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NUMERICAL ANALYSIS SOLUTION OF THE PROBLEM BIMOLECULAR REACTION

Abstract: *In the work, the problem of a bimolecular reaction called the "Brusselator" is numerically solved. After some simplifications, a nonlinear system of ordinary differential equations with two or three unknowns is obtained, which depends on only one parameter (for example, α). The compiled Cauchy problem was solved by the fourth-order Runge-Kutta method of accuracy with a constant step. The problems of singular points, stability, and the limit cycle are analyzed, as well as the graphs of the trajectories in the phase space and their projections on the planes for various values of the parameter α. Also solved the "Brusselator" problem with DDE.*

Key words: *bimolecular reaction, brusselator, system of ordinary differential equations, singular point, limit cycle, stability.*

Language: *English*

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Introduction

As we know, the molecular behavior of a chemical reaction in the process of chemical technology is the number of molecules that participate in the reaction. Molecular reactions are divided into three types: multi-, two- and three-molecular. A multimolecular type reaction is A → B or A → B + C, and a bimolecular type reaction is A + B → C or 2A → B. Three-particle reactions are rare, with the reaction of three particles colliding. Let us take a look at the model of Lefever and Nicolis (1971), which is called the problem «Brusselator». In this case, a bimolecular reaction is studied and the reaction of six substances is studied [5,7,8]. The following are numerical solutions to such a private issue with the help of MATLAB software.

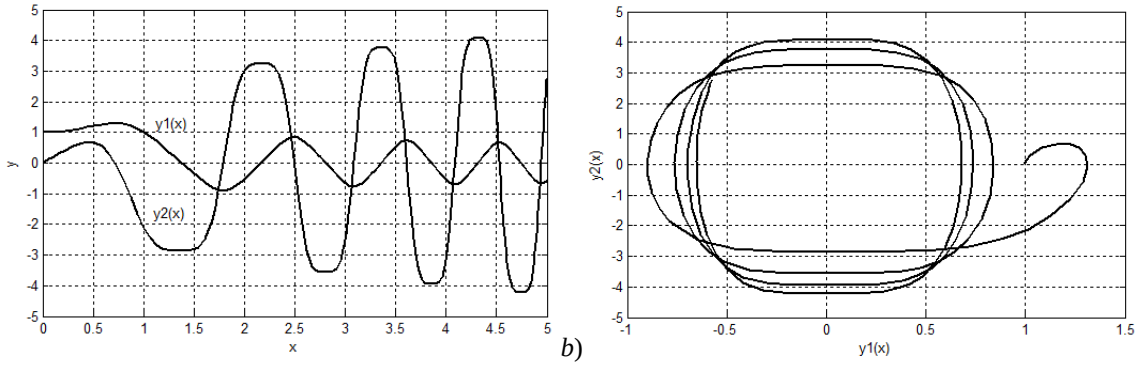
Example 1. As a test, we first solve the Cauchy's problem with the 4-order Runge-Kutta method [5,7,8]:

$$y_1' = y_2, \quad y_2' = 2y_1^2(1-4x^2y_1), \qquad y_1(0)=1, \quad y_2(0)=0. \tag{1}$$

Solution. The exact solution to the problem (1) has the form:

$$y_1 = \frac{1}{1+x^2}, \quad y_2 = -\frac{2x}{\left(1+x^2\right)^2}.$$

Below are the results of a numerical solution this Cauchy's problem (1) with the MATLAB program in the segment $x \in [0;5]$ (Fig. 1). The phase portrait in the figure shows the existence and uniqueness of the limit cycle [1,6,10].



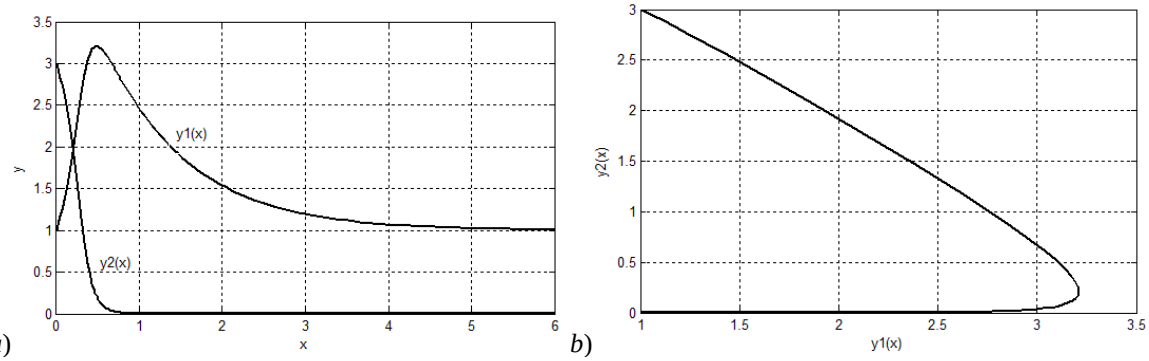
a) *b*)

Fig. 1. Graphs of the results approximate solution of the test system (1) (*a* – graphs of functions $y_1(x)$ and $y_2(x)$; *b* – phase portrait).

Example 2. Now let's look bimolecular reaction reducible to the two-dimensional «Brusselator» problem. for simplicity, assume that according to the law of mass interaction, excluding the effects of two substances on the reactions of other substances, amount of two substances constant, two substances have no effect on the reaction of the rest of the substance. In this case, the Cauchy problem will be represented by a system of two nonlinear ordinary first-order differential equations [5,7,8]:

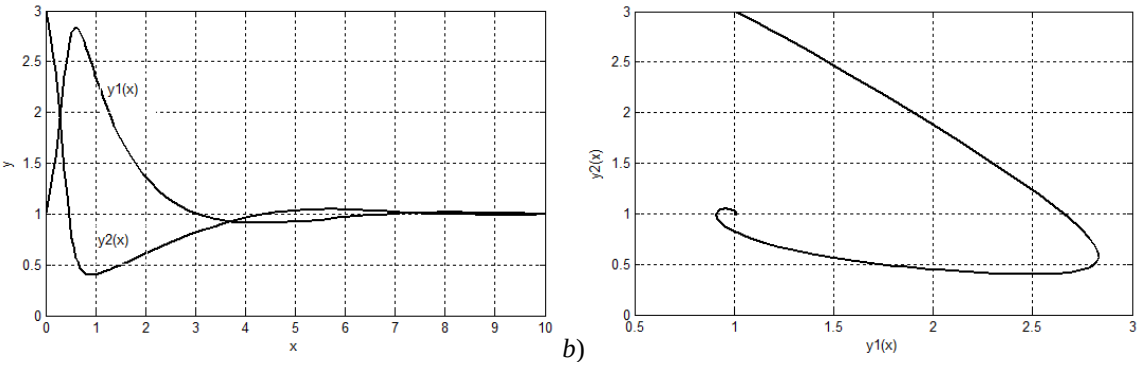
$$y_1' = 1 + y_1^2 y_2 - (\alpha + 1) y_1, \quad y_2' = \alpha y_1 - y_1^2 y_2,$$
$$y_1(0) = 1, \quad y_2(0) = 3. \qquad (2)$$

Solution. The results of a corresponding study of system (2) of nonlinear ordinary first-order differential equations in the MATLAB program by the Runge-Kutta method at $\alpha = 0,1,2,3$ (the dependence of system components on time and phase portraits) are shown in Fig. 2-5 [1,3,9,10].



a) *b*)

