimizing training in a professional educational institution". The article shows the importance of mastering the skills of training personnel using pedagogical methods and information and computer technologies. The implementation of organizational and pedagogical conditions shows the importance of developing pedagogical techniques, assimilating educational techniques and consolidating skill. Also, in the process of training, it is necessary to organize special courses that allow you to study, experiment and master new pedagogical methods, information and computer technologies and training methods. In particular, the article shows the importance of organizational and pedagogical conditions for training personnel and the necessary guidelines for strengthening skill in the process of training personnel.

Key words: Professional educational institution, training, optimization, organizational and pedagogical conditions, pedagogical technologies, didactics, teaching methods, students, research, improving the quality of education.

Language: English

Introduction

Professional educational institutions are organizational and structural institutions created in order to improve the skills of employees and obtain new knowledge and skills. These institutions must have a number of organizational and pedagogical conditions, which include the following:

1. **Training research planning:** Leaders and instructors of organizations should plan systematic studies of training, testing and evaluation processes. These projects provide for the development of knowledge and skills of employees in a specific area, including familiarizing employees with the latest changes in knowledge and technology, updating methods and methods of self-education.

2. **Creation of courses that correspond to the knowledge and skills of employees:** In professional educational institutions, it is necessary to create courses that require employees and new personnel. These courses can be organized by teachers, methodologists, psychologists, career guides and other specialists. These courses ensure the development of employees in a certain professional direction, their familiarization with new knowledge and skills, and their professional competencies.

3. **Use of technologies and best practices:** Professional educational institutions ensure the development of methods of training workers in technological processes. These processes may include online learning, video tutorials, interactive learning tools, and other technological techniques. These methods allow employees to learn new methods and help make the learning process better, more efficient and more regular. These methods allow employees to

learn new methods and help make the learning process better, more efficient and more regular.

4. **Organization of testing and evaluation processes:** Organization of employee evaluation processes is also important in vocational education institutions. Employees should organize assessment processes based on the goals and requirements aimed at evaluating training methods. These evaluation processes help develop employees, improve and develop their professional skills. Evaluation processes may include testing, lesson plans, portfolios, training materials, and other assessment methods.

5. **Providing additional training opportunities:** In vocational education institutions, employees should be given additional training opportunities. These opportunities can be provided in the form of distance learning, multi-purpose resources, articles, books and other professional materials. Additional training opportunities provide even greater access to better knowledge and skills for employees to acquire.

6. **Ensuring development:** Professional educational institutions need to create development plans and support their implementation in order to create opportunities for self-development, professional development and improvement of employees. These plans should be created based on the views of employees and managers, their goals and documents. Plans should include agreed actions, timelines and a system for monitoring the professional and educational development of employees.

At the same time, professional educational institutions provide advanced training for employees by introducing them to new professional skills, developing them and providing additional training opportunities. These institutions include organizational and pedagogical conditions for organizing the processes of training, testing and evaluation and development of employees.

To develop society and increase interest in innovation, production and modernization of industries, a high level of professional development must be ensured. Professional educational institutions are of great importance in this direction and are created to improve professional skills and ensure their compliance with the requirements by providing opportunities for the development and development of workers. Pedagogical conditions created in professional educational institutions are created in order to create an opportunity to improve and develop the professional skills of workers, always strive for development and work with other requirements. These institutions are of great importance for ensuring the professional development of students and society, and by helping them improve their professional skills and work with simple requirements, they meet the specific requirements and development of society.

Review of the literature on the topic. A lot of literature is devoted to literature on organizational and pedagogical conditions for optimizing training in professional educational institutions. This literature covers pedagogy, professional development, spirituality and other interesting topics.

One of them is the book "Training in a professional educational institution", the authors of this book give a correct analysis of pedagogical, psychological and methodological changes related to training and convenient methods used in the training process.

Several studies and scientific articles are also related to this topic. For example, the "System of advanced training stages in professional educational institutions", "Organizational and pedagogical conditions for advanced training" and "Extended training methodology".

Another literature is the book "Organizational and Pedagogical Design and Management". The book contains information on unified design related to organizational and pedagogical design, personnel training, development assessment and organization of the educational process. All this literature can be considered as a good source for familiarization with the necessary organizational and pedagogical conditions for training and strengthening the development of personnel in professional educational institutions.

The authors of the book "Training in a professional educational institution".

O. Abdurazzakov, F. Iskandarov and A. Ragimov. The book was published in Tashkent in 2007.

Turdiev S.B., author of the book "Organizational and Pedagogical Design and Management", published in Tashkent in 2011.

Zh.Umonov and N. Abduzhabborov, who conducted a study on the topic "System of stages of development in a professional educational institution".

In 2017, this study was devoted to the creation of the scientific journal "Problems of Modern Science and Education".

A.Tursunov is the author of a study called "Advanced Training Methodology", and this study was devoted to the creation of the scientific journal "Problems of Modern Science and Education" in 2019.

"Pedagogical methodology and advanced training" (Author: Sh.R.Nuritdinov, 2008).

"Didactic principles of improving vocational education" (Author: M.A.Khidirova, 2010).

"Pedagogy of professional educational institutions" (Author: A.M.Mirzakulov, 2013).

"Organizational and pedagogical foundations of advanced training" (Author: K.H.Makhmudov, 2015).

"Innovative technologies in professional educational institutions" (Author: A.M.Shukurov, 2017).

These literature also contain important information about advanced training and organizational and pedagogical conditions for training personnel in professional educational institutions [1, 2, 3, 4, 5, 6].

MATERIAL AND METHODS

When conducting research on the topic of organizational and pedagogical conditions for optimizing training in a professional educational institution, various methods can be used. These studies tend to include sociological, psychological, pedagogical, information technology, and other methods.

Research methodologies on this topic can be in the following forms:

1. **Questionnaire:** This methodology does not collect important information on organizational and pedagogical conditions for optimizing personnel training. The organization of the survey is of particular importance, since in this method observers have the opportunity to adjust the data, determine the level of importance and carry out optimization.

2. **Analysis of the manager's requests:** With the help of the manager's requests, data can be collected to study and optimize the organizational and pedagogical conditions of personnel training. With the help of requests from managers, it will be possible to identify and solve problems arising in the activities of the institution, and additionally stimulate the training of professional personnel.

3. **Statistical analysis:** This method does not collect a large amount of data and statistical indicators related to the organizational and pedagogical conditions for optimizing training. Using statistical analysis, in any year of the institution's activity, it will be possible to determine the indicators that require optimization of training, established by the state, and the high specialists necessary to further stimulate training.

4. **Survey:** according to this method, questionnaires are used to determine organizational and pedagogical conditions for optimizing personnel training. With the help of questionnaires, he collects concepts and opinions about the organizational and pedagogical conditions of training, organizational activities and pedagogical methods.

5. **Assessment:** using this methodology, specific indicators are prepared to assess the organizational and pedagogical conditions for optimizing personnel training. With the help of this method, pedagogical methods of training, increasing the level of knowledge of students, and further stimulating the professional training of pedagogical personnel are evaluated.

6. **Analysis of the quality and results of education:** Information technologies are used to study the organizational and pedagogical conditions for optimizing personnel training using this methodology and evaluating results. Using this method, moving information about the activities of the institution is obtained and displayed.

7. **Distance learning methods:** The distance system is used to study and implement in practice the organizational and pedagogical conditions for optimizing personnel training using distance learning methods. With this method, students will have their own time for the educational process, and teachers will have the opportunity to control students, evaluate the results of training, and use other pedagogical advice for further motivation.

8. **Special instructions:** special courses, seminars and trainings are organized to implement organizational and pedagogical conditions for optimizing personnel training using special instructions. With the help of this method, he will have the opportunity to master new methods and methods of training personnel, further develop and undergo training from higher specialists.

Similar various methods are used to conduct research on organizational and pedagogical conditions for optimizing personnel training. These methodologies can also influence institutional development, staff development, and student performance to determine their importance.

These methods can be implemented in all educational institutions, since optimizing training and achieving high student results are the main goals of all educational institutions. It is important in ensuring the high quality of personnel training to conduct studies of organizational and pedagogical conditions for optimizing personnel training, mastering new methods and methods, further self-development and training with senior specialists, organizing special courses, seminars and trainings.

By combining and implementing all methods, you can pay attention to the organizational and pedagogical conditions for optimizing training, study the unique capabilities of educational institutions, additionally motivate employees and ensure that students receive high results.

In addition, the following techniques and techniques can be used to comply with the organizational and pedagogical conditions for optimizing personnel training:

1**. Individual approach**: Study of personnel according to their knowledge, experience and features, mastery of them, organization of private approaches for obtaining high results.

2. **Group approach**: Group approaches include consistent approaches to leadership, methods and ideas that employees share when addressing specific tasks, solving problems in the workplace, or training from bosses.

3. **Training and courses**: Teachers should conduct special courses, seminars and trainings covering all aspects of training, advice and support.

4. **Electives:** The best way for students and staff to gain new experience and knowledge is through

electives. This can help to motivate employees more, arouse interest in them and acquire new knowledge.

5. **Good organization**: Good organization in educational institutions helps in effective management of the work process, motivation of staff and achievements of students. At the same time, it is also important to evaluate and approach work among employees to achieve success in training.

In order to gain more experience and knowledge, educational institutions cooperate with specialists with more experience. At the same time, employees can acquire important skills for further development and improvement.

RESULT AND DISCUSSION

Organizational and pedagogical conditions for optimizing training in a professional educational institution are important in ensuring a high level of skill for both employees of the educational institution and students. This allows you to get high results in the workplace with ready-made staff, new knowledge and experience.

To achieve this goal, it is necessary to comply with the organizational and pedagogical conditions of educational institutions and introduce innovative guidelines in this area. In addition, it is important to conduct special trainings and courses on staff training, assess the effectiveness of work, expand selection methods for gaining new experience and knowledge.

As a result, this helps to ensure the effectiveness of educational institutions to achieve success in training personnel, assessing activities, further development of personnel and motivating students. In this case, it is possible to fulfill such important tasks as the further development of educational institutions, effective workflow management, and increased acquisition of new experience and knowledge.

At the same time, organizational and pedagogical conditions and the introduction of innovative manuals will contribute to the successful implementation of training in educational institutions. Educational institutions allow you to create safe and comfortable conditions for self-renewal and preparation for self-improvement, training ready-made personnel as leading specialists and training students at a high level.

Research activities in educational institutions are also important. This will help in the further development of organizational and pedagogical conditions and the successful implementation of innovative applications. Educational institutions combine interaction and influence to make the learning process more efficient.

All this shows the importance of training personnel in educational institutions and helps to master and strive for the implementation of organizational and pedagogical conditions used in this area, and the conditions for the implementation of innovative applications. Research and scientific results on the topic of optimization of organizational and pedagogical conditions for training personnel in educational organizations show that this direction is important. Research on this topic plays an important role in the development of the field of education.

First of all, the introduction of organizational and pedagogical conditions and innovative manuals for optimizing personnel training will make it possible to prepare ready-made personnel at a higher level during.

Secondly, research activities in educational institutions are important. This is of great importance in the implementation of innovative applications, since these indicators help to implement and absorb innovations in educational institutions. Further development and renewal of educational institutions will be possible through research activities.

Thirdly, the introduction of organizational and pedagogical conditions and innovative manuals will further improve the quality of service in educational institutions. These conditions help students learn new skills and develop.

Variables and high safety requirements indicate the need to implement more innovative personnel training methods. These guides will further empower students and enable them to view ready-made footage safely, conveniently, and efficiently. Further development and renewal of educational institutions is possible by increasing the introduction of innovative manuals for training personnel in educational institutions. According to the data, the organizational and pedagogical conditions for optimizing personnel training in professional educational organizations are as follows:

1. **Special training programs:** In institutions, special training programs should be developed and implemented to train employees. These programs help employees get training and master their activities.

2. **Support from faculty and specialists of the department:** Faculty and specialists of the department play an important role in training personnel. They should help, support and guide employees based on their professional knowledge and experience.

3. **Employee Information Systems:** Educational institutions should organize employee information systems. These systems help employees learn and receive training. Also, through the systems, employees can apply for work, send resumes and other instructions.

4. **Practical training to increase employee experience:** To improve and develop employee experience, practical training and professional guidance courses should be organized. These trainings and courses help employees learn new technologies, methods and practices.

5. **Employee assessment and motivation:** It is important to evaluate and motivate employees. Thanks to these projects, it is possible to evaluate the

training, plans and results of employees, encourage and develop them in order to achieve high efficiency.

According to the information:

• With good knowledge of organizational and pedagogical conditions in the process of training, new personnel will be able to strengthen their qualifications and prepare well before joining an educational institution.

• Information and computer technologies can be used to determine what organizational and pedagogical conditions should be, in turn, for the application and creation of pedagogical methods that are classified directly in the educational process.

• If this is a short open question, then if such organizational and pedagogical conditions are determined and implemented, then the training process will create good organizational and pedagogical conditions and consolidate new personnel, allow them to be well trained and mastered, mastered and developed, mastered and mastered.

Conclusion

There are studies, advice and experiments on the organizational and pedagogical conditions for optimizing training in a professional educational institution. Organizational and pedagogical conditions consist of a number of instructions, which should be given due attention.

When implementing these organizational and pedagogical conditions, it is necessary to strengthen pedagogical methods and demonstrate the use of information and computer technologies. This allows you to develop skill and skill in the process of training personnel.

Organizational and pedagogical conditions for personnel training should also be clearly planned and monitored. This allows you to strengthen the process of learning and assimilating new personnel.

At the same time, it is necessary to actively participate in the educational institution of specialists in the basics of practical training and pedagogical methods of training. Also, in the process of training, it is necessary to organize special courses that allow you to study, experiment and master new pedagogical methods, information and computer technologies and training methods.

In particular, organizational and pedagogical conditions for training personnel should be clearly planned, practical training bases and pedagogical methods, the use of information and computer technologies, training and advanced training courses for pedagogical personnel should be used. At the same time, the submission and development of the training process is well controlled and allows them to be mastered in an educational institution.

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Alisher Fayzievich Ismailov
State Museum of the History of Uzbekistan, Academy of Sciences of Uzbekistan
Scientific secretary,
doctor of philosophy (PhD) in pedagogical sciences, senior researcher.
Tashkent, Uzbekistan
alisher.ismailov.1981@mail.ru

FROM THE HISTORY OF THE FORMATION OF SCIENCE MUSEUMS

Abstract: This article analyzes the formation of science museums and their difference from traditional museums. The real emphasis in science museums is determined by the development of science.

Key words: Museion, Science Museum, enlivenment, museum of traditional objects, entertaining science, touch with your hands!.

Language: English

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Introduction

It is known that the museum is derived from the Greek word «Museion», which means a place dedicated to the muses. In ancient times, some art monuments were collected in temples and various exhibitions were organized. The impetus for the development of museum work began with the emergence of collecting experience in people and the preservation of original objects from nature not as a totalitarian economy or valuable item, but as a documentary memorial with a high aesthetic value [1,15]. Therefore, museums are the most important part of the cultural life of society. They play an important role in preserving historical memory and continuity between generations, and in conveying spiritual and cultural heritage. Museums represent a certain phenomenon of science, culture and public space, reflect their level of development. Studying various aspects of the history of museum work can help you understand the particular inclinations and hobbies of a particular era. Thus, by collecting and preserving relics of different periods, museums themselves are, in a sense, relics of the period in which they were created [2].