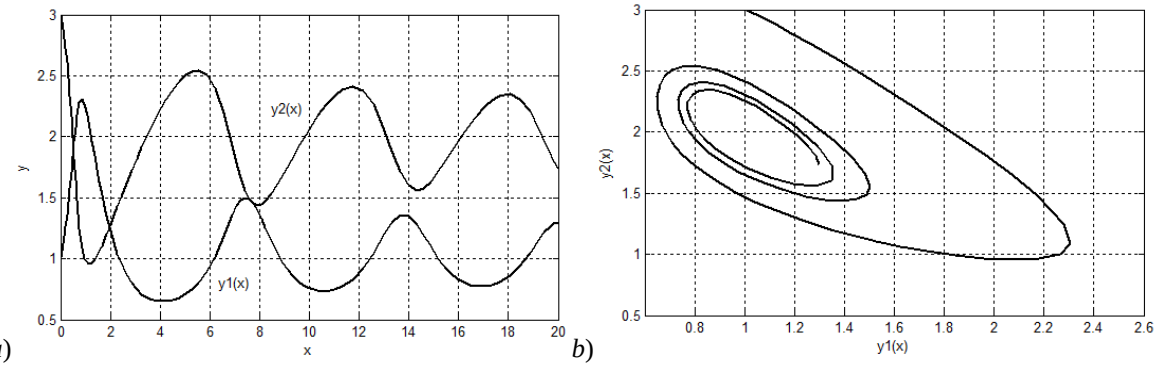
Fig. 2. Graphs of the results approximate solution of the system (2) at $\alpha = 0$ (*a* – graphs of functions $y_1(x)$ and $y_2(x)$; *b* – phase portrait).



a) *b*)

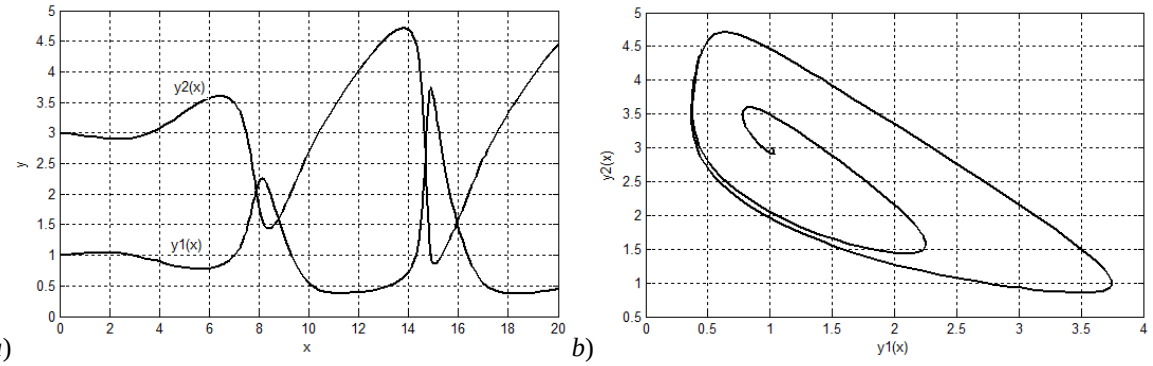
Fig. 3. Graphs of the results approximate solution of the system (2) at $\alpha = 1$ (*a* – graphs of functions $y_1(x)$ and $y_2(x)$; *b* – phase portrait).

This system has a unique singular point $y_1' = y_2' = 0$ at $y_1 = 1, y_2 = \alpha$. The linearized equation around this point is nonlinear only for $\alpha > 2$. Continuing to study the field of research, we conclude that y_1', y_2' or $(y_1 + y_2)'$ are positive or negative, which means that all solutions to this system are limited. Thus, at $\alpha > 2$ has a limit cycle, and numerical calculations show that it is unique.



a) *b*)

Fig. 4. Graphs of the results approximate solution of the system (2) at $\alpha = 2$ (*a* – graphs of functions $y_1(x)$ and $y_2(x)$; *b* – phase portrait).



a) *b*)

Fig. 5. Graphs of the results approximate solution of the system (2) at $\alpha = 3$ (*a* – graphs of functions $y_1(x)$ and $y_2(x)$; *b* – phase portrait).

To confirm the above, we refer to the Zonneveld method. The calculations of the Sonneveld method for two systems of first-order differential equations given above have the form [6]:

$$\vec{y}_{i+1} = \vec{y}_i + \left(-\frac{1}{2}\vec{k}_1 + \frac{7}{3}\vec{k}_2 + \frac{7}{3}\vec{k}_3 + \frac{13}{6}\vec{k}_4 - \frac{16}{3}\vec{k}_5 \right),$$

$$\vec{k}_1 = h\vec{f}(x_i, y_i), \quad \vec{k}_4 = h\vec{f}\left(x_i + h, y_i + \vec{k}_3\right),$$

$$\vec{k}_2 = h\vec{f}\left(x_i + \frac{1}{2}h, y_i + \frac{1}{2}\vec{k}_1\right),$$

$$\vec{k}_3 = h\vec{f}\left(x_i + \frac{1}{2}h, y_i + \frac{1}{2}\vec{k}_2\right),$$

$$\vec{k}_5 = h\vec{f}\left(x_i + \frac{3}{4}h, y_i + \frac{5}{32}\vec{k}_1 + \frac{7}{32}\vec{k}_2 + \frac{13}{32}\vec{k}_3 - \frac{1}{32}\vec{k}_4\right).$$

here

$$\vec{y}_i = (y_1(x), y_2(x)).$$

Results of computational experiment of Zonneveld method (Fig. 6-8):

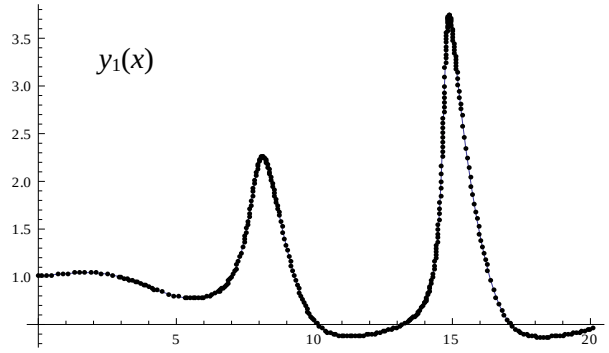


Fig. 6. Graph of approximate solution of function $y_1(x)$.

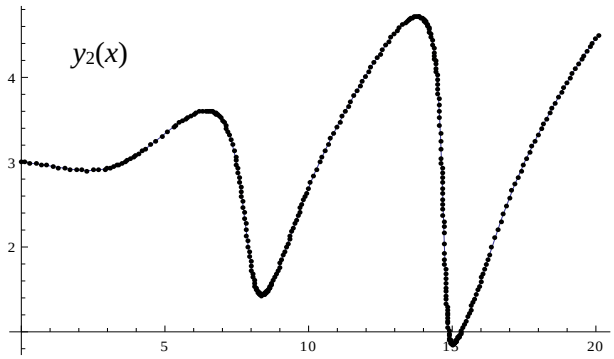


Fig. 7. Graph of approximate solution of function $y_2(x)$.

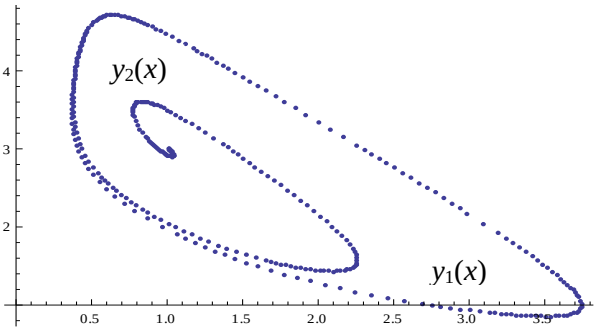


Fig. 8. Phase portrait.

Example 3. The interactions of six substances in the three-dimensional case were studied. According to the law of inter-influencing masses for simplicity, these two substances do not affect the reaction of the rest of the substance; the amount of one substance is constant; three substances are involved in the reaction. In this case, the Cauchy problem will be represented by a system of three nonlinear ordinary first-order differential equations [5,7,8]:

$$y_1' = 1 + y_1^2 y_2 - (y_3 + 1) y_1,$$
$$y_2' = y_1 y_3 - y_1^2 y_2, \quad y_3' = -y_1 y_3 + \alpha. \tag{3}$$

The initial conditions for this problem are of the form: $y_1(0)=1$; $y_2(0)=1+\alpha$; $y_3(0)=1+\alpha$.

Solution. This system (3) at $y_1 = 1$, $y_2 = y_3 = \alpha$ has one singular point:

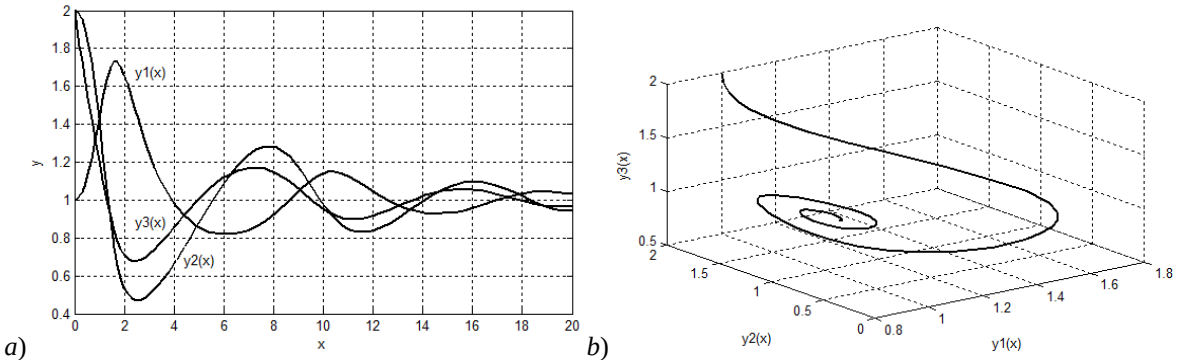
$$\frac{\partial f}{\partial y} = \begin{pmatrix} \alpha - 1 & 1 & -1 \\ -\alpha & -1 & 1 \\ -\alpha & 0 & -1 \end{pmatrix}$$

The characteristic polynomial of this matrix has the form

$$\lambda^3 + (3-\alpha)\lambda^2 + (3-2\alpha)\lambda + 1 = 0$$

and it satisfies the stability condition only when condition $\alpha < (9-\sqrt{17})/4 = 1.21922$ is satisfied (that is, the real part of the root of the polynomial is less than zero).

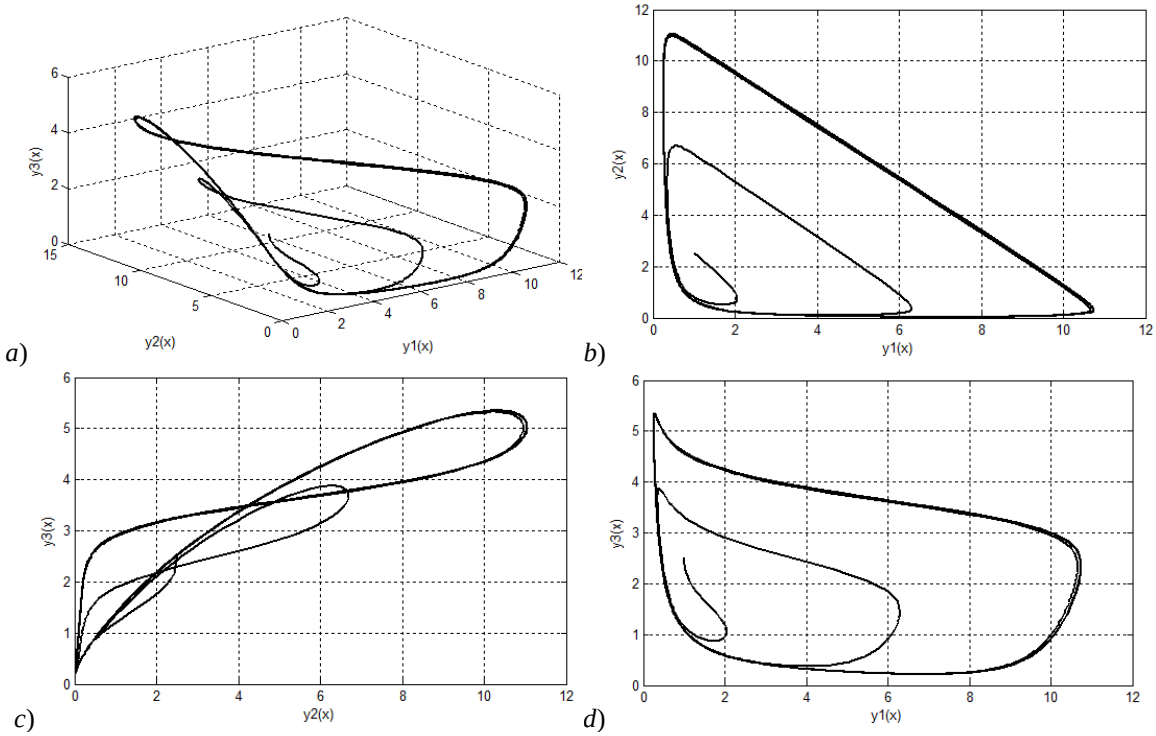
If we continue to study the field of study, we will see that there is a limit cycle only if the value of α increases from 1.0 to 1.5. The proof of the above considerations in the MATLAB program by the Runge-Kutta method is shown in Fig. 9 (x = 20, α = 1) [1,4,10].



a) *b*)

Fig. 9. Graphs of the results approximate solution of the system (3) at x=20, α=1 (*a* – graphs of functions $y_1(x)$, $y_2(x)$ and $y_3(x)$; *b* – phase portrait).

Taking into account (3), we construct the trajectory of the system of ordinary first-order differential equations (y_1, y_2, y_3) in space, its projections (y_1, y_2), (y_2, y_3), (y_1, y_3) in the planes at α = 1.5, x = 50, 100, 500, 1000, 5000. The results remained virtually unchanged (Fig. 10). If we increase the value of α, then we will see that the mentioned limit cycle "explodes", that is, $y_1 \to 0$, $y_2, y_3 \to \infty$ as $x \to \infty$.



a) *b*) *c*) *d*)

Fig. 10. Graphs of the results approximate solution of the system (3) at x=12, α=1.5 (*a* – phase portrait; *b*, *c*, *d* – graphs of functions (y_1, y_2), (y_2, y_3), (y_1, y_3) in the planes).

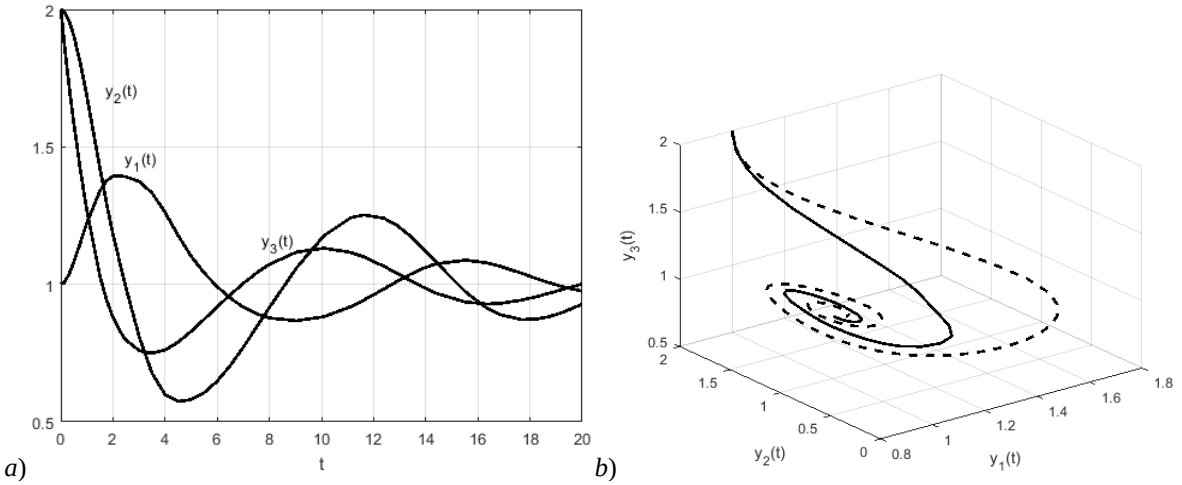
Thus, numerical calculations show that the entire solution of this system has a limit cycle at α <2; If we increase the value of a, we will see that the limit cycle disappears.