Historically, such important changes in human societies have been reflected in the representation of natural and cultural heritage in museums. Museums have even directly participated in the formation of historical and semiotic systems for their interpretation. Museums have been criticized as institutions that endlessly reproduce taxonomic ensembles and deform various social forms and multiple systems of knowledge. Such convergent historiography has neglected the various calendar systems by which other societies not only measure time but also vitally construct their sense of reality. By establishing chronological structures that are temporal in Western history, museums have come to be seen as teleological time machines [3,70-72].

Materials and methods

Speaking about scientific and technical museums, it should be noted that due to historical reasons, there is a significant difference between the understanding of their functions in Russia and in the West. A comparative analysis conducted by L. N. Bakayutova shows that museums in Russia and the Soviet Union solved the problem of spreading «the idea of technology and technological development as a decisive means of achieving common welfare» in society. Unlike local museums, European technical museums established in 1910-1920 relied on different conceptual approaches in their development and pursued other goals. In them, the museum was considered as an institution that shows how

technology played a role in the life of society at different historical stages [4,96-102].

Thus, solving the problem by simply copying the world's models turned out to be futile. However, turning to their experience was not ineffective. Nowadays, there are a lot of science and technology museums in the world, especially in developed countries. As noted by V. M. Grusman, museums of science and technology are among the factors that make it easy to «revive» time, «bring historical events or events closer to the spiritual life of modern society.»

It is worth noting the museums where various objects related to the history of the development of science and technology have been reconstructed. First of all, if we emphasize about British museums, their themes are related to the period of the industrial revolution. For example, former textile manufacturer Richard Arkwright's factory in Cornwall now introduces visitors not only to originals, but also to models of the first automatic looms, one of the symbols of the Great Industrial Revolution - the working principle. Such museums not only preserve historical memory, but also adapt it to mass visitors and help them directly enter this period [5,96-102].

In the last three decades, science museums have been transformed from a «traditional museum of objects» into an environment that interacts with the general public, on the one hand, to promote the specifics of scientific knowledge and, on the other hand, to discuss the public image of science [6,716-718]. We are talking about solving a difficult creative task - to turn the museum into an area of «entertaining science» for children and adults, while preserving the scientific and educational content. Thanks to this approach, their audience is steadily growing: in 2005, according to the Association of Science and Technology Training Centers, 41 million people from 96 countries visited them [7,64-70].

Digital technology development is no longer just an option, but a necessity, and museums are constantly creating and implementing new concepts related to this issue.

In short, museums are being reborn as experiential spaces rather than as educational spaces that deliver knowledge [8,412-417]. That is why, recently, the desire for mutual relations between a school and a social and cultural institution such as a museum has increased, showing the inseparable unity of culture and education. Representing the environment for the implementation of changes in education through culture, the museum is a natural partner of the school in the humanitarian development of scientific and technical achievements, overcoming the scientific direction in education.

The difference between science museums and traditional museums is that scientific and educational centers are interactive, their main principle is «touch with your hands!» can emphasize that [9,64-70].

Arguably, it's a place where people of all ages can read at their own pace to satisfy their curiosity; using their feelings and emotions to ask questions and get answers also explains what they have learned to others.

Mutual relations between the school and the museum can be considered as a separate direction of development. Today, this problem is extremely important, clearly revealing old and new contradictions in pedagogy and museum policy [10]. Processes of humanization of education show interest in museum pedagogy as a field of scientific and practical activity of a modern museum that helps to solve these problems.

That is why the museum is a complex and multifaceted phenomenon. In the culture of Western Europe, the museum not only performs the functions of collecting and storing artifacts, but also reflects a certain socio-cultural situation in all the diversity of scientific, aesthetic, pedagogical, ideological, recreational, and economic aspects. In the second half of the 20th century, the problem of the museum became particularly acute, which was primarily due to the fact that the traditional forms of the end of the 19th century and the beginning of the 20th century did not correspond to the changed cultural situation [11].

In the 19th century, museums dedicated to the history of science or its separate branches, the interrelationship of science with technology, nature and man appeared. This indicates that science has become the subject of museum activity. The world's first science and technology museum-conservatory of arts and crafts was established in 1799 in the building of the monastery of St. Martin de Champagne in Paris. It is based on the collections of cars and models collected by the great engineer and inventor Jacques de Vaucaison and the Royal Academy of Sciences.

However, the widespread use of science and technology museums began in the second half of the 19th century, when the industrial revolution spread throughout Europe and the United States. The developing large-scale industry needed qualified personnel, educational institutions, laboratories, experimental workshops and museums were needed as centers for the dissemination of knowledge about advanced techniques and technologies. In order to stimulate industrial and commercial activities, national and world exhibitions showcasing the achievements of scientific discoveries, engineering and design thinking began to be organized regularly. Later, their exhibits often served as the basis for creating museums [12, 216-217].

Studying the history of the Academy of Sciences in Uzbekistan helps to understand that it is a leading organization in the field of science and shows the importance of preserved academic traditions [13, 88-95]. Today, this topic is of particular importance due to the reforms being implemented in the organization of scientific activity in our country. Reference to the

history of the Academy of Sciences complements the history of the Academy of Sciences and promotes the role of the higher scientific institution of Uzbekistan in the field of science. These aspects definitely show the need to establish science museums in our country.

Conclusion

So, the important difference between science museums and other forms of museums is that activities such as education and popularization of knowledge are considered as secondary, complementary functions of the museum. The real emphasis was determined by the development of science, and education and enlightenment were seen as derivatives of this process.

Each of the museums is unique and unrepeatable, at the same time, there are similar features in the composition of their collections, scope of activity, legal status and other characteristics, which allow to divide all the diversity of the museum world into certain groups, in other words, carry out classification. One of the most important classification categories is the profile of the museum, that is, its specialization.

Science museums are institutions that present scientific works and information to the public. The mission of a science museum is to educate the public about science and its role in society, and to provide visitors with experiences similar to those experienced by scientists and engineers. The latest technologies are often used to enhance the excitement and fun of science. The importance of science can be seen in the fact that it is open and encouraged by the participation of all.

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Francis Dindo G. De Lara
Cebu Technological University – Main
Doctor of Philosophy in Technology Management,
Cebu, Philippines
francisdindo.delara@ctu.edu.ph

CUSTOMIZED PORTABLE PIZZA OVEN: ITS DEVELOPMENT AND ACCEPTABILITY RELATED TO GARVIN'S AND TAM'S FRAMEWORKS

Abstract: Cooking equipment is a need, especially for businesses that cater and serve food in large quantities, as well as for educational institutions that offer courses on food preparation, for instance, Cebu Technological University (CTU), where the Bachelor of Science in Hospitality Management program is being offered and students dealing with food preparations. As a result, it is acceptable to satisfy their desire for a portable pizza oven. This research determined the effectiveness and the acceptability of the Customized Portable Pizza Oven as Supplemental Laboratory Equipment in Hospitality Management Cooking Subject and used the quasi-experimental method approach. The Customized Portable Pizza Oven meets the required standards and is a thorough guide in Hospitality Management Program. The prior art related to portable pizza ovens, the Cooking Apparatus is a multipurpose cooking apparatus adapted for multipurpose use as a grill, oven, stove, or patio heater. It has a chamber with straight walls and a hinged cover, a single gas burner, a cooking zone with one or more grills, an exterior drip tray, an anti-flare grease diverter, a burner and grate subassembly, and a cook-top cover. The respondent groups' assessments of how well the created customized portable pizza oven adhered to Garvin's quality dimensions. Substantial differences between respondent groups' opinions on whether the customized portable pizza oven is acceptable. The technology management of the customized portable pizza oven model. It is recommended that the Customized Portable Pizza Oven be adopted and utilized for Hospitality Management Program Supplemental Laboratory Equipment for instruction and Community Extension activity.

Key words: Customized portable pizza oven, prior arts, technical requirements, design and features, labor and materials, ergonomics and safety.

Language: English

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Introduction

Cooking equipment is a need, especially for businesses that cater and serve food in large quantities, as well as for educational institutions that offer courses on food preparation. Innovation becomes essential to meet consumers' demands, and if traditional food products want to keep the pace, they need innovation as much as other food products. Consumers feel divided about innovation in traditional products, due to the contradictory concepts laying underneath: innovation versus tradition. On the other hand, this is a particular window of opportunity because it brings innovation into a product that has a special position precisely because it is meant to be traditional [1]. Moreover, Research in the restaurant sector has focused heavily on 'culinary' innovations, with little emphasis on creativity and innovations in marketing, management, processes, and services [2]

The essential usability principles have to be implemented into the design of a product while maintaining within the boundaries of human behavior to produce a more realistic material environment. This is necessary to do so. Design approaches must be developed to liberate technology for design. This is

done with the thought that perhaps we will not design for these technologies but with them [3]. Both developed and developing economies have seen an increase in the demand for and consumption of convenience foods as a result of factors including the rapid expansion of retail chains selling convenience foods, significant advancements in food processing and packaging technologies, and significant shifts in the ways people relate to and interact with food [4]

This is still true for Cebu Technological University (CTU), where students study dealing with food preparations, particularly the Bachelor of Science in Hospitality Management and other food-related topics—almost all of the subjects in Hospitality Management deal with kitchen operations. The practical components for these classes—Kitchen Basics, Basic Food Preparation, and Specialized Cuisine—require students to set up their workspace before class. Before cooking, materials are prepared and placed according to mise en place (like a commercial kitchen) (Merriam-Webster). This culinary notion signifies that everything has been prepared and is ready for use (Schlegel et al., 2019). Culinary Creativity is the ability to produce novel and appropriate work within gastronomy (Stierand, M. 2020). Different cooking techniques may be used to produce tasty food, but if one aspect impacts the oven's proper temperature, the outcome cannot be assumed to be the same.

The obligation to participate in community outreach programs is then placed on a few faculty members who instruct courses on food. The aforementioned faculty members frequently need help in the off-campus site due to the need for an oven for the presentation and return demonstration. As a result, it is acceptable to satisfy their desire for a portable pizza oven explicitly tailored for them, and this study provides the proper response.

MATERIALS AND METHODS

This paper is a quasi-experimental of the research data utilized in the unpublished research entitled "Customized Portable Pizza Oven: Its Development And Acceptability Related To Garvin's And Tam's Frameworks", at the Cebu Technological University for technology adoption for supplementary laboratory equipment for students activities in the cooking subjects in the Hospitality Management Program. This will determine the effectiveness and acceptability of the prototype. The barriers and challenges cited in the unpublished research on precedence are: availability of materials in the area; numerous materials that entail a lot of money for procurement; and choosing the right CAD operator for designing this prototype.

RESEARCH METHODOLOGY

This study includes descriptions of the research design, environment, respondents, method for collecting data, and statistical analysis.

In this work, a quasi-experimental methodology was employed. Because it does not use randomization and instead aims to evaluate interventions, quasi-experimental research is a study that imitates experimental research but is not original experimental research. Similar to randomized trials, the goal of a quasi-experiment is to provide evidence linking treatment to a specific outcome. Nevertheless, participants are not randomly allocated to circumstances or combinations of conditions, so the results cannot be generalized to other situations in which the independent variable is changed [5].

The respondents carefully noticed the eight aspects in which the Garvin-developed quality expectations were present. These include performance, features, dependability, conformity, durability, usability, aesthetics, and perceived quality.

RESULTS AND DISCUSSION

The assessment and determining the effectiveness of the Customized Portable Pizza Oven Technological University-Main Campus during the Academic Year 2022-2023 basis on Technology Model.

The prior art related to portable pizza ovens The Cooking Apparatus is a multipurpose cooking apparatus adapted for multipurpose use as a grill, oven, stove, or patio heater. It has a chamber with straight walls and a hinged cover, a single gas burner, a cooking zone with one or more grills, an exterior drip tray, an anti-flare grease diverter, a burner and grate subassembly, and a cook-top cover.

The respondent groups' assessments of how well the created customized portable pizza oven adhered to Garvin's quality dimensions. They are able to perform their task during the testing of the model and they have different positive experience during the cooking, baking, and grilling using the prototype.

Substantial differences between respondent groups' opinions on whether the customized portable pizza oven is acceptable. As they have different takeaways of the prototype, most of their choice is very useful for laboratories activities and for community training use.

The technology management of the customized portable pizza oven model involves several key consideration, including design, fabrication, quality control and ongoing product development.

Design and Features

To create a user-friendly, multifunctional culinary tool that may improve existing cooking abilities or help develop new ones while maintaining a quality comparable to commercially available cooking and baking tools. The concept is to build a portable, specially designed-pizza oven with a grill on

top and a center table for gathering all the components required to prepare a particular dish. The prototype is simple to travel and may be used for business, personal, educational, and community training. I will be redesigning the standard oven into a versatile cooking appliance as part of the process. [6]

The customized pizza oven has an attachment of 304 stainless steel flat grills attached to the cooking chamber. As the heat circulates within the chamber, it will travel to the convection plate; as the heat escapes, it will be controlled by the air vent, which control desired temperature, as you will open minimum to maximum. As the griddle begins to heat up, you may apply the different cooking techniques the user will have to sauté vegetables, sear burger patties, or make pancakes. While preheating the pizza oven or in the process of cooking the pizza. The other attachment is a customized centerfold table with a stainless steel clip that will help the customized pizza oven holds.

For the end user to comfortably carry out his task, it can be adjusted to the desired height. The mise en place the ingredients in making pizza, lasagna, and sauces or any preparation related to the dish the end user will prepare. While the customized pizza oven has worked well for its intended purpose, the inventor used 304 stainless steel to promote food safety and anti-corrosion, and the oven's walls have fiberglass attached to provide insulation that can prevent skin burns as part of the safety features.

Target Group. Those in the Academe and Technical Vocational Institutions that offer culinary courses with minimal laboratory resources can be used to supplement the learning needs of the students and trainees. For those Food Entrepreneurs who hardly mobilize their cooking equipment for day-to-day operations, the end user will no longer bring a table and pots and pans to do the cooking task. Also, it is simple to operate.

Intended Outcome. The desired result will be a functioning prototype with accompanying 3D CAD renderings and photos of the progress and final product.

Cooking Chamber. This figure is the cooking chamber of the oven. The yellow U shape is the burner and is made of carbon steel. It provides heat to the entire chamber; it is controlled by the gas valve to reach the desired internal temperature. The dimension is ideal for 18 inches pizza, the height is ideal for lasagna, bread, and pastries, and the other dimension includes 2 inches of thick heat insulation to hold the heat.

Operations and Functions

Encompasses the entire or almost the entire operational and functional range of the customized portable pizza oven.

Operations

Gas-powered portable pizza ovens bake pizza. Gas fuel replaces wood in this case. This modified portable pizza oven is preferred over wood-fired ovens because it bakes pizza faster. Modern ovens make temperature and time control easier. The 304 stainless steel background coating makes pizza cooking more flexible and durable. Pizza operations use the cooking chamber, which heats the griddle on top and releases surplus heat through the emission vent. Hawaiian pizza makers use the LPG tank to fuel the chamber fire. This customized portable oven lets operators cook on the griddle while preheating the cooking chamber. The oven's operators can relax at a table.

Functions

Heating is possibly the most traditional way of processing foods. The technologies involved in heating have been continuously developing for the past many years as per consumer need, satisfaction and demand [7]. Usage of Customized Portable Pizza Oven. Although there are different ways to use it, the usage is straightforward. You know that you can use a customized portable pizza oven outside of your home, for community extension training, in a lab class, and occasionally for transportation to the ideal area where you would love to enjoy a piece of your favorite pizza. You can cook and consume any pizza style in these customized portable pizza ovens, regardless of your preferences. The good news is that these ovens are for more than just baking pizza. The dimension of pizza that can accommodate this prototype is from 6" to 18" large dough.

Baked Pizza. Baking and roasting are characterized as methods used for high-temperature food processing. The cooking mode can be convective, radiative, or conductive heat transferring modes, to develop the proper quality of baked and roasted foods through diffusion, evaporation, starch gelatinization, protein denaturation, and nonenzymatic browning reaction [8]. Pre-heat the oven on high. Professional pizza ovens are hotter than kitchen appliances. The oven's highest setting should be 500F (260C). Pizza stones take longer to heat than ovens, so wait 30 minutes. This change is major.

Gas ovens heat unevenly and produce more moisture than electric ovens. A warmed pizza stone removes moisture to prevent sogginess and cooks food faster and more evenly. Put your homemade pizza dough on a floured or cornmeal-dusted pizza peel to prevent sticking. Roll the dough into a disk and form the crust lip with your hands. Pull your pizza to the right thickness. After lightly oiling the crust lip,

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add all toppings. Slide pizza onto the prepared pizza stone. Gently shake the pizza peel to remove dough. Pizza will slide off the peel when shaken over the heating surface. Drop the remaining pizza by swiftly jerking the peel back. Examine the pizza after five minutes. Don't use the recipe's time if you bake pizzas at a lower temperature. Most handmade pizza takes 8–12 minutes at 500–550°F (260–285°C). Take it out when the crust is browned and the top is bubbling.

Roasted Vegetables. The ideal temperature to preheat our unique portable pizza oven is 400–450 °F (204–232 °C). Roasting is best done at a temperature of 425 °F (218 °C), but it can also be done at a temperature close to this. If the temperature is too low, the vegetables will overcook before they get the necessary browning. Vegetables must be cooked at a high temperature for perfect tenderness and caramelization. The oven should be preheated to 450 °F (232 °C) before roasting (232 °C).

Bake Bread. Baking is the final, crucial step in breadmaking. It requires very high temperatures, typically in a range between 160 and 250 °C, and there are several techniques that use different types of oven (9). Depending on the type of bread being cooked, pizza ovens are frequently heated to 450 °F (232 °C) before roasting (232 °C), and baking bread at a temperature between 200 and 250 °F (392-482 °F) is standard. Bread like naan and garlic bread will cook quickly at the highest temperature range. Then, lean bread (a dough low in fat and sugar) is cooked at roughly 392-446 F (200-230 C), including sourdough, ciabatta, focaccia, and rolls. Fattier, egg- and sugar-rich bread are baked till they resemble cakes at a lower temperature of about 356 °F (180 °C).

Roasted and Slow-Cooked Meat - Roast or slow-cook a chicken or beef stew for a delectable supper. Season in a roasting pan, and roast until the meat is moist and fall-off-the-bone tender. A temperature of 320 degrees Fahrenheit (160 degrees Celsius) must be maintained for the meat to cook for around four hours.

Seafood. Fish can be roasted until cooked by being wrapped in a bundle with lemon wedges and chili. Turn on the custom-built portable pizza oven at 350 °C (662 °F). You can determine the temperature inside by briefly glancing at the bi-metallic thermometer affixed to the oven.

Griddle. Food like pancakes, French toast, toast, and eggs are cooked on a large, flat surface known as a griddle. Griddles can cook all of these items at once due to their size. Griddles can be recognized by their perfectly smooth surface. Low heat is between 200 and 250 degrees on a thermometer. It is perfect for slow-cooking stews, simmering sauces, braising meat, and cooking beans. Turn the skillet to medium to begin cooking the meal. Reduce the heat to a low setting as the food starts to steam, then simmer as you would on a stovetop.

Ergonomics and Safety

The process of designing a job to fit the employee, can reduce these costs and make the work safer and more efficient. When implemented as part of a comprehensive workplace program in restaurants and bars, ergonomics also helps reduce absenteeism, increase productivity, and decrease the chance for higher insurance premiums [10].

To provide comfort to the operators of this customized portable oven, I designed and fabricated a stainless centerfold preparation table where the oven is placed during the operations and has an adjustable height to improve the comfort and productivity of the operators. The stainless centerfold table can easily be cleaned and dismantled when the operators are done with the task; it is easy to store and can be lifted by one person.

CONCLUSION

The customized portable pizza oven meets the required standards and is a precise guide for the Hospitality Management Program Supplemental Laboratory Equipment for instruction and the Community Extension Program. Consequently, it had attained its goal of effectivity and acceptability as to Garvin's quality dimensions in terms of performance, reliability, conformity, durability, and serviceability.

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Tamar Sekhniashvili
child and adolescent's rehabilitation center "PUZZLE"
MA, BCBA,IBA;
Clinical Director
+995595701075
Tsekhniashvili77@gmail.com

Tamara Turashvili
Georgian institute of Public Affiars
Lecturer, (GIPA)
Ph.D; Associate Professor University of Georgia
+996568717272
Tamara.turashvili@gmail.com

WORK-RELATED BURNOUT AND ENGAGEMENT IN PERSONNEL EMPLOYED AT SERVICE SECTOR IN GEORGIA

Abstract: A prerequisite for a successful organization lies in developing employees' strengths, creating goals and positive emotions for them, ensuring high level of engagement, and forming positive interactions. The present study aimed at exploring work-related burnout and engagement. Additionally, it was tested whether marital status of employees had any effect on burnout and engagement. Research was carried out among personnel employed at a rehabilitation center and an insurance company. Results showed high negative correlation between burnout and engagement, r(131)=.697, p = .000. However, no significant differences were found in burnout and engagement scores between married and unmarried employees.

Key words: Burnout, engagement, marital status, organizational psychology.
Language: English

Introduction
Literature Review and Hypotheses

Organizational psychology is focused on developing dynamic, healthy processes at organization, such as "flourishing" and resilience, as an important adaptive skill of individuals (Luthans, 2002), engagement, kindness, and enhancing positive human potential, such as motivation, altruism, unconditional self-commitment (Cameron, 2003).

Burnout

Studying burnout syndrome of an employee has been the focus of research for several decades. Increase in professional needs leads to increase in the impact of negative consequences on an individual's health, which, in turn, affects an individual themselves, their life quality and, generally, the society at large. Burnout is a significant challenge for an organization, employees, and clients who get service from the latter, and the whole society.

The most common definition of burnout is proposed by Maslach & Jackson (1981a, p. 99): "Burnout is a syndrome of emotional exhaustion and cynicism that occurs frequently among individuals who do 'people work' of some kind."

Burnout is a metaphor to describe the state of mental exhaustion (Schaufeli, De Witte, & Desart, 2020).

According to the Maslach's inventory of emotional burnout (Maslach & Jackson, 1981b),

professional burnout consists of three dimensions: 1) Emotional burnout – when one experiences emotional tension and constant fatigue; 2) depersonalization – when one distances oneself from one's work, work-related tasks and obligations, and clients and colleagues (Kahn et al., 2006; Schaufeli & Enzmann, 1998); and 3) diminishing personal achievements, which can be seen as a sense of incompetence and lack of achievements at work (Maslach & Leiter, 2008).

Burnout is caused by imbalance between high requirements during work performance and insufficient resources (Schaufeli & Taris, 2014). Unmet needs, disappointment, tension, failure to restore energy after stressful workday (Cordes & Doughterty, 1993) have negative effect on individual's physical and psychological wellbeing, which might lead to absenteeism, insomnia, alcohol consumption, addiction to substances, family issues (Maslach & Leiter, 2008), sense of incompetence and lower work performance (Swider & Zimmerman, 2010).

Engagement

Engagement is a multidimensional construct (Law et al., 1998; Rich et al., 2010), a psychological condition, during which people are focused only on the work they perform (Forgeard et al., 2011). The highest level of engagement is "flow" (Csikszentmihalyi, 1996). According to Csikszentmihalyi (1996, 1997), the highest level of engagement is characterized by the following: Person has exact goals and inner interest towards their tasks; task is pertinent to person's qualification level; task provides direct and mediated feedback to person; person maintains a sense of control over one's work; action and consciousness are in tune, and person is fully engaged in the work they are performing.

Like positive emotions, engagement is assessed subjectively (Seligman, 2011). Engagement in work at an organization involves intense concentration, absorption (Schaufeli, Bakker, & Salanova, 2006; Csikszentmihalyi, 1990). Kahn (1990) defined engagement of an employee as a holistic manifestation of person's self (physical, cognitive, and emotional) in their job role (Joo & Lee, 2016).

Definition of work engagement proposed by authors (Schaufeli, Salanova, González-Romá, & Bakker, 2011) implies positive, complete work-related state of mind, which is characterized by the following: 1) Vigor – physical steadiness and highest level of energy; regardless challenges, person is ready to commit to work; 2) dedication – enthusiasm, absorption, pride and engagement in one's work; 3) absorption – complete concentration on work. This leads to the sense of time flying fast and, as a result, person finds hard to get bored with their work (Schaufeli & Bakker, 2004).

This element of wellbeing incorporates enjoyment, ecstasy, comfort, and warmth. However, thoughts and feelings are absent during "flow" (Seligman, 2011).

Results of an organization are best reflected in an employee's engagement (Harter, Schmidt, & Hayes, 2002; Stander, Mostert, & de Beer, 2014; Woerkom, Oerlemans, & Bakker, 2015).

Present Study

Schaufeli and Bakker (2001) argue that burnout and engagement are two distinct concepts and should be assessed independently. These two are contradictory concepts, but this does not mean that when one (burnout) is higher, the other (engagement) should be low *per se* (Schaufeli & Bakker, 2011).

The aim of the present study was based on this assumption, and it was explored whether higher levels of burnout would be related to lower levels of engagement and vice versa. Indeed, work engagement is characterized by high energy with person identifying oneself with the work performed by them. On the other hand, burnout is characterized by low energy where person cannot identify oneself with the work performed (Schaufeli & Bakker, 2004).

Additionally, the present research focused on whether marital status could provide any differences in burnout and engagement levels. As certain studies suggest, single respondents showed lower level of burnout as compared to divorced participants (Zhang et al., 2020); also, married respondents showed lower burnout level than single participants (Harper, Alshammani, Ferdynus, & Kalfa, 2020).

Method
Participants and Procedures

The study was carried out among personnel employed at a rehabilitation center (behavioral therapist, speech therapist, psychologist, occupational therapist, physical therapist, office manager, supervisor, housewife) and at an insurance company (sales managers).

133 respondents participated in the study with 10 males only. Participants' age ranged from 20 through 74. As for their marital status, 40 were single, 69 were married, 11 – divorced, 11 were in a free relationship, and two were widowed. Out of 69 married respondents, 60 had children.

The questionnaire was sent out to respondents online, via Google Forms. Participation was voluntary, and instructions on how to fill it out, research goals, and information on study's confidential nature were provided in the beginning of the survey. The time required for filling out the questionnaire was 40-45 minutes on average.

Prior to administering the questionnaire, participants read the informed consent. IP addresses have been deleted after completing the survey and no emails or names of participants were recorded. Data safety and privacy protection was ensured.

Instruments

Burnout was measured by Work-related Version of the BAT (Schaufeli, de Witte, & Desart, 2019). The questionnaire consists of 33 items. 23 items measure core symptoms: 1) Exhaustion, which is physically experienced as weakness or fatigue manifested in specific symptoms such as fatigue at work, lack of energy to begin the new day, inability to restore energy and have rest after work; 2) mental distance, which means that work process becomes aversive for person, they avoid contact with colleagues and even clients, enthusiasm and interest towards work is virtually absent and feels as if person functions on autopilot; 3) cognitive impairment – person finds difficult to make decisions independently; attention and concentration deficit are present as well as problems with focusing on one's work; 4) emotional impairment – disappointment, anger and inability to manage one's emotions at work. Other 10 items measure secondary symptoms: 1) Psychological complaints such as sleep problems, anxiety, weight loss without diet; 2) psychosomatic complaints, that is, symptoms manifested as a result of psychological problems, such as increased heart rate, chest pain, frequent sickness. Items for secondary symptoms serve as tools to gain additional information. Scores for core and secondary symptoms assess whether emotional burnout is a syndrome with its key element being exhaustion (Schaufeli, 2019). The questionnaire measures work burnout using 5-points Likert scale (1 = *never,2=rarely, 3=sometimes, 4=often* and 5 = *always*). Items were provided in original sequence. Using questionnaire is recommended both individually and collectively at an organization to determine the level of emotional burnout.

Engagement was measured by the Utrecht Work Engagement Scale (Schaufeli & Bakker, 2003). The questionnaire includes 17 items assessing work-related engagement. The latter is defined as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption (Schaufeli & Bakker, 2003, p. 5). Items presented in the scale are divided in line with this definition, measuring three components of engagement: 1) Vigor – vitality, readiness and ability to resist the difficulties at work; 2) dedication – a sense of value of one's performed work, enthusiasm, and inspiration; 3) absorption – complete engagement in the work process and a sense of happiness gained from the process. Answers are provided on 7-points Likert scale with 0 = *never,* 1 = *almost never* (several times a year or less), 2 = *rarely* (once a month or less), 3 = *sometimes* (a few times a month), 4 = *often* (once a week), 5 = *very often* (several times a week), and 6 = *always* (every day). Items were provided in original sequence.

Results

Descriptive statistics showed that the level of burnout(Core Symptoms) of study participants was medium: M = 2.14 (SD = .70). Burnout(Core symptoms) scores range from 1 through 5. Scores obtained in the study were divided into four categories: 1) Low (0–1.60), 2) average (1.61–2.40), 3) high (2.41–3.29), and 4) very high (3.30–5). Percentages for each category are shown in Table 1.

Table 1. Distribution of percentages for burnout(Core symptoms) levels

Low	23%
Average	45%
High	26%
Very high	6%

Almost third of the participants (32%) scored high or very high on work burnout.

Analysis of secondary symptoms showed that respondent had higher burnout level: M = 2.47 (SD = .83). Similarly, scores of secondary symptoms range from 1 through 5, and scores obtained in the study were divided into same four categories. Percentages for each category are shown in Table 2.

Table 2. Distribution of percentages for secondary symptoms

Low	14%
Average	43%
High	28%
Very high	15%

In the same vein, almost third of the participants (33%) scored high or very high on burnout.

Table 3. Correlation between burnout and engagement

Correlations		BAT	UWES
BAT	Pearson Correlation	1	-.697**
	Sig. (2-tailed)		.000
	N	133	133
UWES	Pearson Correlation	-.697**	1
	Sig. (2-tailed)	.000	
	N	133	133
**. Correlation is significant at the .01 level (2-tailed).			