Example 4. Assume that according to Example 3, a solution to the following DDE is required [2,5,10]:

$$\begin{cases} y_1'(t) = 1 + y_1(t)y_1(t-\tau)y_2(t) - y_1(t)(y_3(t)+1), \\ y_2'(t) = y_1(t)y_3(t) - y_1(t)y_1(t-\tau)y_2(t), \\ y_3'(t) = -y_1(t)y_3(t) + \alpha. \end{cases} \quad (4)$$

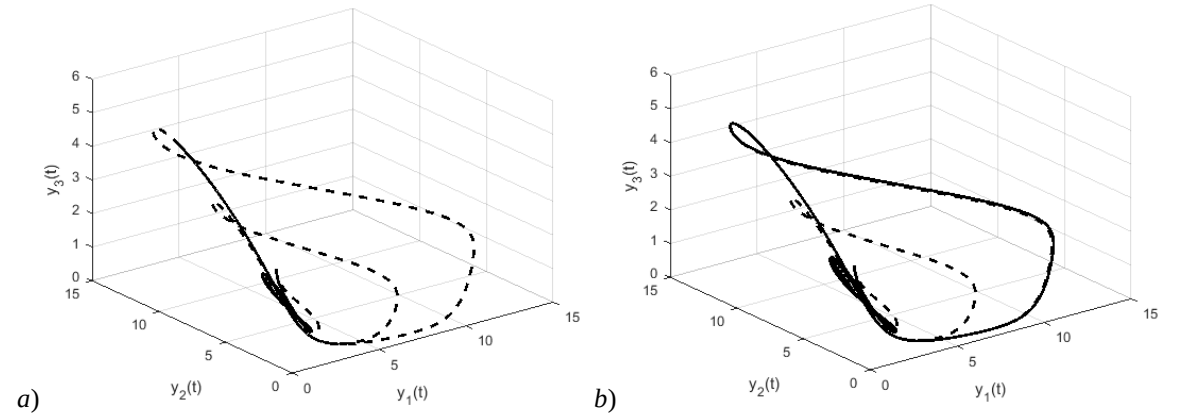
Here functions $y_1(t)$, $y_2(t)$ and $y_3(t)$ are time-dependent t changes in the amount of substances, and τ denotes time delay. The initial conditions for this problem are of the form: $y_1(0)=1$; $y_2(0)=1+\alpha$; $y_3(0)=1+\alpha$.

Solution. For $\tau = 0$, we obtain a solution to Example 3. The proof of the above considerations in the MATLAB program by the Runge-Kutta method is shown in Fig. 11 (α=1.0, t=50: $\tau = 0$ (*a*) and $\tau = 2$ (*b*)) and Fig. 12 (α=1.5: t=50 (*a*) and t=500 (*b*)) [1,4,6,10]. Here the same thing, the conclusions of Example 3 are repeated.



a) *b*)

Fig. 11. Graphs of the results approximate solution of the system (4) at α=1 (*a* – graphs of functions $y_1(t)$, $y_2(t)$ and $y_3(t)$ ($\tau = 2$); *b* – phase portrait ($\tau = 2$ - solid line, $\tau = 0$ - dashed line)).



a) *b*)

Fig. 12. Graphs phase portrait of the results approximate solution of the system (4) at α=1.5: t=50 (*a*) and t=500 (*b*) ($\tau = 2$ - solid line, $\tau = 0$ - dashed line).

Conclusion.

In this paper, we applied the numerical method for solving nonlinear ODE and DDE. It was shown that this metod provides an approximate solution which is closer to the real solution. We offer a procedure that is simple and clear, and illustrative examples demonstrate that the applied numerical method is valid and effective. In the same way, more complex tasks with ODE or DDE can be solved further [2,4,7,8,10].

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ABOUT IMPROVEMENT OF THE UNION OF THE ORTHOPEDIST AND PRODUCERS OF CORRECTIVE MEANS FOR REDUCTION OF PATHOLOGICAL DEVIATIONS OF FEET AT CHILDREN (MESSAGE 2)

Abstract: *in the article, the authors have developed recommendations for the orthopedist and manufacturers of orthopedic shoes on its correct selection, taking into account pathological abnormalities, to ensure the formation of a healthy foot for the child, excluding the formation of pathological abnormalities. At the same time, the authors substantiate their concern about the reduction of social protection of families in Russia, whose children have pathological abnormalities, to provide them with free service from an orthopedic doctor in regional centers with mandatory payment by social bodies of municipal, regional and Federal branches of government of the costs of manufacturing medical, preventive shoes and corrective products that create comfortable conditions for the child's foot.*

Key words: *valgus, varus, clubfoot, hard side, pronator, oblique, cork, arch layout, beveled heel, lacing, hard heel, hard toe, special soft, hard and metal corrective parts, range of shoes, pathological abnormalities, anthropometry, demand, implementation, competitiveness, demand, financial stability, plantography, rengenography, plaster casts, prosthetics, rehabilitation.*

Language: *English*

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Introduction

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the beginning (the first part)

Walking - is an automated motor act, carried out as a result of extremely difficult to coordinate the activities of the skeletal muscles of the trunk, lower limbs. Human Walking composed of individual steps which are easy locomotory cycle where two phases are distinguished: the transfer and support. when the diseaseICP delayed and disrupted the formation of all motor functions. In this case, movement disorders can vary widely. In the design of orthopedic shoes with high effect for the rehabilitation of children with cerebral palsy is important to take into account the

specifics of the static, locomotor functions and movement disorders.

Human movement and the proper functioning of muscles as a whole is only possible with the normal innervation. All the nerves entering and passing through the muscles should not be damaged and have breaks.

When flaccid paralysis or paresis of the affected muscle tone sharply lowered, active movements are absent or weak, there is no tendon reflexes. Is either wasting (decrease in the amount of muscle that can function normally) or atrophy (complete absence of movement) of muscles, so when walking in patients with flaccid paralysis or paresis of the lower extremities, there is a wobble in the joints. For flaccid paralysis or paresis of the lower limbs is characterized by equinus foot (ie, the foot is in plantar flexion or, in other words, sag foot). With this foot position, so as not to touch the supporting surface during walking, the patient has much to bend the leg at the hip and knee joints.

Several distinct types of walk: normal, with additional support and pathological, which can occur in violation of joint mobility, loss or violation of muscle function, as well as in violation of the masses - the inertial characteristics of the lower extremities. Biomechanical structure walk usually considered, highlighting the following elements: the spatial structure of walking;temporal structure walk; kinematics walk; dynamics walk; innervation structure of walking.

The basic biomechanical features walk: reducing the duration of a portable phase flexion setting the lower limbs, the restriction of motion in joints, and reduction of the deformation curves constituting the reference reaction[1].

A detailed comparison of the kinematics of the joints when walking in normal and cerebral palsy is presented in Figure 1.