Relationship between burnout and engagement was tested through Pearson's correlation. As Table 3 shows there was a strong negative correlation between engagement and burnout, $r(131) = -.697$, $p = .000$.

Additionally, linear regression was performed with engagement as a predictor variable and burnout as an outcome variable. As Table 4 shows, regression model was statistically significant, $F(1, 131) = 123.854$, $p = .000$.

Table 4. Regression on burnout: ANOVA

ANOVA[a]		Sum of Squares	*df*	Mean Square	F	Sig.
Model						
1	Regression	31.474	1	31.474	123.854	.000[b]
	Residual	33.290	131	.254		
	Total	64.764	132			
a. Dependent Variable: BAT						
b. Predictors: (Constant), UWES						

As shown in Table 5, engagement emerged as a statistically significant predictor of burnout, $\beta = .697$, $t = -.11.129$, $p = .000$.

Table 5. Regression on burnout: Beta Coefficients

Coefficients[a]		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.741	.151		24.851	.000
	UWES	-.422	.038	-.697	-11.129	.000
a. Dependent Variable: BAT						

Given the findings, regression equation can be produced: BAT = 3.741+UWES*(-.422).

Table 6. Regression on burnout: R-squared

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.697[a]	.486	.482	.50411
a. Predictors: (Constant), UWES				

Engagement can be accounted for 48.6% of variability of burnout scores (see Table 6), that is, 46.8% of variability in burnout scores can be explained by variability in engagement scores.

Pearson's correlation was used to explore the relationship between age and burnout and engagement. However (see Table 7), no significant correlations were found between age and burnout or engagement.

Table 7. Correlations of age with burnout and engagement

Correlations		
		Age
Age	Pearson Correlation	1
	Sig. (2-tailed)	
	N	133
BAT	Pearson Correlation	-.084
	Sig. (2-tailed)	.337
	N	133
UWES	Pearson Correlation	.001
	Sig. (2-tailed)	.992
	N	133

Independent samples t-test was used to explore the possible differences in burnout and engagement scores between respondents with different marital status. However, as the t-test showed, no statistically significant differences were found between single and married participants in neither burnout (mean difference = .22, $t = 1.761$, $p > .05$), nor engagement scores (mean difference = .10, $t = .471$, $p > .05$).

Discussion

The goal of the current paper was to study the relationship between work burnout and engagement among personnel employed at service sector in Georgia.

Although the study was carried out only at one rehabilitation center and one insurance company and the small size of the sample does not allow for generalizations, certain predictions can still be made.

It was hypothesized that low burnout levels would be associated with high engagement levels and vice versa (Schaufeli & Bakker, 2001). Indeed, the correlational analysis showed statistically significant strong negative association between the two variables. Additionally, regression analysis confirmed that engagement significantly and negatively predicted burnout.

Also, according to the study results, respondents obtained high scores on core symptoms of burnout (exhaustion, mental distance, cognitive impairment, emotional impairment). Almost third of the participants (32%) had high or very high levels of burnout. Moreover, respondents demonstrated even higher levels of secondary symptoms of burnout (psychological complaints, psychosomatic complaints).

At an organizational level, it is important to implement the programs that would be directed toward reducing burnout consequences. Gross (1998) proposed strategies of emotional regulation such as cognitive reappraisal and suppression, improving ability to work and skills for employees in a manner that it is appropriate to the goals of an organization.

It is worth noting that, according to the results, age did not correlate significantly with burnout or engagement.

Certain studies (Cañadas-De la Fuente et al., 2018) suggest that marital status provides support and protection from cynical and indifferent attitudes at

work. However, the present study did not show any statistically significant differences between single and married participants in neither burnout, nor engagement scores (Bakker et al., 2005; Zhang et al., 2020). Thus, it can be argued that marital status does not have any impact on burnout and engagement of those employed at the rehabilitation center and the insurance company where the research was conducted.

Scholars (Jeung et al., 2018) argue that enhancing employees' abilities and competences and

behavior modification strategies serve as important interventions at an organizational level.

Limitations and Directions for Future Research

The present research has certain limitations. The instruments used in the study were translated in Georgian impromptu for the research without being validated and adapted to Georgian context. Another limitation is the small size of sample not allowing for generalizations to other organizations or larger population in general.

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Mahfuzakhon Abdumannob kizi Jaloldinova
International Islamic Academy of Uzbekistan
doctoral student
Tel. number: +99890 788 74 95
M.Jaloldinova1995@gmail.com

TERMS IN THE MEANING OF SOCIAL PROTECTION AND THEIR INTERPRETATION FROM THE PERSPECTIVE OF ISLAMIC LAW

Abstract: In this article, issues related to social protection, which is one of the urgent issues of society in every era, are studied from the point of view of scientific-theoretical and Islamic law. Terms such as social security, social justice, social security, social work, al-takoful al-ijtima' have come synonymous with the term social protection, and the article tried to explain it.

Key words: Social protection, social security, social justice, social supply, social work, al-takoful al-ijtima' hadith, poverty.

Language: English

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Introduction

Every country in the world has its own ultimate goals for sustainable development. Several elements play a key role in their implementation. In particular, among the principles of establishing a strong state and a strong society, the rule of law, justice, and equality, social protection is one of the factors that ensure the strength of the state.

It is a well-known fact that all religions and political-economic systems, regardless of whether they have divine origins within their historical processes, have given importance to social protection and developed policies directed at social protection. [1, p.5; 15, p.41]

Islamic law addresses the question of how to deal with poverty, which is a small aspect of financial rules, as well as the rights of the poor, the eradication of their demands, and the maintenance of their dignity in society. The concepts of "scarcity" and "poverty" are not unfamiliar to mankind [16, p.10]. One of all faiths and philosophy of fundamental concerns has long been determining the best way to address the problem of poverty, the difficulties faced by people who live there, and the problems they face. [2, p.5]

Main part

The word "social" is derived from the arabic word "community", "belonging to society", it means related to the life of a person and society, the stratum, class, society in it, dependent on the public, voluntary (unrequited) service for the needs of the society, belonging to the society, among the public. The word of protection is an arabic word that means "sponsoring by someone, defense, barrier, sponsorship". [3, p.177-178, 531]

The social protection system provides assistance to people who are unable to work and make a living or who are caring for children and dependents. [4, p. 21]

Esping-Andersen, an early theorist of social protection, realized the importance of a broader definition of the phenomenon and developed the concept of social protection regimes as "an integrated, interdependent way of producing and distributing welfare between the state, the market, and the family". [5, p.56]

The term social protection has various scientific definitions. Definitions differ in some respects. But all of them reflect selfless giving of help to people.

In terms of social policy, social protection expresses a structure that won't make an individual dependent on somebody else within an understanding of mutual cooperation and solidarity in society for the purpose of protecting the weak and vulnerable in society. [1, p.16]

Social protection of the population is a system of directly targeted guarantees that provide the population of the state with the necessary conditions for normal life activities. [7, p.3] If social protection depends on the process of factors affecting human life activity, then social protection represents the state of human living standard. [8, p.27]

Social protection in Islamic law, its history goes back to the early days of Islam. There is no separate definition of the concept of social protection in Islamic law. This concept can be seen on the basis of the Islamic state of Madinah, which was founded by our Prophet Muhammad.

The emergence and development of social protection in Islamic law occurred earlier than the concept of social protection today. While studying the concept of social protection and the functions of regulated social protection institutions in Islamic law, they emphasize that these institutions are one of the main areas of Islamic Shari'a.

The term social protection has various scientific definitions. Definitions differ in some respects. But all of them reflect selfless giving of help to people [17, p.527]. Social protection - in a broad sense, consists of a set of measures aimed at providing social assistance in the event of a social danger (risk) applied to all layers of the population. In a narrow sense, it envisages social protection of socially needy sections of the population [4, p.21]

In another definition, the social protection of the population should be understood as the process of implementation of targeted guarantees by the state to create all the basic decent conditions for the population to live and work, to support the poor. [9, p.8]

Also, based on studies in Indonesia, of particular note is Benda-Beckmann's (2007) description of social protection as a combination of family, neighborhood, friendship, local communities, religious and secular institutions, including credit groups. All these definitions assume the largest context of analysis to be the nation-state, as it would be the provider of any secular institutions of social protection. [5, p.56]

Scientists have tried to explain the social protection of the population using the following systems:

1. Social security system.
2. Employment system.
3. System of creating social benefits for some citizens, etc. [10, p.24]

In addition, in the process of researching the topic of social protection, another term, which is used as a synonym for this term, the concept of social security, was also studied. A number of scholars associate the term social security with the term al-takoful al-ijtima' in Islamic jurisprudence. This term is similar to the term social protection not only in terms of meaning, but also in terms of features and tasks, and is mainly focused on the economy.

Conditionally, social security means an insurance system aimed at protecting humanity without any discrimination, restrictions or in all situations of life, health, maternity, unemployment, rest, disability, low income, incapacity for work, pension, work injuries.

Although the terms social protection and social security were introduced into scientific circulation in the last century, their history and emergence date back to ancient times. In the development of cultures and customs of all peoples, concepts of social protection have a special place. In particular, our people have accumulated a lot of experience in the social sphere, relying on their religious and national values. It is important to study this experience and gather certain information that is available in the current social protection aspect of social relations[11, p.213-215].

Social security mainly refers to provision and support of citizens through the state, state social security systems. As for the concept of'' social security right", this concept is directly related to the concept of ''social security'' and one of its aspects, i.e. organizational and legal forms related to the implementation of social security, legal system, state bodies implementing social security, and in appropriate cases reflects the system of public bodies, the legal bases of their activity. [12, p.20]

The word "Takoful" is derived from the Arabic word "kafala" which means mutual guarantee or concern for each other. The verb "kafala" means to protect or look after someone's interests or to guarantee someone. When the suffix "ta" is added to this word, it conveys the idea of two parties providing mutual guarantees. Takoful is designed to provide protection against natural calamities, similar to the protection provided by traditional insurance. In essence, takoful is a continuation of the concept of mutual aid, as well as the widespread pre-Islamic Arab concept of compensation for the killing of an innocent. The principles of takoful are mutual responsibility, cooperation and protection. [13, p.387, 392-392] Therefore, the term'' takoful society" with its characteristics reflects social protection and fulfills certain functions. In this respect, this term can be used as a synonym.

When it comes to social protection in Islamic law, another term that expresses its meaning is social security, and there is a lot of information about it.

Allama Yusuf Qaradawi shows measures of Islamic law in solving the problem of poverty, which is one of the main issues of social protection as follows:

1. Practice
2. Taking care of poor relatives
3. Zakat
4. State provision
5. Mandatory duties other than Zakat
6. Voluntary donations and personal charity[14, p.39]

Conclusion

In this study, which was conducted on the theoretical basis of understanding the concept of social protection in Islam, it was found that this concept did not appear in the sources in the form of the term social protection. That is, the term of this name appeared in the middle of the last century. The terms social security, social justice, social supply, social work, al-takoful al-ijtima' are synonymous with the term social protection. However, the social protection system, which reflects the meaning and characteristics of social protection, was formed in the early days of Islam. It is reflected in the development of human interactions within the framework of the order of social relations in society. Therefore, an attempt was made to reveal the theoretical basis of social protection in Islam by studying the rules and principles of providing social protection to Muslims in the social relations of Islam.

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Issue   **Article**

Jurabek Sodikov
International Islamic Academy of Uzbekistan
Phd, lecturer at the department of IRCICA - the chair for the study
Islamic History and source studies.
ORCID: 0000-0003-4100-5097
jurabeksodiq@gmail.com

SIGNIFICANCE OF THE STUDY OF THE SCIENTIFIC HERITAGE OF ABU MANSUR MOTURIDI

Abstract: Among the world's Sunni Muslims, the two main major doctrines are Ash'arism and Moturidism, and the wide spread of Muturidiya doctrine (المدرسة الماتريدية) is increasing interest in it. Imam Moturidi, the founder of this doctrine, which belongs to the majority of muslims in about twenty countries today, is from Samarkand, his views, which formed the basis of his religious teaching, are recorded in the books "Kitabu-t-Tawhid" (كتاب التوحيد) and "Ta'wilat Ahli-s-Sunnah" (تأويلات أهل السنة). It is these sources that serve as the basis for determining the specific aspects of Moturidism. "Ta'wilat Ahli-s-Sunnah" is a scholarly work on the tafsir of the Qur'an, it was written in environment of Samarkand, where people of different religions and faiths live together. Therefore, with the help of this tafsir, it is acceptable to identify the specifics of many religious doctrines and views and to regulate the social relations between them.

Key words: Abu Mansur Moturidi, tafsir, Ta'wilat ahli-s-sunna, Kitab at-tawhid, non-Islamic faiths, Islamic sects, mental evidence, narrative evidence, mu'tazilites, atheists, fanatical currents.

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Introduction

Scientific research centers specializing in Islamic studies around the world are conducting research on the methods of tafsir of "Ta'wilat Ahli-s-Sunnah", its sources and manuscripts, comparative analysis with other authoritative tafsir, revealing the social significance of the source. In such research, it is expedient to focus on finding solutions to current religious issues and problems in Islam through the views of scholar. Indeed, the scientific study of the essence of the texts related to religion and religious teachings in the work of Imam Moturidi "Ta'wilat Ahli-s-Sunnah" serves to correctly understand and comprehend the essence of Islam.

As a result of religious and enlightenment reforms in Uzbekistan, educational and research institutions such as the International Islamic Academy of Uzbekistan and the Imam Moturidi International Research Center have been established. There an

effective working to study the rich scientific heritage of scholars who are from Mawaraunnahr. In particular, Abul Muin Nasafi's "Tabsiratu-l-adilla" on the teachings of Moturidi, 26-30 volumes of Imam Moturidi's tafsir were translated into uzbek language. As such doctoral dissertations about the life and scientific activity of Moturidi scholars such as Abul Muin Nasafi, Abul Lays Samarkandi, Saduddin Taftazani were written.

Main part

The life and activity of Imam Moturidi and the doctrine of Moturidi were studied by a number of scholars around the world, including Abul Muin Nasafi, Abul Yusr Pazdavi and Abdul Qadir Qurashi, and later scholars K.Brockelman, F.Sezgin, and I.P.Petrushevsky. Scholars such as U.Rudolf, A.Bebek, T.Ozdes, Bakr Topal oglu, S.Kutlu, R.Onal have also conducted special research on the

personality of Imam Moturidi and the doctrine of Moturidi [1, p. 1060-1063]. In recent years, there has been a great deal of interest in Moturidi's scientific legacy in the Arab world, where the teachings of Asharism have become widespread. Fatima Yusuf Khaymi, Majdi Basallum, Ahmad ibn Awadullah Harbi and Ahmad Sa'd Damanhuri are among the Arab scholars who have done significant work in this regard [2-18, vol. 2].