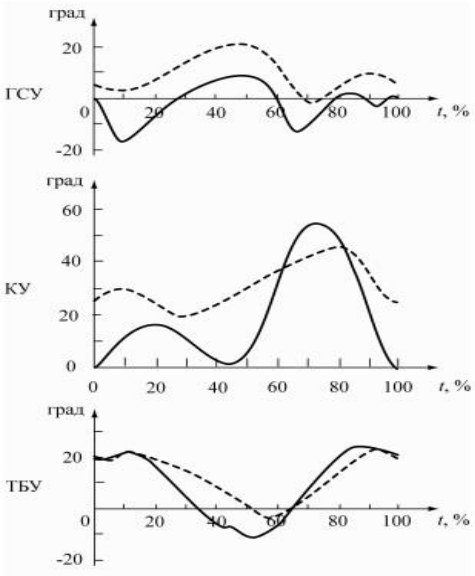


Figure 1 - graph of angular displacement of the joints of lower extremities during walking normal (solid line) and cerebral palsy (dotted line).
GUS - ankle angle CG - knee angle TBU - hip angle

The graph of angular displacement of the ankle angle (GUS) that the first plantar flexion is reduced due to the short-term rolling through the heel. Dorsiflexion at support phase increases due to the pretilt tibia forward second plantar flexion is reduced, indicating an insufficient repulsion from the support foot; dorsiflexion in its transport phase has a small amplitude, that is the possibility of snagging the toe support surface.

From an analysis of the angular displacement of the knee joint (CS) can conclude that the patient is not straightening full leg in the joint, for carrying phase puts on a support bent limb, then it slightly unbend and as soon begins roll stack through the front part, again flexes. When analyzing the angular displacement of the hip joint (TBU), there is only a reduction of the angle of extension, while maintaining the basic elements of the curve.

Research phase traffic stop and the state of the ankle showed that the time of the foot support and the footprint associated with the design of the shoe. Thus, the biomechanics of the movements of children with this disease determines the choice of constructive and technological solutions making shoes. Thus, in the case of maximum support for the toe portion of the foot, the shoe design operate with increased stiffness

in the frame parts nosochno beam portion. When a longer phase of support to the heel - reinforce the frame parts in the heel-gelenochnoy part.

In this connection, for the creation of designs of orthopedic shoes, important analysis of locomotor disorders.

Main part

Harusheniya musculoskeletal system in children with cerebral palsy are associated with developmental disorders or damage to motor mechanisms of the central nervous system (CNS).Muscle imbalance child with cerebral palsy, is manifested in the inability to perform voluntary movements. In this case violated the acts of standing and walking, movement coordination. There is a predominance of flexor tone, leading, proniruyuschey muscles. Develop flexion (flexion-pronation) installation and contractions of the limbs, kyphoscoliosis, kyphosis, scoliosis of the vertebral column. When spasticity is no phase relaxation of muscles, which leads to a slowing of its growth and development, "short muscle syndrome", resulting in contractures appear. In further developing malnutrition tissue and replacing it with the loss of connective tissue contraction.Motor motion for cerebral palsy are often accompanied by sensitivity defects, changes in cognitive and communicative functions, disorders of perception, behavior, and seizures.

When ICP observed violation of muscle tone, which plays a leading role in migration movements and their resistance, stability and flexibility. There is a dysfunction of the "kinetic melodies" movement[2]: From smooth it becomes a jerky, dezavtomatizirovannoe consisting of individual, unrelated to each other elements. When postcentral Abuse cortical afferent observed apraxia and failure analysis of cortical kinesthetic pulses expressed in difficulties select the desired combination of movements.

By the phenomena of underdevelopment are synkineses: involuntary movements that are not related in the sense of arbitrary motions. Table 1 shows the data movement disorders, depending on the form of cerebral palsy [2].

Table 1 - Movement disorders with cerebral palsy [2]

form of cerebral palsy	movement disorders
spastic diplegia	Impaired function of muscles on both sides. Ranging from those expressed paresis to mild embarrassment. Delay straightening trunk reflexes.
double hemiplegia	Always dominated by muscle rigidity, reinforced under the influence of surviving over time tonic reflexes.
hyperkinetic	Paralysis and paresis, manifested in the form of slow, gummy worm-like movements and seizures with muscle contraction. Latency reduction of tonic and righting reflex. Muscle stiffness in the neck, torso and legs. Involuntary muscle movements.
Atonic-astatic	Low muscle tone in the presence of abnormal tonic reflexes. Absence or hypoplasia of the righting reflex. High tendon reflex and periostanalny. Trunk ataxia. Incoordination.
hemiparetic	Trophic disorders, bone growth retardation. Struck by one of the sides of the body.

Symptomatology of the disease can somewhat reduced by the background of the conservative treatment (medication, the use of botulinum toxin drugs, physical therapy, etc.), but this is only possible at an early age (usually up to 5-6 years) and often to a small extent. Subsequently patients having a background persistent high muscle tone sets them irreversible degeneration and shortening, which leads to limitations in range of motion joints (contracture) curving bones and the development of subluxation and dislocation.

Common functional activity of the patient in a familiar environment for it can be estimated on the international scale classification of motor functions GMFCS patient (Global Motor Function Classification System). It is important that it is estimated the daily activity level, rather than the maximum possible, demonstrated only during the study. The scale is divided into 5 levels, each of which has different movement possibilities and different ages. On a scale established by the child's ability to move, including the use of assistive technologies. The levels of motor function on a scale GMFCS presented in Figure 2.

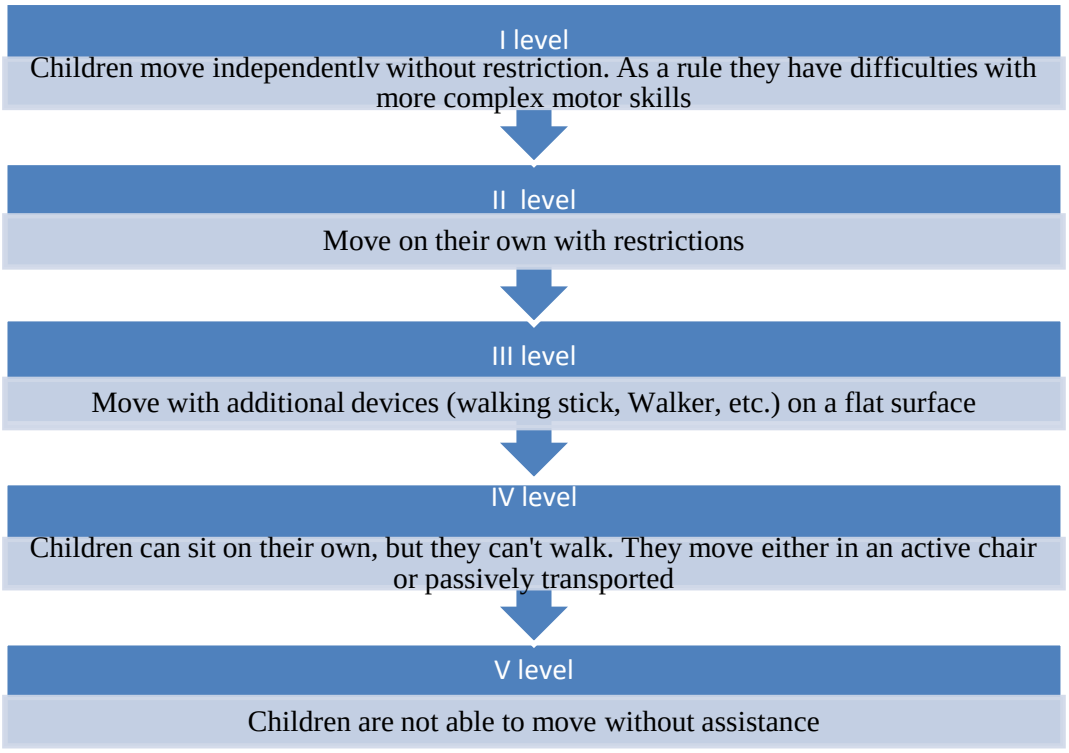


Figure 2 - The levels of motor functions GMFCS scale [83, 84]

Figure 2 shows that consumers are patients orthopedic shoes first, second and third levels of motor functions GMFCS scale. In this case, the first level of the patients in most cases, use orthopedic shoes, supplemented by individual orthopedic insole. Patients of the second and third levels increasingly used exclusively individual shoes. Important interrelation of accuracy of movements with a form of cerebral palsy. Thus, in the form of ataxic cerebral palsy observed imbalance associated with a defect regulation of the distribution of muscle tone in the group of muscles that maintain posture and precision of movement.