Since the 90s of the last century, the interest in the work of the scientist, the study of his scientific heritage has increased significantly [32, p. 5]. In particular, the share of Turkish scientists in this regard have been great. In 2019, scientists of the Akdeniz University of Turkey, Professor Umer Faruk Teber and Ahmet Tunahan Akgun, published their research results. The research includes all known works, research papers and articles related to Imam Maturidi and Maturidism until 2019. In particular, in this bibliography contain information about: 182 manuscripts and 307 printed works (119 Turkish, 135 Arabic, 10 Uzbek, 10 English, 7 French, 17 German, 2 Persian), 140 master's degrees and 87 doctoral dissertations and 399 articles in various languages [19, p. 688-847]. It can be seen that this study focuses mainly on studies in Turkish and Arabic languages.

During the years of independence, Uzbekistan also had the opportunity to study the scientific and spiritual heritage of Abu Mansur Moturidi on a large scale. In particular, the widespread celebration of the scholar's 1130th anniversary in 2000 led to a new level of research on Abu Mansur Moturidi and his scientific legacy. Including, A.Mansurov, A.Abdullaev, S.Okilov, Sheikh Muhammad Sodiq Muhammad Yusuf, Sh.Ziyodov and O.Palvanov in their scientific researches [20-26, p. 56], the entry of the Hanafi sect into Mawaraunnahr, the life of Abu Mansur Moturidi, the spread of the Moturidi doctrine, the scientist's scientific activities and works, his unique style and sources, the essence of the era he lived in, and the observation of important opinions and scientific conclusions about the ideological views of the Ahli Sunnah possible[27, p. 213-215].

The above shows that although significant work has been done on Moturidi's life and work, his works "Kitabu-t-Tawhid" and "Ta'wilat Ahli-s-Sunnah", the information about various religions and beliefs in Moturidi's commentary has not been fully and comprehensively studied.

"Ta'wilat Ahli-s-Sunnah"contains information on a total of 34, including 16 non-Islamic faiths and 18 Islamic sects.

The "Kitabu-t-Tawhid" contains information on a total of 30 religions and beliefs, including 16 non-Islamic religions and 14 Islamic sects.

During the time of scholar, there was also an active movement of sects belonging to the Shia group. Russian orientalist V. Barthold, based on the information of the classical Arab historian Ibn Asir,

says that the Samanid ruler Nasr II ibn Ahmad (301-331/914-943) entered the Qarmatism [28, Vol. I. p. 303.]. Other sources state that Nasr II ibn Ahmad belonged to the Shiite Ismaili sect and supported Qarmatism [29, p. 25]. These events correspond to the period when Moturidi reached the level of a scientist. For this reason, in his works, the scholar also strongly criticized the sects of the Shiite sect, such as Rafizi, Batinism and Qarmatism.

Many Western scholars and some of the scientists influenced by them try to link the early Islamic renaissance with Mu'tazilism. They explain this by the great importance given to rationalism in Mu'tazilism [30-31, p. 204-205]. Actually, this view is not correct. This is because that majority of Muslim encyclopedic scholars are followers of Ahli Sunnah, or at least there is no convincing evidence that they were mu'tazilites [32, p. 1058]. It can also be seen in the "Ta'wilat Ahli-s-Sunnah" that when Moturidi enters into a scientific debate with the mu'tazilites, he defeats them not only in terms of narrative evidence, but also in terms of logical reasoning [33, p. 422-423].

In a number of places in his commentary, scholar enters into a debate with the materialists and atheists, and surpasses them in their methods, that is, in terms of intellectual and logical arguments. In particular, in the tafsir of verse 56 of Surat "an-Nisa", Moturidi says:

"A group of mulhids (atheists) said: "The reward that will be given in the Hereafter will not be given to this "nafs" (body) who eats and drinks and does various deeds. It may be given to a soul whose original ore is light". We say that the life of the "nafs" is tested in the world by such things as eating and drinking, which is surrounded by various shortcomings and calamities. If the nafs can avoid guilt and shortcomings in spite of all the obstacles that stand in its way, it will be worthy of a great merit and a huge reward" [34, p. 286]. It is clear that some mulhids in the time of Imam Moturidi did not completely deny the Hereafter. Perhaps, those who are against the beliefs that do not agree with their minds.

Today, in many countries of the world, especially in Muslim societies, atheistic ideas mixed with "popular culture" are spreading widely [35, p. 890]. Therefore, the legacy of scholars like Moturidi, who were able to respond appropriately to atheism, is of great practical importance in the preservation of national and religious identity [36, p. 1052].

Conclusion

The number and names of non-Islamic beliefs and Islamic sects mentioned in Moturidi's two works are close. The information about their different faiths does not completely duplicate each other, but it does not contradict each other, but rather enriches each other. Their methods of argument, debate, and rebuttal are also in harmony.

Maturidi's tafsir is also of great importance in

refuting the concepts and views of misguided currents and extremist groups. This is because it covers a wide range of issues, such as "faith", "action", "herecy", "al-shirk to Allah", and "the fate of the sinner", which are important today.

At present, fanatical currents, by misinterpreting the verses of the Qur'an, are not only arousing hostility towards members of other religions, but are also trying to make the Muslim community hostile to each other. Of course, in such a situation, the need for the tafsir of "Ta'wilat Ahli-s-Sunna", which interprets the verses of the Qur'an in accordance with the traditional Islamic view, increases. From this point of view, it is one of the important tasks for today's scientists and researchers to scientifically in-depth study of the heritage of the scholar and to show ways to solve existing problems on this basis.

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Olimjon Musurmonovich Dusmatov
Samarkand State University
Professor to Department of,
Theoretical and Applied Mechanics,
dusmatov62@bk.ru

Nurali Sunnat ugli Qudratov
Samarkand State University
Masters

ON A PROBLEM OF DYNAMIC SUPPRESSION OF OSCILLATIONS OF AN ELASTIC ROD

Abstract: *In this paper, we consider the problem of transverse vibrations of an elastic rod with a dynamic damper under kinematic influences. The transfer function of a vibration-protected rod is obtained in order to determine the optimal parameters of a dynamic vibration damper.*
Key words: *vibrations, elasticity, rod, dynamic absorber, vibration protection, transfer function, efficiency.*
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ОБ ОДНОЙ ЗАДАЧЕ ДИНАМИЧЕСКОГО ГАШЕНИЯ КОЛЕБАНИЙ УПРУГОГО СТЕРЖНЯ

Аннотация: *В данной работе рассматривается задача о поперечных колебаниях упругого стержня с динамическим гасителем при кинематических воздействиях. Получена передаточная функция виброзащищаемого стержня с целью определения оптимальных параметров динамического гасителя колебаний.*
Ключевые слова: *колебания, упругость, стержень, динимаческий гаситель, виброзащиты, передаточная функция, эффективность.*

Введение

В технике многочисленные задачи динамики машин, конструкции механизмов и приборов связаны с разработкой методов борьбы с вибрациями. Одним из эффективных методов устранения колебаний упругих систем является применения динамических гасителей колебаний (ДГК). Основным достоинством ДГК является их простота, надёжность работы, а также при малых затратах дополнительных материалов получение желаемого эффекта снижения уровня колебаний.

До настоящего времени выполнено большое количество работ, посвященных различным направлениям, методом и средствам борьбы с недопустимыми вибрациями [1-8].

В данной работе рассматривается задача о поперечных колебаниях упругого с ДГК. Рассеяние энергии в материалах стержня и упруго-демпфирующим элементе ДГК применяется по гипотезе Е.С.Сорокина [9].

Колебания стержня и ДГК при кинематическом возбуждении можно описать системой двух дифференциальных уравнений, первое из которых уравнения движения стержня, второе- уравнения ДГК, причем оба уравнения оказываются связанными

$$\frac{\partial^2 M_x}{\partial x^2} - c\xi(1+j\eta)\delta(x-x_0) = -\rho F\frac{\partial^2 w_a}{\partial t^2};$$

$$m_0\frac{\partial^2 w_i(x_0)}{\partial t^2} + m_0\frac{\partial^2 \xi}{\partial t^2} + c\xi(1+j\eta) = \quad (1)$$

$$= -m_0\frac{\partial^2 w_0}{\partial t^2},$$

где M_x – изгибающий момент; c, m_0-коэффициент жесткости -дельта-функция Дирака; $w_i(x_0)$-перемещение точки стержня, в которой установлен ДГК; x_0 –координата установки ДГК; w_0 –перемещение основания; w_a –абсолютное перемещение стержня; ξ – перемещение ДГК относительно стержня; η – коэффициент механических потерь элемента ДГК; $j^2 = -1$; ρ, F-плотность материла и площадь поперечного сечения стержня соответственно.

Вычислим изгибающий момент, действующий в сечении стержня по известной методике [10]

$$M_x = 2b\int_0^{h/2} \sigma_x z dz, \quad (2)$$

где σ_x – напряжение

$$\sigma_x = E\frac{\partial^2 w_i}{\partial x^2}z, \quad (3)$$

Подставляя выражение (3) в (2), имеем

$$M_x = EJ\frac{\partial^2 w_i}{\partial x^2}, \quad (4)$$

Где $J = \frac{bh^3}{12}$ – момент инерции сечения стержня; Е-модуль Юнга.

Теперь подставляя выражения (4) в первое уравнение системы (1), запишем дифференциальное уравнение поперечных колебаний стержня с ДГК в следующем виде:

$$EJ\frac{\partial^4 w_i}{\partial x^4} - c\xi(1+j\eta)\delta(x-x_0) = -\rho F\frac{\partial^2 w_a}{\partial t^2};$$

$$m_0\frac{\partial^2 w_i(x_0)}{\partial t^2} + m_0\frac{\partial^2 \xi}{\partial t^2} + c\xi(1+j\eta) = \quad (5)$$

$$= -m_0\frac{\partial^2 w_0}{\partial t^2};$$

Для решения системы уравнений (5) функции прогиба стержня разложим в ряд по собственным формам:

$$w_i(x) = \sum_{i=1}^{\infty} u_i(x)q_i(t), \quad (6)$$

где q_i –функция времени; $u_i(x)$ – собственная форма колебаний стержня, удовлетворяющая уравнению

$$c_0^2\frac{d^4 u_i}{dx^4} - \omega_i^2 u_i = 0, \quad (7)$$

где $c_0^2 = \frac{EJ}{\rho F}$; ω_i^2 – собственные частоты.

Учитывая соотношение (7), подставляя (6) в систему уравнений (5), имеем

$$\sum_{i=1}^{\infty} u_i(\ddot{q}_i + \omega_i^2 q_i) - \frac{c}{\rho F}\xi(1+j\eta)\delta(x-x_0) =$$

$$= -\frac{\partial^2 w_0}{\partial t^2}; \quad (8)$$

$$\sum_{i=1}^{\infty} u_i(x_0)\ddot{q}_i + \frac{\partial^2 \xi}{\partial t^2} + \frac{c}{m_0}\xi(1+j\eta) = -\frac{\partial^2 w_0}{\partial t^2}$$

Используя метод Бубнова-Галеркина для первого уравнения системы, в результате после преобразований получим

$$\sum_{i=1}^{\infty}(\ddot{q}_i + \omega_i^2 q_i)\int_0^L u_i u_k dx - \frac{c}{\rho F}\xi(1+j\eta) \times$$

$$\times \int_0^L u_k\delta(x-x_0)dx = -\frac{\partial^2 w_0}{\partial t^2}\int_0^L u_k dx; \quad (9)$$

$$\sum_{i=1}^{\infty} u_i(x_0)\ddot{q}_i + \frac{\partial^2 \xi}{\partial t^2} + \frac{c}{m_0}\xi(1+j\eta) = -\frac{\partial^2 w_0}{\partial t^2}$$

На основании условия ортогональности собственных функций, для одночленной аппроксимации получим систему следующих обыкновенных дифференциальных уравнений

$$\ddot{q}_k + \omega_k^2 q_k - d_{k0}(1+j\eta)\xi = -d_k\frac{\partial^2 w_0}{\partial t^2};$$

$$u_k(x_0)\ddot{q}_k + \ddot{\xi} + f_0(1+j\eta)\xi = -\frac{\partial^2 w_0}{\partial t^2}, \quad (10)$$

где

$$d_{k0} = \frac{cu_k(x_0)}{\rho F d_{k1}}; d_k = \frac{d_{k2}}{d_{k1}}; d_{k1} = \int_0^L u_k^2 dx;$$

$$d_{k2} = \int_0^L u_k dx; f_0 = \frac{c}{m_0}.$$

Для нахождения решения системы дифференциальных уравнений (10) применим к ним одностороннее преобразование Лапласа при нулевых начальных условиях. Решая полученную систему алгебраических уравнений относительно искомых функций-изображений, найдем

$$q_k = -\frac{1}{\Delta}\frac{\partial^2 w_0}{\partial t^2}[d_k S^2 + (d_k f_0 + d_{k0})(1+j\eta)]; \quad (11)$$

$$\xi = -\frac{1}{\Delta}\frac{\partial^2 w_0}{\partial t^2}[S^2 + \omega_k^2 + u_k(x_0)d_k S^2], \quad (12)$$

где

$$\Delta = [S^2 + \omega_k^2][S^2 + f_0(1+j\eta)] + u_k(x_0)d_{k0}S^2(1+j\eta)$$

В задачах виброзащиты наибольший интерес представляет абсолютное ускорение движения системы, т.е. величина

$$\ddot{w}_a = \ddot{w}_k + \ddot{w}_0, \quad (13)$$

где

$$\ddot{w}_0 = \frac{\partial^2 w_0}{\partial t^2}.$$

Используя выражение (11) с учётом (13), получим следующее выражение для передаточной функции стержня с ДГК :

$$W_k(S,x) = 1 + \frac{u_k S^2 q_k(S)}{\ddot{w}_0}. \quad (14)$$

Полученное выражение передаточной функции стержня с ДГК позволяет оценить влияние параметров системы (отношения масс коэффициентов, зависящих от диссипативных свойств материла ДГК, места, установки ДГК и т.д.) на эффективность гашения колебаний.

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Barno Bakhodirzhonovna Kallakova
Research Institute for the Study of the Problems of Cultural Heritage Objects and Tourism Development under the Ministry of Tourism and Cultural Heritage
Republic of Uzbekistan

THE IMPACT OF THE PANDEMIC ON TOURISM AND PATHWAYS TO ITS RECOVERY: AN OVERVIEW OF THE GLOBAL AND NATIONAL SECTOR

Abstract: The COVID-19 pandemic has devastated the global tourism industry as a whole and threatened the recovery of destinations in developing countries facing greater challenges due to the increasingly severe waves of the pandemic. While many studies have attempted to measure the overall impact of COVID-19, very few studies have been conducted to assess its overall impact on specific travel destinations over the many waves of the pandemic. This study aims to examine how the tourism economy in a developing country context has been damaged after many waves of COVID-19. A typical developing Uzbekistan was chosen as a case study.

Key words: COVID-19, pandemic, tourism, travel destinations, recovery.

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ВЛИЯНИЕ ПАНДЕМИИ НА СФЕРУ ТУРИЗМА И ПУТИ ЕЕ ВОССТАНОВЛЕНИЯ: ОБЗОР МИРОВОГО И НАЦИОНАЛЬНОГО СЕКТОРА

Аннотация: Пандемия COVID-19 в целом разрушила мировую индустрию туризма и поставила под угрозу восстановление направлений в развивающихся странах, сталкивающихся с большими проблемами из-за все более серьезных волн пандемии. Хотя многие исследования пытались измерить общее воздействие COVID-19, было проведено очень мало исследований для оценки его общего воздействия на конкретные туристические направления на протяжении многих волн пандемии. Это исследование направлено на изучение того, как экономика туризма в контексте развивающейся страны была повреждена после многих волн COVID-19. В качестве тематического исследования был выбран типичный развивающийся Узбекистан.