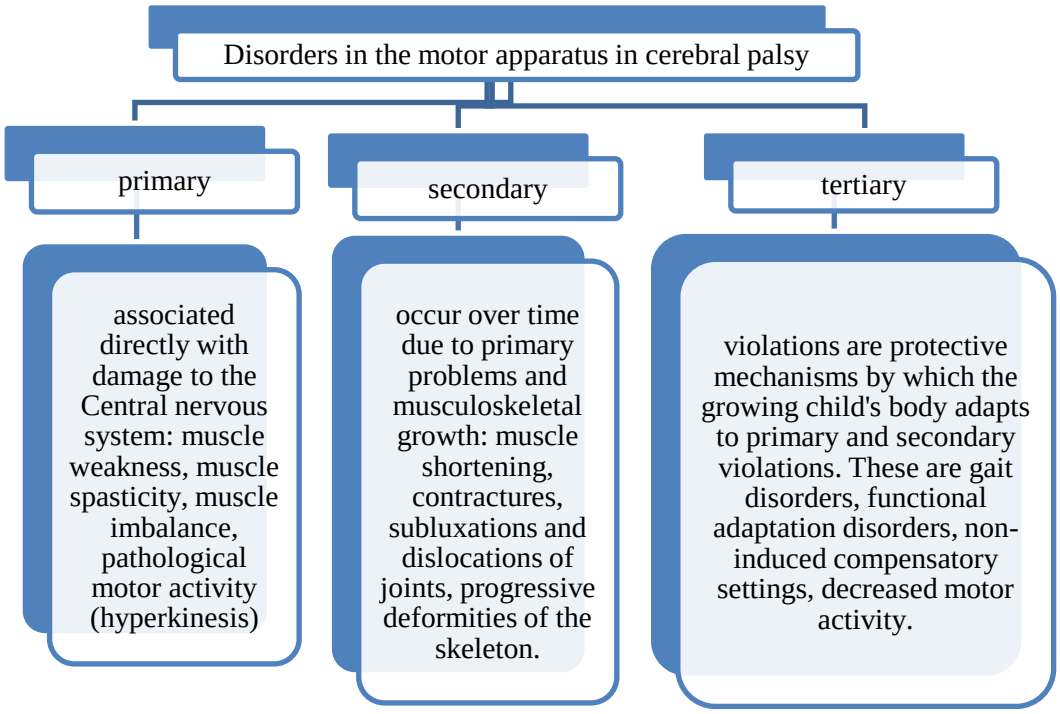


Figure 3 - Types of disturbances in motor apparatus with cerebral palsy [3]

When spastic form broken biomechanical component retention posture stability, while dyskinetic form - extrapyramidal postural control. Disturbances in the motor unit can be either primary, directly related to the CNS, and arise from the underlying causes. A more detailed description of types of violations in the motor unit at disease ICP is shown in Figure 3.

An important characteristic of static and motion as a healthy person, and the person with the disease cerebral palsy, is to find the total center of gravity (center of mass) and its projection on the bearing area. Distinguish the common center of gravity (bct) of the human body and the centers of gravity of its parts.

The common center of gravity of the whole body - is an imaginary point to which is attached the resultant force of gravity of all parts of the body [3]. Bct consists of the centers of gravity of the individual parts of the body and affects the balance of the body and its degree of stability.

If you change the posture of the body OCM shifts, and in some cases, particularly when bending forward and back, may be outside the human body. The center of gravity of the foot located on the straight line connecting the calcaneal tuberosity of the calcaneus to the end of the second finger at a distance of 0.44 from the first.

Analytical method for determining based on addition bct moments of gravity on Pierre Varignon theorem: "The sum of moments of forces, with respect to each center point is equal to the sum of these forces (or resultant) relative to the same center."

Any body can be regarded as a set of point, which serve, for example, molecules. Newton's laws for the material point with almost no changes are applicable to the real body, if we introduce the concept - the center of mass (CM).

Body weight and weight of the individual segments are important to the various aspects of biomechanics. For the analysis of body movements using the method of segmentation of the body: it is cut to certain segments. For each segment is determined by its mass and center of gravity.

Thus, compensation balance disorders in structures is achieved due to balance all parts of products used by humans. Extrapolating the foregoing in relation to the construction of orthopedic shoes.

In the development of orthopedic footwear is necessary to focus on her weight. Control of the masses of shoes is essential for maintaining or changing the body center of mass.

As shown above, the weight of the human body depends on the mass center of mass points from which it is composed. In calculating the center of mass of the weight to be considered a technical means of the rehabilitation (TCP), in particular orthopedic shoe, the weight of which will also affect the change in center of mass. Of the guidelines, "Hygienic requirements for children's shoes," [4] stations 46429990-010-2015 "Children footwear with uppers of leather" [90] and technical regulations customs union TR CU 007/2011 "On the safety of products intended for children and teens "it follows that the weight of shoes for small children should not exceed 300 g .; preschool - 380gr. and relate to the everyday mass-produced footwear. In

the GOST R 54407-2011 "Orthopedic footwear. General technical conditions "[1] pointed out that the mass of orthopedic footwear to individual manufacturing parameters not regulated.

However, there are cases in which the weight poluparah shoe is different. This may be due to the different composition of elements corrective insole; weight parts shoe upper materials caused by design features in whole or features frame parts; Weight accessories defined design features; weight soles associated with the presence of corrective elements (compensation due to shortening of the sole, to bear heels, etc.). Figure 4 shows a sample shoe, one polupar which carcass part fixed to the foot of the metal buckle.

Figure 4 - The sample shoes with different weight polupar

The difference in weight of the right and left polupar is 86 grams. Thus, wearing shoes with different weight polupar manifested in a difference of weights of the segments (lower limb) and leads to a shift in the total center of gravity, the position of which impact on the biomechanics of the motion.

Introduction weighting for rehabilitation described in detail in [5]. The author considers a healthy baby's body as a system of material points with a known center of mass (CM), and claims that its weight is evenly distributed relative to the axis of symmetry. Thus, the child maintains equilibrium by equalizing the internal forces of the body. In that case, if the figure of a man has any morphological disturbances, balance preservation condition remains the same, but in this situation, the child is forced to compensate for the displacement of one of the segments of the body changes in the position of others, thereby making up for the lack of weight and equalizing torque. When you add the goods to one of the segments of the body there is a change of torque CM. Thus, knowing the coordinates of the CM system author [5] suggests that by moving the center of mass of one of the body segments, thereby changing the torque, the child's body will tend to return point CM whole body in a starting position. Presented in [5] indicates that maintaining the balance of the equilibrium conditions is a key factor in the design of products for ICP. The main objective in the design of footwear design is to find locations of latches parts to ensure low amplitude vibrational movements and enhance their own body sensations.

Based on the foregoing, we propose a technique of working designs of orthopedic shoes, providing balanced equilibrium. It includes:

- analysis of morphological features of a figure and lower limb deformities of the child;
- acquiring a digital image figure of the child;
- the construction of a balanced geometric spatial and conventional mechanical child body model;
- determining locations of the items for latches weighting;
- body balance testing of the child.

Under the definition of "part-locks" we mean their configuration details, pockets ankle boots shoes, which are designed to contain the weighting.

According to the results of the child's body balance test with cerebral palsy, depending on the morphological characteristics, we proposed the topography of the location-clamps parts for weighting shoe designs (Table 2).

In the design must take into account that the maximum mass of the weighting in the latch detail stationed at polupare shoe must not exceed 1.5% of body weight.

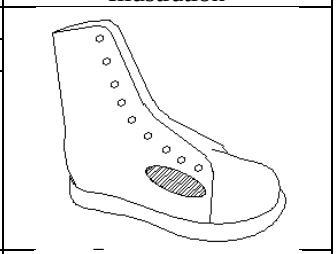
Table 2 - Location-pieces in clamps shoe designs depending on the morphological features of a child with cerebral palsy.

The morphological characteristics of the patient	Directional effect of the weighting agent	Location weighting element
Contracture of the lower limbs flexor	It is necessary to impact on the muscle groups with lower tone.	Clamps are placed in the lower parts of the tibia anteriorly offset.
foot supination	It is necessary to impact on the foot on the inside of the turn in the correct position.	Spacers are placed at the bottom of the inner side of tibia.
foot pronation	It is necessary to impact on the foot on the outside of a turn in the correct position.	Spacers are placed at the bottom of the outer side of tibia.
Atonic-astatic form of cerebral palsy	It should weighting effects to reduce the amplitude of oscillatory motion.	It is advisable to combine the suit with the weighting. The design of the shoe to place the clips on the tibia at the ankle.

As the weighting is recommended to use a steel or lead shot, specific weight of 7.8 and 11,3g / cm3, respectively.

Depending on the location of their configuration details for weighting-pockets that ensure the balance equilibrium, products can be classified into 9 groups (Table 2).

Table 3 - Classification of shoes depending on the location of pockets for weighting, providing the balance equilibrium.

The location of their configuration details, pockets for weighting	Illustration
in the lower parts of the tibia on both sides of anteversion	
the bottom of the tibia on the outside with an offset anteriorly	
the bottom of the tibia on the inside with an offset anteriorly	
the bottom part of the tibia on both sides	
the bottom of the tibia on the outside	
the bottom of the tibia on the inside	
on the tibia on both sides in the ankles	
bertsami on the outer side in the region of the ankles	
on the inside of the tibia in the ankles	

For the development of health-designs of orthopedic shoes for children with cerebral palsy need to know the parameters of their feet and tooling park, which is used for the manufacture of such shoes.

In the practice of orthopedic companies for children with cerebral palsy disease, as a rule, is made difficult orthopedic shoes, which is divided into two groups: correcting, to correct more amenable to remedial and compensatory deformations, the purpose of which is to compensate for various incurable strains [6]. In GOST P 55638-2013 "services of manufacturing an orthopedic shoe" [6] shows the classification of services for manufacturing the orthopedic shoe according to methods which comprise the individual manufacturing orthopedic shoes and selection orthopedic shoes. Service Composition for the manufacture of these types of shoes are different.

When individual services instead of manufacture "Selection finished orthopedic shoes in accordance with the GOST P 54407-2011" introduced a number of services (for the definition of parameters of special orthopedic items and the choice of materials for their production, characterization or obtaining initial data for the mathematical model (scanning) of the foot and lower leg user, selection and adjustment or individual manufacturing tooling, manufacturing of orthopedic footwear, including fitting), which significantly increase labor and material nye costs, thereby increasing the cost of the product. Therefore, cost-effective is to increase the services on selection orthopedic shoes, followed by supplementary equipment orthopedic insole and additional corrective elements.

When transferring from the status of an individual shoe manufacturing in the status of "the selection" is necessary to meet the needs of the customer, developing a design with a set of corrective elements for various lower limb deformities. From the analysis section of the study, the following description of features of the disease cerebral palsy and possibilities of improving the designs of products for people with cerebral palsy, it can be concluded that the range of orthopedic footwear includes design, providing different levels of rehabilitation effect. This allows us to approach the classification of these types of shoes from the standpoint of customization. In this article, this campaign is attractive primarily for ethical reasons: the customer feels that the product (in this case - shoes) and is personally satisfying his personal need for it. In general, the "customization" (fromEng.to customize - to set up, change something, making it more suitable to the needs of a specific consumer) is treated as individualisation products under the orders of specific customers by introducing structural or design changes (usually - in the final stages of the production cycle). Considerthe life cycle model orthopedic footwear in terms of customization. At its core, the model is phased with the iterative repetition of some of them (Fig. 5). Figure 5 shows that the first stage is formed by a general idea about the product, its main functions and solved with the help tasks. To develop structuresorthopedic shoesit is important to get the maximum information and to fix it in the source documents. However, be aware that not all wishes of the customer can be displayed in the terms of reference (TOR), particularly through an integrated approach to the solution to create a product, which is the orthopedic shoes:some items may contradict each other, or simply be untenable for various reasons (eg, organizational and technical). However, this can not justify their exclusion. At the second stage, the product design, which are designed sketches, drawings, technological and instructional card data and other documents necessary for manufacturing the product sample. Thus, the steps covered shoes at all life-cycle analysis of the market (search for product ideas) - Preliminary design - design - creation of experimental models - production, which determine the important moments of formation of quality footwear.

Figure 5 - The life cycle of product development process in terms of customization[]

Actually the production is the key to the life cycle of orthopedic products: manufactured shoes that are being tested at the fitting. In this case, a discrepancy is allowed in the prototype of elements (e.g., additional or other fastening fittings, which determine the degree of fixing of the shoe on the foot), which according to previous decisions are secondary. The obtained data make it possible to evaluate not

only the technical but also the price of the product characteristics and decide whether its further development[7].

If it is decided to continue the customization process, product development moves to the next stage - the introduction of changes and bug fixes. In all design - technological documents should be amended accordingly. Stages of the design and subsequent changes can be repeated several times, until you reach a result that satisfies all the requirements of the Customer. Experience in manufacturing orthopedic footwear shows that the number of iterations is typically one or two, and almost never more than three.

Various levels of individualization in the range of orthopedic shoes all from the standpoint of design customization can, In our opinion, divided by the mass or ultra-customized [8]. By definition mass a customized orthopedic shoes we understand - shoes, which has developed a design based on typical features of the medium uniform in the diagnosis of patients. Customization is done at the expense of supplementary adjustments corrective elements, design features of models that regulate the amount of vnutriobuvnogo space and framework components that provide rehabilitative effect. Ultra-a customized shoes are models designed to meet individual anatomical features of the foot of the individual patient based on model designs a customized shoe mass.

Wearing orthopedic shoes stereotype forms a right foot, suppresses giperkinezy eliminates contracture, prevents the development of foot deformities, develops motor skills. Orthopedic shoe rehabilitation effect depends on the shape and size vnutriobuvnogo space, which in turn is determined by the shape and size of shoe lasts.

The issue of establishing shoe pad described in sufficient detail so this article does not discuss [9]. In the development of new designs of orthopedic shoes, according to the hypothesis put forward by the working contact, should focus on creating mass and ultra-a customized product.

Having studied the range of shoes orthopedic companies, compiled by us classification of footwear in the degree of compliance with its internal shape of the patient stop:

- aboutrtopedicheskaya shoes made on the pad according to GOST or TU;
- orthopedic shoes, custom-made shoes, size is communicated to the individual parameters of the stop;
- orthopedic shoes, made individually by a plaster cast of the foot, or on the basis of it on 3D-scans.

Within this article the refinement of shoe lasts settings to create a customized mass footwear Orthopedic Enterprise regions of the SFD and North Caucasus Federal District.

To this end, we conducted anthropometric studies feet of children with cerebral palsy disease, as well as measurements of parameters of orthopedic shoe pads of Russian production, which are used in the prosthetic - orthopedic enterprises regions of the Southern Federal District and the North Caucasian Federal District for the manufacture of orthopedic shoes.

According to statistics, in the regions of the Southern Federal District and the North Caucasian Federal District, there are about 2,000 children with cerebral palsy disease. We take this number for the general population sample. Then, for the confidence probability of 85% and 5% confidence interval required sample size is 390.

In the cities of Rostov-on-Don and Krasnodar, we have carried out measurements of the stop390children aged 2 -17 years with various forms and severity of cerebral palsy disease. In the experiment, the children took part, growing up in families and in institutions.