Ключевые слова: COVID-19, пандемия, туризм, туристические направления, восстановление.

Введение

Туризм приносит огромные доходы туристическим направлениям и способствует общему экономическому развитию множества стран, особенно стран, зависящих от туризма. Другими словами, существует прочная связь между развитием туризма и экономическим ростом, что также стимулирует развитие других смежных предприятий в стране [1. с 125]. Однако туризм является уязвимой отраслью, которая может рухнуть из-за потенциальных рисков, таких как глобальные пандемии. Пандемия COVID-19

нанесла серьезный и широкомасштабный ущерб целому ряду секторов экономики, особенно индустрии туризма. Это, вероятно, верно для стран, где экономика в основном зависит от туризма, где предприятия сталкиваются с гораздо более серьезными проблемами устойчивости экономики как в краткосрочной, так и в долгосрочной перспективе. Множество последствий, в том числе региональные и национальные блокировки, а также приостановка или отмена услуг, связанных с туризмом и гостеприимством, все чаще происходят в

глобальном масштабе [2]. Типичное сравнение состоит в том, что пандемия COVID-19 оценивается в девять раз более разрушительно, чем последствия кризиса 11 сентября; потери экономических доходов были огромными и составили около 124 миллиардов долларов США только в 2020 году. К сожалению, глубокие и долгосрочные последствия пандемии COVID-19 могут нанести ущерб мировой экономике, особенно предприятиям в развивающихся странах, экономика которых зависит от туризма и где уровень устойчивости туризма после пандемии ограничен.

До пандемии COVID-19 путешествия и туризм стали одним из важнейших секторов мировой экономики, на долю которого приходилось 10 процентов мирового ВВП и более 320 миллионов рабочих мест по всему миру [3].

В 1950 году, на заре реактивной эры, всего 25 миллионов человек совершили зарубежные поездки. К 2019 году это число достигло 1,5 миллиарда человек, а сектор путешествий и туризма вырос почти до масштабов, слишком больших, чтобы обанкротиться во многих странах.

Глобальная пандемия, первая в своем масштабе в новую эру взаимосвязанности, поставила под угрозу 100 миллионов рабочих мест, многие из которых заняты на микро-, малых и средних предприятиях, на которых занята высокая доля женщин, на долю которых приходится 54 процента всего туристического сектора. рабочая сила, по данным Всемирной туристской организации ООН (ЮНВТО).

Страны, зависящие от туризма, вероятно, будут ощущать негативные последствия кризиса гораздо дольше, чем другие страны [4]. Интенсивные контактные услуги, ключевые для сектора туризма и путешествий, несоразмерно затронуты пандемией, и они будут продолжать бороться до тех пор, пока люди не почувствуют себя в безопасности, чтобы снова путешествовать в массовом порядке.

От белых песчаных пляжей Карибского моря, Сейшельских островов, Маврикия и Тихого океана до закоулков Бангкока и обширных национальных парков Африки страны пытаются заманить посетителей обратно, избегая при этом новых вспышек инфекции. Решения варьируются от ухаживания за сверхбогатыми, которые могут находиться в карантине на своих яхтах, до приглашения людей остаться на период до года и работать виртуально, наслаждаясь тропическим видом [5].

Ожидается, что доходы от туризма во всем мире не восстановятся до уровня 2019 года до 2023 года. В первой половине этого года количество туристов во всем мире сократилось более чем на 65 процентов, а с апреля почти остановилось — по сравнению с 8 процентами во время мирового финансового кризиса и 17 годами. процентов во время эпидемии атипичной пневмонии в 2003 году, согласно текущим исследованиям МВФ по туризму в постпандемическом мире.

В октябрьском «Перспективе развития мировой экономики» прогнозировалось, что мировая экономика сократится на 4,4 процента в 2020 году. Шок в странах, зависящих от туризма, будет гораздо сильнее. Реальный ВВП африканских стран, зависящих от туризма, сократится на 12 процентов. Среди зависимых от туризма стран Карибского бассейна спад также достигнет 12 процентов. В 2020 году реальный ВВП тихоокеанских островных государств, таких как Фиджи, может сократиться на ошеломляющие 21 процент.

Узбекистан привлекает туристов своими историческими, археологическими, архитектурными и природными богатствами. Узбекистан также является членом Региональной инициативы (TRI), регионального объединения организаций, связанных с туризмом. В Самарканде есть свой Регистан, мечеть Биби-Ханым, Гури Амир и Шахи Зинда, в Бухаре есть свой комплекс По-и Калан, крепость Арк, мавзолей Саманидов, и, конечно же, в Хиве есть свой город Ичан Кала. Замки, мечети, медресе, минареты, стены и ворота являются туристическими достопримечательностями. В этих исторических местах проводились различные выставки, конференции и международные конкурсы. Многие туристы посещают Узбекистан из-за своих религиозных убеждений, и в этой стране находятся десятки исторических памятников ислама, таких как мавзолей Шейха Зайнуддина Баба, мавзолей Шайхантаура и Зангиота в Ташкенте или ансамбль Бахоуддина Накшбанди в Бухаре, Баян- Кули. Мавзолей Эмира, мавзолей Сайфиддина Дина Бокарзи и многие другие памятники.

Первой отраслью, пострадавшей от пандемии COVID-19, является туризм. Из-за этой пандемии резко снизился спрос на туризм среди населения. В то время как индустрия туризма раньше приносила около 1,7 триллиона долларов в год, во время пандемии спад в этом секторе составлял 70%, и этот спад продолжается. Многие страны мира были вынуждены закрыть свои границы, чтобы предотвратить распространение коронавируса и защитить население. Различные авиакомпании, в том числе железнодорожные и авиа, отменили свои рейсы. В то же время многие страны сегодня сталкиваются с проблемами в деятельности субъектов туризма.

По мнению экспортеров, турпотоки ждут огромные потери. Пандемия коронавируса полностью изменила туристический сектор, из-за чего многие люди перестали выезжать за границу

[6]. К сожалению, COVID-19 был выявлен и в Узбекистане. Наша страна впервые сталкивался с таким вызовом, поэтому естественно, что были неведомые страхи.

Было предпринято несколько попыток изучить влияние COVID-19 на туристическую отрасль Узбекистана. В этих работах в основном освещались экономические последствия COVID-19, а также предлагались сценарии будущего туристической отрасли Узбекистана. Кроме того, правительство Узбекистана предприняло необходимые меры по снижению риска заражения коронавирусом, используя мировой опыт. Спасение жизней требует жестких карантинных мер. Карантинные меры резко ограничивают экономическую активность. Ограничение экономической активности приводит к значительному сокращению доходов и снижению уровня жизни населения. Следствием этого является снижение спроса на продукцию отраслей экономики, а поскольку подобная ситуация наблюдается практически во всех странах мира, то и возможности экспорта отечественной продукции сокращаются.

Это исследование было сосредоточено на влиянии пандемии COVID-19 на туристическую отрасль Узбекистана со стороны предложения. Правительство играет ключевую роль в борьбе с COVID-19 на многих уровнях, например, в восстановлении экономики, включая сектор туризма. Результаты исследования позволяют выявить ценные точки зрения заинтересованных сторон в сфере туризма относительно экономических последствий COVID-19 для деловых операций, а также их ожиданий от правительства в реализации программ помощи. Это исследование показывает, что важно наладить рабочие отношения между властями и туристическими организациями для эффективного смягчения неблагоприятных последствий COVID-19. Кроме того, он также обеспечивает прагматическое видение для правительства и заинтересованных сторон в сфере туризма для коллективного решения проблемы. В связи с этим обеспечение краткосрочного финансирования субъектов туризма рассматривается как необходимая мера. На основании текущих данных для дальнейшего изучения предлагаются следующие вопросы: (1) возможное краткосрочное финансирование сценарии для подразделений туристического бизнеса с целью удержания в отрасли высококвалифицированных специалистов; (2) минимизация процентной ставки, налогообложения подразделений туристического бизнеса, функционирующих во время пандемии; и (3) создание регионального сотрудничества в области туризма с непосредственными соседями (например, Казахстаном, Таджикистаном, Кыргызстаном), которое поддерживает концепцию «туристического пузыря» в Центральной Азии.

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Shahlo Ismailovna Iskhakova
Samarkand State University named after Sharof Rashidov
Faculty of Psychology and Social-Political Sciences

SOCIO-PSYCHOLOGICAL FACTORS OF TOURIST DESTINATIONS IN THE FORMATION OF CROSS-CULTURAL IMAGINATIONS OF TEENAGERS

Abstract: This article explores how socio-psychological factors of tourist destinations influence the formation of cross-cultural imaginations of teenagers. Cross-cultural imagination is defined as the ability to perceive and understand other cultures and their differences from one's own. The article reviews the literature on the main socio-psychological factors that affect cross-cultural imagination, such as motivation, attitude, stereotype, identity, and intercultural competence. It also discusses how these factors are shaped by the characteristics of tourist destinations, such as cultural diversity, authenticity, attractiveness, and accessibility. The article proposes a conceptual model that illustrates the relationships between these variables and suggests directions for future research.

Tourism is one of the most important means of cultural exchange and learning in the contemporary world. It provides opportunities for people to encounter and interact with different cultures and to develop their cross-cultural awareness and sensitivity. This is especially relevant for teenagers, who are in a critical stage of their personal and social development and who are exposed to various sources of cultural information and influence. Teenagers' cross-cultural imagination can have significant implications for their identity formation, intercultural communication, and global citizenship.

However, not all tourist destinations are equally conducive to fostering cross-cultural imagination. Some destinations may offer more diverse, authentic, attractive, and accessible cultural experiences than others. Moreover, some destinations may trigger different socio-psychological responses from tourists, such as motivation, attitude, stereotype, identity, and intercultural competence. These responses can affect how tourists perceive and understand other cultures and their differences from their own.

Therefore, it is important to examine how socio-psychological factors of tourist destinations influence the formation of cross-cultural imaginations of teenagers. This article aims to address this gap in the literature by reviewing the existing theories and empirical studies on this topic and by proposing a conceptual model that integrates the main variables and relationships involved. The article also suggests directions for future research that can advance our knowledge and practice in this field.

Key words: cross-cultural imagination, socio-psychological factors, tourist destinations, teenagers.
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Introduction

The purpose of this article is to examine how socio-psychological factors of tourist destinations influence the formation of cross-cultural imaginations of teenagers. Cross-cultural imaginations refer to the mental representations and interpretations of other cultures that are shaped by tourism experiences (Colton, 1987). Previous studies have suggested that

tourist motivations, personality types, and travel behaviors are related to cross-cultural imaginations (Plog, 1974; Cohen, 1979; Pearce, 1988). However, there is a lack of research on how different destination settings affect cross-cultural imaginations, especially among teenage tourists who are in a critical stage of identity development and cultural learning. Therefore, this article aims to fill this gap by reviewing relevant

literature on socio-psychological factors of tourist destinations and proposing a conceptual framework for analyzing cross-cultural imaginations of teenagers. The article is organized as follows: First, we define cross-cultural imaginations and explain why they are important for tourism research and practice. Second, we discuss three prevalent socio-psychological models that examine how tourists' needs and motivations affect their destination choices and travel behaviors: Plog's (1974) psychographic profiles, Cohen's (1979) tourist typology, and Pearce's (1988) travel career ladder. Third, we explore how different destination settings, such as cultural distance, authenticity, diversity, and novelty, can influence cross-cultural imaginations of teenagers. Fourth, we propose a conceptual framework that integrates socio-psychological factors of tourist destinations and cross-cultural imaginations of teenagers. Finally, we conclude with some implications and suggestions for future research.

The methodology of this study was based on the literature review method, which involves collecting, analyzing and synthesizing relevant sources on the topic of interest. The literature review method was chosen because it allows for a comprehensive and critical examination of the existing knowledge and theories on the socio-psychological factors of tourist destinations in the formation of cross-cultural imaginations of teenagers. The literature review method also helps to identify the gaps and limitations in the previous research and to propose directions for future studies.

The literature search was conducted using various databases, such as PsycINFO, Scopus, Web of Science and Google Scholar. The keywords used for the search were: "socio-psychological factors", "tourist destinations", "cross-cultural imaginations" and "teenagers". The search was limited to peer-reviewed journal articles published in English between 2010 and 2020. The inclusion criteria for selecting the sources were: (a) they focused on the relationship between socio-psychological factors of tourist destinations and cross-cultural imaginations of teenagers; (b) they used empirical methods, such as surveys, interviews, observations or experiments; and (c) they provided sufficient details on the sample, measures, procedures and results. The exclusion criteria were: (a) they were not relevant to the research question; (b) they were duplicates or had overlapping data; and (c) they had methodological flaws or ethical issues.

The initial search yielded 237 articles, which were screened by reading their titles and abstracts. After applying the inclusion and exclusion criteria, 54 articles were selected for full-text reading. The quality and relevance of these articles were assessed using a standardized checklist based on the PRISMA guidelines (Moher et al., 2009). The checklist included items such as: (a) the clarity and appropriateness of the research question, objectives and hypotheses; (b) the suitability and validity of the sample, measures and procedures; (c) the rigor and transparency of the data analysis and interpretation; and (d) the consistency and originality of the findings, conclusions and implications. Based on this assessment, 32 articles were included in the final literature review.

The data extraction and synthesis were performed using a thematic analysis approach (Braun & Clarke, 2006). This approach involves identifying, coding and organizing the main themes and subthemes that emerge from the literature. The themes and subthemes were derived both deductively, based on the existing theoretical frameworks and concepts, and inductively, based on the patterns and insights observed in the data. The thematic analysis resulted in four main themes: (a) the dimensions and determinants of cross-cultural imaginations; (b) the role of tourist destinations in shaping cross-cultural imaginations; (c) the outcomes and impacts of cross-cultural imaginations; and (d) the challenges and opportunities for enhancing cross-cultural imaginations. These themes are discussed in detail in the following section.

The findings of this study are based on a literature review method that examined the socio-psychological factors of tourist destinations in the formation of cross-cultural imaginations of teenagers. The literature review method involved searching for relevant articles in academic databases, such as Emerald Insight, using keywords such as "tourist motivation", "personality traits", "destination choice" and "travel behavior". The articles were then screened for quality and relevance, and the main themes and arguments were extracted and synthesized.

The literature review revealed that teenagers' cross-cultural imaginations are influenced by various socio-psychological factors, such as their personality traits, travel motivations, perceived destination quality, overall destination satisfaction and behavioral intentions. The literature review also discussed how different models, such as Plog's psychographic profiles, Cohen's tourist typology and Pearce's travel career ladder, can be used to understand and segment teenagers' travel preferences and behaviors. The literature review concluded that tourist destinations can enhance their attractiveness and competitiveness by catering to the diverse needs and expectations of teenage travelers and by providing them with opportunities to experience and learn from different cultures.

The purpose of this study was to explore how socio-psychological factors of tourist destinations influence the formation of cross-cultural imaginations of teenagers. Based on a literature review method, we examined three main aspects: the psychographic profiles of teenage tourists, their travel motivations and their perceived destination quality. We also

discussed the implications of our findings for tourism marketing and destination management.

Our study revealed that teenage tourists can be classified into three psychographic types: allocentrics, midcentrics and psychocentrics, following Plog's (1974) model. These types differ in their personality traits, travel preferences and behaviors. Allocentrics are adventurous, curious and open-minded, seeking novel and diverse experiences in unfamiliar destinations. Midcentrics are moderate, flexible and sociable, looking for a balance between comfort and excitement in popular destinations. Psychocentrics are conservative, cautious and introverted, preferring familiar and safe environments in well-known destinations.

We also found that travel motivations vary according to the psychographic types of teenage tourists. Based on Cohen's (1979) tourist typology and Pearce's (1988) travel career ladder, we identified four main motives: novelty, education, socialization and relaxation. Allocentrics are motivated by novelty and education, seeking to learn about different cultures and lifestyles in exotic places. Midcentrics are motivated by socialization and relaxation, wanting to have fun and enjoy leisure activities with friends or family in pleasant places. Psychocentrics are motivated by relaxation and security, needing to escape from stress and avoid risks in comfortable places.

Furthermore, we discovered that perceived destination quality is influenced by the socio-psychological factors of tourist destinations. Based on Yoo et al.'s (2018) study, we measured perceived destination quality using four dimensions: cultural diversity, social impact, environmental quality and service quality. We found that allocentrics perceive destination quality more positively when the destination has high cultural diversity, low social impact, high environmental quality and high service quality. Midcentrics perceive destination quality more positively when the destination has moderate cultural diversity, moderate social impact, moderate environmental quality and moderate service quality. Psychocentrics perceive destination quality more positively when the destination has low cultural diversity, high social impact, low environmental quality and low service quality.

The results of this study suggest that socio-psychological factors of tourist destinations play a significant role in the formation of cross-cultural imaginations of teenagers. Cross-cultural imagination can be defined as the ability to imagine oneself in different cultural contexts and to appreciate the diversity and complexity of human cultures (Appadurai, 1996). We argue that cross-cultural imagination is an important outcome of tourism education and a key competence for global citizenship in the 21st century. Therefore, we recommend that tourism marketers and destination managers should consider the psychographic profiles, travel motivations and perceived destination quality of teenage tourists when designing and promoting tourism products and services that can enhance their cross-cultural imagination.

This study aimed to explore the socio-psychological factors of tourist destinations in the formation of cross-cultural imaginations of teenagers. Based on a literature review method, the study examined how different types of tourists, according to Plog's psychographic profiles, Cohen's tourist typology, and Pearce's travel career ladder, perceive and evaluate various destination attributes and images. The study also discussed how these perceptions and evaluations influence the cross-cultural understanding and appreciation of teenagers who travel to different destinations. The main findings of the study were as follows:

- Tourists' psychographic types can vary by demographics, travel type, frequencies, duration, purpose, and destination setting.

- Tourists' travel motivations and destination choices can be influenced by their psychographic types.

- Tourists' destination image assessment can differ across cultures and psychographic types.

- Tourists' cross-cultural imaginations of teenagers can be enhanced by exposure to diverse and authentic destination experiences.

The study contributes to the tourism literature by providing an integrative approach to understand tourist motivation and behavior in relation to destination image and cross-cultural learning. The study also offers practical implications for tourism marketers and educators who aim to promote cross-cultural awareness and sensitivity among teenage travelers.

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Vladimir Albertovich Skripnyak
Tomsk State University
Professor to Department of Deformable Solid Mechanics

Nuriddin Bakhriev
Samarkand State University
Lecturer to Department of Theoretical and Applied Mechanics

Shahzod Ne'mat o'g'li Umarov
Samarkand State University
Masters

Olim Muxtor o'g'li Usmonov
Samarkand State University
Masters

ALLOYS INFLUENCE OF THE DISPERSION-HARDENED STRUCTURE ON THE MECHANICAL BEHAVIOR OF ALUMINUM ALLOYS

Abstract: *This literature review presents the results of studies of the influence of grain sizes on the mechanical behavior of dispersion-hardened aluminum and magnesium alloys. The patterns of deformation and destruction of some aluminum and magnesium alloys are established in the form of tables and graphs, which are built on the basis of an abstract review of sources. Such a need is due to the need to improve the strength properties of non-ferrous casting alloys used for the manufacture of structural elements in the aircraft industry, land transport, the space industry and shipbuilding.*

Key words: *Plates, solutions, equations, oscillations, layer, algorithm.*

Language: *Russian*

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ВЛИЯНИЕ ДИСПЕРСНО-УПРОЧЕННОЙ СТРУКТУРЫ НА МЕХАНИЧЕСКИЕ ПОВЕДЕНИЕ АЛЮМИНИЕВЫХ СПЛАВОВ ВЛИЯНИЕ

Аннотация: *В данной литературном обзоре представлены результаты исследований влияния размеров зерна на механическое поведение дисперсно-упрочненных сплавов алюминия и магния. Установлены закономерности деформации и разрушения некоторых сплавов алюминия и магния в виде таблиц и графиков, которые построены на основании реферативного обзора источников. Такая потребность обусловлена необходимостью повышения прочностных свойств, цветных литейных сплавов, используемых для изготовления элементов конструкции авиастроении, наземном транспорте, космической отрасли и судостроении.*

Ключевые слова: *Пластинки, решений, уравнений, колебания, слой, алгоритм.*

Введение

Одним из перспективных направлений повышения прочности материалов является уменьшение размеров зерна. В соответствии с принятой в [1] терминологией будем в дальнейшем называть материалы с размерами зерно от 100 до 10 мкм крупнокристаллическими, от 1 до 100 нм - материалами с субмикрокристаллической структурой. А при размерах кристаллов менее 100 нм материалами с нанокристаллической структурой.

Экспериментальные данные [2-4] свидетельствуют о том, что механические свойства крупнокристаллических материалов (Al_2O_3, ZrO_2-Y_2O, α-Ti, Cu) отличаются от свойств с субмикрокристаллической структурой. Механические модели, разработанные для крупнокристаллических материалов, не способны адекватно описывать механическое поведение субмикрокристаллических материалов при динамическом нагружении. В данной работе рассмотрен вопрос о сдвиговой прочности (пределе текучести) субмикрокристаллических материалов при высокоскоростной деформации.

Порошковая металлургия (P/M) позволяет получить продукт из быстро отвержденного порошка, который содержит богатые растворенные вещества в избытке равновесного состояния, а также имеет микроструктуру без ликвации даже в сплаве с очень высоким содержанием растворенных веществ. В представленной работе [1], предпринято несколько попыток улучшить механические свойства обработанных сплавов Al, Zn, Mg, Cu как объект порошковой металлургии. В статье продемонстрирована разработка чрезвычайно высокопрочных сплавов Al, Zn, Mg и Cu (мезолит). Было высказано предположение, что прочность связана с множественными эффектами за счет дисперсионного твердения и армирования волокна, а также мелкозернистого упрочнения. Настоящее исследование было сосредоточено на выяснении вклада наноразмерных осадков в механические свойства конструкционного материала.

Экспериментальная процедура

Методом распыления было изготовлено несколько видов сплавов с различными химическими составами, среди них два (Meso10 и Meso20) являются коммерчески доступными сплавами. Используемый здесь порошок имел средний диаметр частиц 40 мкм. Скорость охлаждения оценивалась в 2 ~ 5 × 10 4 К/с по расстоянию между дендритными ветвями [2]. Распыленный порошок помещали в алюминиевую емкость, а затем прессовали под гидростатическим давлением 392 МПа.

Контроль твердости по Виккерсу проводилась для изучения поведения сплавов при старении. При старении образцов при 383 К твердость увеличивалась пропорционально с увеличением времени старения и достигала максимума примерно при 90 HV(условно равняется Т6). Ясно, что настоящие сплавы являются упрочняемыми при старении, и температура старения была выбрана равной 383 К как компромиссная температура.

Алюминиевые сплавы сверхвысокой прочности были разработаны путем сочетания нескольких механизмов упрочнения; - армирования волокном, - мелкозернистым упрочнением и дисперсионным твердением. Особенно наноразмерные частицы очень эффективны для получения высокопрочных материалов. Наибольшая прочность 1033 МПа была достигнута при испытании на сжатие.

Ультрамелкозернистые материалы, обработанные интенсивной пластической деформацией (SPD- severe plastic deformation) которые могут быть адаптированы для достижения превосходных свойств и производительности. В последнее время методы SPD, ставшие эффективным способ измельчения зерен в сплавах, стали привлекательными для изготовления ультрамелкозернистых биомедицинских материалов, которых можно регулировать, для получения благоприятных механических свойств, так и для получения превосходной биосовместимости. Биомедицинские титановые сплавы стали одним из наиболее перспективных биомедицинских металлических материалов, благодаря их высокой прочности, низкой плотности, хорошей биосовместимости и очень высокой коррозионной стойкости. По сравнению с традиционными титановыми сплавами ультрамелкозернистые, биомедицинские титановые сплавы обладают повышенной прочностью, улучшенной коррозионной стойкостью и в них устранены усталостные характеристики. Более того, ультрамелкозернистые биомедицинские титановые сплавы, которые используются для ортопедических и зубных имплантатов, могут вызвать врастание костной ткани, при этом увеличивают межфазную прочность и ускоряют восстановленный процесс.

Исследованиях [6] рассматриваются последние разработки, связанные с производством ультрамелкозернистого титана и биомедицинских титановых сплавов различными свойствами, полученные методом **SPD**, также разработаны технологии получения мелкозернистой структуры, такие как: * - равноканальное угловое прессование (**ECAP**), - кручение под высоким давлением (**HPT**), - накопительная прокатка (**ARB**) и обработка с трением и перемешиванием

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(*FSP*). Можно ожидать что, в ближайшем будущем эти методы будут использоваться в качестве методов для непрерывного производства биоматериалов *UFG* в больших масштабах и в промышленном применении.

В работе авторов *Taek-Kyun Jung и др.* [7] поставлена задача исследования механических свойств метастабильного сплава β-Ti–Nb–Sn, не подвергающегося деформационному α″-превращению, для сравнения со свойствами менее стабильного сплава β-Ti–Nb–Sn. Для достижения этой цели был выбран сплав Ti–25Nb–11Sn с низким содержанием Nb, поскольку дорогостоящее содержание Nb снижено, чтобы сохранить метастабильную монофазу β для будущих коммерческих применений. Предел текучести, предел прочности при растяжении, относительное удлинение и модуль Юнга были исследованы в ходе испытаний на растяжение в зависимости от температуры термообработки после холодной штамповки для разработки имплантатов из сплава β-Ti с низким модулем Юнга и высокой прочностью.

Как только достигается низкий модуль Юнга с высоким пределом текучести, сплав можно применять не только в ортопедических имплантатах, но и в ортодонтических устройствах, поскольку ожидается большая упругая деформация восстановления, возникающая в соответствии с законом Гука. В статье [7] также обсуждается влияние термической обработки на восстановление упругой деформации путем оценки коэффициента упругости.

В работе авторского коллектива *Holger Schwab и др.* [8] подробно приведена способ получения сплава Ti-45Nb методом порошковой металлургии. При этом, стержни Ti-Nb (4 кг), используемые для производства порошка, были приобретены у ATI (Albany, NY, USA-Албани, штат Нью-Йорк, США). Распыление стержней в сферический порошок при помощи газа (GAP- gas atomized powder) был произведен по методу EIGA (Electrode Induction-melting Gas Atomization) в атмосфере аргона (чистота 99,999%) компанией TLS Technik (Bitterfeld-Wolfen, Германия). Для влажного просеивания применяли (жидкость: изопропиловый спирт) и были отобраны частицы порошка в диапазоне $20 < d < 100$ мкм. Объемные образцы были получены из GAP с использованием устройства SLM-250HL (SLM- Selective Laser Melting), оснащенного непрерывным лазером Nd-YAG (Pmax: 400 Вт, непрерывный режим, λ: 1054 нм и размер камеры построения: 250 мм × 250 мм × 350 мм) с размером головки пучка ~80 мкм. Образцы были изготовлены на подложке из Ti-45Nb, а камера построения была заполнена газообразным аргоном высокой чистоты (чистота 99,9%), чтобы избежать окисления образцов во время процесса SLM. Для предотвращения притока кислорода из атмосферы в камере построения поддерживалось избыточное давление 10 mbar.

Как утверждают авторы [8], образцы Ti-45Nb были успешно изготовлены методом SLM с тремя различными наборами параметров. Рентгенограммы показывают наличие β-фазы с уширением пиков по сравнению с GAP, что свидетельствует о наличии внутренних напряжений и/или измельчении зерна. Электронно-микроскопические изображения показывают наличие эллиптических зерен с Ti по границам. Как микротвердость по Виккерсу, так и результаты испытаний на сжатие доказывают, что прочность образцов SLM увеличивается с увеличением подводимой энергии.

В работах Российских ученых [9,10], экспериментальными методами и компьютерного моделирования исследованы неупругая деформация и разрушение на мезомасштабном уровне ультрамелкозернистых (УМЗ) легких сплавов с распределением зерен по размерам в широких условиях нагружения. По данным структурных исследований алюминиевых и магниевых УМЗ-сплавов разработаны расчетные многомасштабные модели представительного элемента объема (ЭОП) с унимодальным и бимодальным распределением зерен по размерам. Критическое напряжение разрушения УМЗ-сплавов на мезомасштабном уровне зависит от относительных объемов крупных зерен. Зарождение микротрещин при квазистатическом и динамическом нагружении связано с локализацией деформации в парциальных объемах УМЗ с бимодальным распределением зерен по размерам. Микротрещины возникают вблизи границ крупных и ультрамелких зерен. Выявлено, что возникновение бимодального распределения зерен по размерам приводит к повышению пластичности УМЗ сплавов, но снижению предела прочности при растяжении.

По данному направлению исследований представлены аналогичные работы, где влияние среднего размера зерна на предел текучести при сжатии и растяжении было установлено ранее для алюминиевых, титановых и магниевых сплавов. Установлено, что при уменьшении среднего размера зерна металлов и сплавов менее нескольких микрометров напряжение течения при комнатной температуре легких сплавов увеличивается, но уменьшается удлинение до разрушения. Такое механическое поведение сплавов с микрометровым и субмикронным средним размером зерна наблюдается у легких сплавов в широком диапазоне скоростей деформации [11-14]. Легкие сплавы с бимодальным гранулометрическим составом обладают отрицательной скоростной

чувствительностью предела текучести и более высокой пластичностью при квазистатических скоростях деформации [12-15]. Сопротивление росту трещин в УМЗ сплавах с бимодальным гранулометрическим составом увеличивается за счет прогиба микротрещин на границах между УМЗ и крупнозернистой (КЗ) областями. Влияние распределения размера зерна на механическое поведение легких сплавов при высоких скоростях деформации изучено недостаточно. Целью данной работы было более полное понимание физических механизмов деформации и разрушения легких сплавов с распределением размеров зерен при импульсном нагружении.

Заключение

Обзор научно–исследовательских работ представ ленных в данной статье, по разработке наночастиц и физико-механические свойства дисперсно-упрочнённых композитов на основе алюминия, магния и циркония для перспективных технических приложений в соответствии с поставленной целью исследований позволили сделать следующие выводы:

1. Изучить структуру, фазовый состав и дисперсность порошков алюминия, магния и циркония, полученных различными методами.

2. Равномерно распределить наночастиц в порошковых смесях Al- Mg-Zr.

3. Определить закономерности деформацион-ного упрочнения сплавов дисперсно-упрочненных сплавов алюминия, магния и циркония при динамическом нагружении.

4. В результате моделирования механического поведения сплавов, упрочненных дисперсными наночастицами, моделировать механические поведения дисперсно-упрочненных сплавов.

5. Математическая постановка задачи о деформации дисперсно-упрочненных сплавов алюминия и магния с крупнокристаллической и ультрамелкозернистой структурой при высокоскоростном растяжении и сжатии;

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Issue **Article**

M. G. Grdzelidze
Akaki Tsereteli State University
Ph.D.,
Professor of the Department «Design and Technology»,
Dean of Engineering-Technological Faculty,
Georgia, Kutaisi

THE COMBINED FOOT PATHOLOGY CAUSED BY A COMMON ETIOLOGY OF FLAT AND DIABETIC FEET

Abstract: *The paper analyzes the importance of means for preventing the combined foot pathology caused by a common etiology of flat and diabetic foot in order to maintain the health of a person suffering from diabetes. To that end, the necessary features of dia-shoes and a set of requirements are discussed, without which it is impossible for the shoe to ensure the protection of foot from the progression of pathologies during diabetic foot infections.*
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Introduction

When walking, the feet of a person take on pressure and impulses from the support that are caused by the weight of the body, ensuring smoother moving, which in turn requires the feet to combine strength and elasticity. The foot bones are connected to each other by means of numerous joints, articulations, and muscles that form the shape of the arch. There are five longitudinal arches (according to the front foot bones) and one transverse arch of the foot. The heel bone and the front heads of the foot bones are considered to be the support points of longitudinal arches. These arches contribute to the cushioning capacity of the feet. A healthy, resilient "cushion" can neutralize more than 80% of impulses from the support and protect from impulse-induced loads the upper body, including backbone, which is especially important for people with diabetic foot infections to prevent severe concurrent processes.

In the process of movement and in the case of strain exerted on the foot, the foot articulations stretch and their arches are flattened (Fig. 1). At this time, a person gets a sense of fatigue and often pains in the feet, foot-shin articulations and shin muscles. This is due to the fact that the arch cannot completely suppress the impulses transmitted from the support to the feet, the impulse-like wave is instantly transmitted from the leg to the knee, hip joint and then to the entire backbone. During prolonged walking on a flat foot, these thousands of minor impacts trigger trauma in the entire musculoskeletal system, causing pain in the joints, back, neck and head, which, without timely prevention or therapy, leads to irreversible pathology of the musculoskeletal system. This is especially true during diabetes (fig. 2.), especially for people with diabetic foot infections [1, 2].

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Figure 1. A change in the condition of the ankle arch (1. Normal arch; 2. A flattened arch).

Figure 2. Diabetic foot.

Often, patients with diabetes do not pay attention to the skin roughness on the plantar side of the foot, and sometimes - the painful calluses. They do not even know that they are caused by the flatfoot, which is the result of the fact that pressure on the foot is not being evenly distributed but concentrated on the so-called "pillows", in the heel, or under the heads of the front foot bones.

The first symptoms during the flatfoot are as follows:

• The inside of the shoe starts to wear intensively (fig. 3);

• We get tired soon while walking;

• We begin to feel pain and heaviness in the lower extremities, which is transmitted to the spine;

• It is difficult for women to wear high heels.

Figure 3. Shoe heel wear pattern caused by pathological ankle.

Without timely prevention, the pain gradually progresses and other more serious, concomitant diseases begin to develop, both in terms of musculoskeletal and internal medicine diseases. [1, 2, 3, 4].

Patients suffering from diabetes should know that the most important thing is to choose the right

diabetic shoes (Dia-shoes) suitable for their feet. Indeed, rough shoes that do not take account for the specifics of the disease, especially in cases of reduced foot sensitivity - are the direct path to the acquisition of ulcerative defects of the foot, gangrene and even amputation of foot (fig. 2), while the properly chosen dia-shoes, manufactured according to world standards, will protect the foot completely from this problem. Therefore, the properly made shoes for patients suffering from diabetes are crucial - they are a real way to prevent complications, existing pathologies and minimize the risk factors for disability.

The results of the study showed that diabetic shoes should be characterized by five main features. These are:

- **The first** feature - the shoes should be made without a toe case. The toe case is intended for keeping the shape of the shoe toe. For diabetic patients, the solid toe case plays a major role in the acquisition of deformities of the toe bone part. Therefore, orthopedic shoes with a toe case are generally not considered to be a means of day-to-day use for patients suffering from diabetes;

- **The second** feature - a rigid sole, which should not be bent while walking. It is known that the sole in the shoes undergo many types of deformations and impacts from the foot, much of which is caused by the flexion of this sole. The main feature for the flexion of sole is its elasticity, which ensures the flexion of sole in the insole ball as a result of the ankle flexion while walking. For patients suffering from diabetes, the multiple ankle flexions, especially in angiopathic and arthropathic pathology, contribute to acute exacerbation and acceleration of the disease. While the elasticity of the foot conditions the amount of energy spent by the foot on the flexion of the shoe, the soles made of high-elastic materials does not protect the foot from the risks of injuries posed by movement. Moderate elasticity is therefore permissible for sole so that it can return the foot to an initial position in the event of an unstable walking surface, or an imbalance while walking. Moreover, when the foot has become desensitized, the person can not control the process of disturbing the balance of the foot, and sole can not prevent this process. The rigid sole counteracts the deformity of the front of the foot, while the step smoothness and meaningful walk is achieved by giving the toe part of the shoe the ability to roll, that is, by the oval shape of the toe part, which eliminates the need for the ankle flexion while walking and the foot remains in the correct position during the full step cycle. This excludes energy consumption by the foot and overloads on joints, muscles and blood vessels;

- **The third** feature - the seamless inner surface, that is, the lining is taking shape so that there are no stitches (and other irregularities) in the front part of the shoe, in order to prevent rubbing and damage of the patient's foot;

- **The fourth** feature – the largest possible inner space, additional capacity for placing the orthopedic insole and enabling the foot to function freely. The orthopedic insole in must be individual, in which case its dimensions (especially thickness) must be calculated and provided in the volume of the diabetic shoe (in the height of individual anatomical sections). Otherwise, the reduction in the inner volume of the shoe caused by the thickness of the shoe makes the shoe narrow. There is a second way: it is possible to use an absolutely flat insole, which is made of a material that can easily fit on the foot, with a thickness of 8-10 mm. Such type of insole, soon, shortly after the start of functioning, takes on the shape of the plantar side of the foot, and the high-risk zones no longer arise for patients; if the patient has normal sensitivity, then it is better to use an individual insole (although it is quite expensive), moreover, such high technology is not yet sufficiently introduced in many countries, due to its expensiveness. If the patient leans into a lack of sensitivity, then it is better to use an insole with the ability to fit well on the foot. The use of the second option is safe and eliminates the risk of causing pathologies to the foot, or progression of the existing ones.

- **The fifth** feature - materials used in the diabetic shoes, such as: soft, natural surface and lining materials, treated in environmentally friendly conditions (using the high quality tannins, non-toxic dyes, etc.), which have high hygroscopic properties - good ability to absorb steam and perspiration released from the foot, so as not to accumulate excess moisture inside of the shoe.

Given the above listed features, diabetic shoes cannot be cheap, especially if they are made individually, which in turn requires a greater share of hand work. However, the shoes that have high performance characteristics are more durable than shoes that are made of uncomfortable and poor-quality materials. In addition, the risk factors for injuries in high-quality shoes are minimized, which is a key prerequisite for maintaining good health and reducing costs in this regard.

A prerequisite for the purchase of orthopedic shoes of mass-produced shoes must be a certificate that certifies high quality (safety) and consumer characteristics of the materials used for its manufacturing, which must describe the specific factors that are emphasized during the manufacture of shoes, because all specific pathologies require particular conformity of the consumer characteristics of shoes. Of course, that means a conscientious attitude of the businessman to work. When choosing the shoes, the consumer can more or less timely discover the mechanical characteristics, but it is impossible to identify the hygienic-toxicological characteristics without laboratory tests. Even its

negative effects on the human body are very difficult to identify, as it has not been the case that the cause of any disease has been discussed in connection with the hygienic-toxicological characteristics of clothing and footwear. This is a mistake, because the clothes that a person wears all day and are in constant contact with his/her body can become a source of migration of numerous dangerous chemicals and toxic substances through the skin (because the skin is one of the main organs of metabolism). The risk and rate of infection during ulceration of the foot are much higher.

It is fashionable today to wear shoes without socks, on bare feet, which is unequivocally improper conduct on by footwear consumer. Shoe is a durable product and it is not easy to ensure its hygiene as it is not subject to direct washing (it is impossible to completely clean the shoes from bacteria by cleaning the outside or by periodically cleaning the inside). Wearing it on the bare foot causes its inner surface to become dirty and then constantly touching the foot with a dirty surface, easily transferring dirt and bacteria to the foot, as well as contributing to further multiplication of bacteria by steam and perspiration released from the foot. The use of socks and their frequent change help to maintain the hygiene of the inside of the shoe for a long time. In addition, the sock-less foot can be easily damaged mechanically by the impact on the inner surface of the shoe, resulting in constant friction between the foot and the shoe while walking.

To date, despite the scale of modern media, people's awareness of the consumer and hygienic characteristics of shoes, pathologies caused that they cause or progressing under their influence, as well as of the role of the foot in the state of health is very low. Some people completely ignore the role of shoes in terms of their impact on health and think that the injury caused by shoes is local and they have even no idea that the foot is a "mirror of health" because it is rich in neuro-receptor zones and points of almost all vital organs, and it plays an essential role in changing the state of an organism and maintaining health [5].

According to the International Diabetes Federation, more than half a billion people worldwide are diagnosed with diabetes mellitus. The complications of diabetes mellitus in a person suffering from diabetes not only lead to mortality and a deterioration in the quality of life, but also place a heavy burden on the health system and lead to irreversible economic consequences [6, 7].

Studies conducted by endocrinologists have shown that the development of 80-90% of the foot ulcers was accelerated by external injuries (usually due to poorly fitted shoes) [7]. Therefore, the properly chosen shoes are crucial in creating normal living conditions and life extension for people suffering from diabetes.

The studies provide little information on the percentage distribution of flat foot among diabetic foot combined diseases. Flatfoot can be both congenital and acquired. Acquired flatfoot in turn can be traumatic and age-related. Among the age-related pathologies of the foot, flatfoot is one of the most common deformities, which causes many complications both in the spine and internal organs, because without preventive measures it becomes a progressive pathology, and this disease is not something that just goes away.

In combination with diabetic foot infections, the treatment of flatfoot or amelioration of signs, especially during the ulcerative disease of the foot, when the contact area with the plantar side of the foot reaches a maximum, is possible only using the orthopedic means. These can be orthopedic shoes made individually, as well as comfortable household shoes with orthopedic elements (insole, sole in the arch region or otherwise). However, if we also take into account that the shoemaker should not be a random person, and he/she should realize what a product he/she made is, and what impact it can have on a person's health. The quality of the product he/she made very much depends on his/her knowledge and good faith. The quality of shoes is determined by a number of factors. Just as the safety of food and other products is brought under the control of the State, important items of personal use that can adversely affect human health, especially the orthopedic devices, must also be brought under the same control.

In connection with the above, in case of combined pathology of the foot caused by a common etiology of flat and diabetic foot, the shoes must meet the following requirements: [8–18]:

• The shoe must be accompanied by a GMP certificate from the manufacturer to confirm compliance of the materials used in its manufacture with the hygienic-toxicological characteristics, as well as the firm must be authorized (with appropriate qualifications, staffed with certified specialists) to manufacture the orthopedic shoes and components;

• The appearance of the shoes must be appropriate to the season and geographical location of person in a particular situation and climatic conditions. It is unacceptable to walk barefoot, especially on the rough ground and similar-type walking surface;

• It is unacceptable to wear shoes (especially with closed design) without socks, barefoot;

• Shoes should fit well and comfortably to the foot not only when trying it on, but also after walking for a few minutes, and it should not fit tightly the foot, or be oversized. Frictional forces during walking in the oversized shoes (consequently the risk of mechanical damage to the skin of the foot) are greater than when using the tightly fit shoes, so it is a mistake to believe that the oversized shoes cause less problems on the foot;

- Shoes should be made with laces or cosmic zipper to easily change their volume during the day according to changes in the size of the foot;
- The shoe upper should be made of natural, soft materials, without internal seams; the workpiece parts should not be connected to each other in the toe and ball region, and the edges of the surface should be treated by pleating, and in order to connect the surface with lining, it is necessary to use the reverse stitch, with an insert of a soft intermediate part along the edge;
- A toe case cannot be used in the forepart region of the workpiece toe; the heel thickness should be gradually reduced above the stretching edge until the most bulging point of the heel, and it must be minimal in the area of direct contact with the heel part of the foot, while the length of its wings depends on the workpiece design, and it is taken in accordance with the norms allowed by the standard (the heel wings must pass in front of the front part of the heel and be no more than $0.3 \div 0.35$ of the foot length);
- The sole must be rigid, characterized by good rolling and gripping ability on the walking surface;
- Shoes should be made with the medium or low heels. It is unacceptable to use the high-heeled and heelless shoes;
- The relief insole should allow for optimal load distribution on the walking side of the foot, and should be made with an individual or optimally computed construction, and made of soft, natural, or other hygienic materials, as well as be appropriate to the natural plantar side of the foot and must have a quick molding ability.

Considering that a person who leads an active life, makes an average of 6000 steps per day. Performing a complete step cycle normally, without excessive loads, or without factors impeding the walking smoothness, the day will pass without excessive fatigue, while under the influence of such factors, on the contrary, the energy spent while walking is added to the excessive energy consumption caused by external factors, and at the end of the day, the situation is tough. The multitime repeat negative factors lead to the intensification of the existing pathologies, or provocation of new deformities. The progression of the pathologies on the foot is due to the fact that the foot is the most physically loaded organ compared to all other organs. Added to this is the age-related excess weight, which is why the load on the foot is much higher during the day.

Each specific case requires an individual plan of conservative treatment and, above all, an adequate management-compensation of diabetes. However, when patient has already developed "diabetic foot infections", in most cases the structural abnormalities are irreversible. In such a situation, the issue is in the foreground to minimize the mechanical impact on the foot, which provides injury prevention. Shoes should be made for this purpose, in strict compliance with all the above characteristics.

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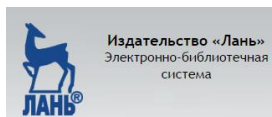
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