According to the research we found that for more boats rated, the stop lengths obtained in the study are in the range from 145 to 200 mm. According to GOST 54407-2011 [1] This corresponds to the size of small children and pre-school groups footwear, which includes girls and boys from 3 to 7 years. The article presents data distribution number of disabled people with cerebral palsy by age. The share of children aged 4-7 years is 18.1%. Consequently, the general sample population for a given age and gender group is 267 people.With a confidence level of 95% and 5% confidence interval required sample size is 217. The number of measurements in a given sex and age group of 220 people, which allows further investigations.

Measurements were performed on a thin stop sock. Measurement was carried out on the foot length stopomere. The scheme for obtaining parameters obhvatnyh stop. For the selection of shoes at a shoe manufacturing are needed: setting №1 - the girth of the foot in bundles; option №2 - the girth of the foot forward vzome; parameter № 3 - girth foot oblique; 4 - lower leg above the ankle circumference.

Measurements of latitude parameters feet are made only in the case of the manufacture of the individual pads.

In the manufacture of shoes for children with cerebral palsy disease in most cases used shin pad as construction cover the ankle and have frame parts to maintain and normalize the biomechanics of the foot. The magnitude of the tibia pad tube parameters depends on the length of the track. From the statistical data, it follows that the height of the tibia part when the length of the foot 140 should be -150 mm to 140 mm, at a length of 150 - 180 mm - 150 mm and at 180 - 190 mm - 160 mm.

The height of the shoes is regulated GOST P 54407-2011 "Orthopedic footwear. General technical conditions "[1] but it may be a change on prescription

- orthopedist. Recommended GOST R 54407-2011 height parameters tibia orthopedic shoes, manufactured for selection are given in Table 4.

Table 4 - Recommended height bertsami orthopedic shoes, manufactured on selection

sex and age group	Shoe size	The height of the shoe, mm, not less than		
		recommended	0.3L + 59	0.3L + 63
small children	135	100	99.5	
	145	105	102.5	
	155	110	105.5	
	165	110	108.5	
Preschool	155	110		109.5
	160	115		111.0
	165	115		112.5
	170	115		114.0
	175	120		115.5
	185	120		118.5
	190	125		120
	195	125		121.5
	200	125		123

For further investigations we have carried out measurements of the three lines of shoe lasts, for the manufacture of orthopedic shoe for patients with orthopedic DTsP.Obuv must comply not only a complex technology, but also the medical requirements. When measuring the stop patients recorded medical appointments doctor orthopedic insoles.

For example, the product with a supplementary orthopedic insole must conform to the anatomy of the foot and ensure its normal functioning. Free shoes does not contribute the necessary pathology correction functions due to sliding of the foot inside the shoe may be formed abrasions, calluses. Overly Tight shoes violates the physiology of the foot, causing her injury and the progression of deformation.

Thus, the manufacture of mass a customized orthopedic shoes must be provided an additional space for volume vnutriobuvnogo orthopedic insole.

Removable, orthopedic insole made of leather, thermoplastic et al. Materials 3 mm thick. On corrective insole elements, such as the instep, pronator, the calculation set etc. use foam or thermoplastic materials. The size and position of the correcting elements assigned orthopedic doctor, depending on the nature and extent of deformity. For further study, we have drawn up a classification (Fig. 6) corrective elements (FE) at the position in vnutriobuvnom space.

Based on the analysis of medical appointments for patients with cerebral palsy, conducted in enterprises and SFD NCFD contact frequency distribution chart composed of corrective elements (FE) in the shoe for children with cerebral palsy (Fig. 7).

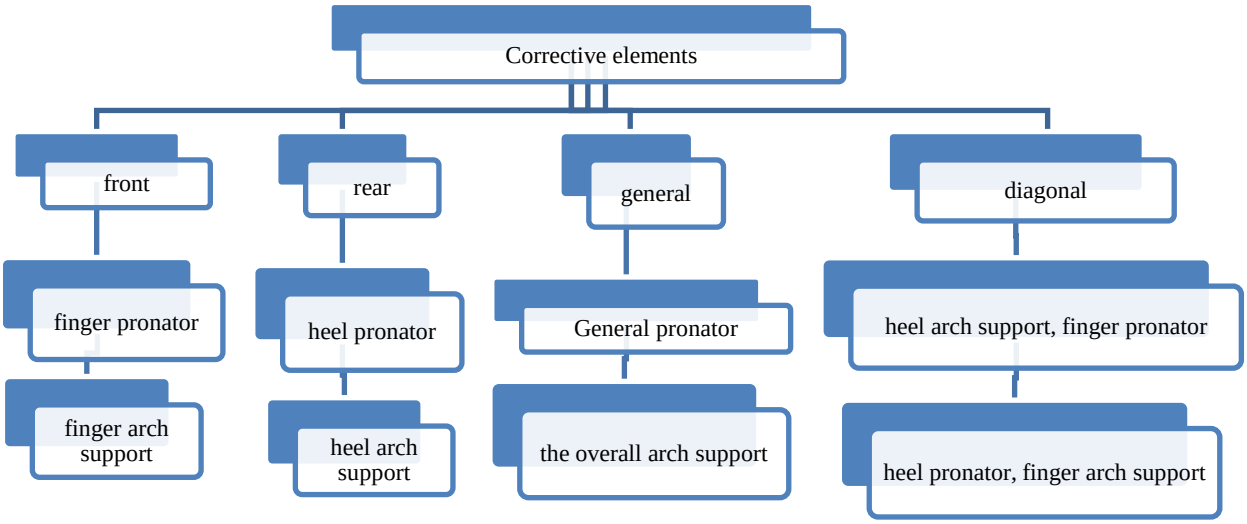


Figure 6 - Classification of corrective elements in the place position in space vnutriobuvnom

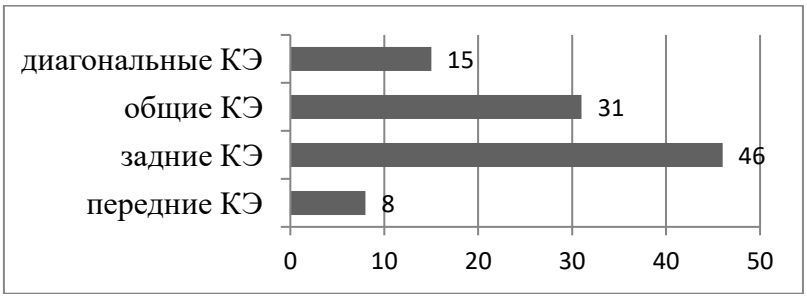


Figure - 7 Frequency distribution of the use of diagram elements corrective shoes for children with cerebral palsy

The analysis of the data revealed two cases of mismatch parameters pad mass a customized shoe parameters stop patients with disease ICP (Fig. 8).

Design mass a customized shoe for children with cerebral palsy have intermediate frame parts to fix the ankle joint. This shoe element can be made of skins of increased thickness or thermoplastic materials. To avoid injury, the child's foot to form calluses and abrasions during use shoe designs feature otblokovkoy in the ankle that gives extra space between the frame parts and the patient's leg. Thus otblokovanny portion in the manufacturing process of footwear recommended duplicate soft rubber-like material.

The height of the pads must be above the tube blank uppers not less than 10 mm. It provides the convenience of molding frame parts of footwear in the tibia. Subject to the requirements and the results of measurement stop patients, a table 3.10, which indicates the altitude and obhvatnye parameters tubes orthopedic pad for making a customized shoe mass [10].

To test the results obtained by us were taken pads Rostov orthopedic factory, the parameters of which have been brought to set by the results of the research (Figure 8).

For these blocks we made line of shoes that have been offered to patients as a finished or fitting shoes. The design of orthopedic shoes with high tibia part is shown in Figure 9.

a b

Figure 8 - Pads: a - the original form, b - brought to the set parameters

Footwear is a two-way hard Berecz and supplementary orthopedic insole, which can complement the necessary corrective elements, if necessary.

Here are the basic principles of the concept of development of this design:

- parameters for initial pad adopt minimum girth of the foot, produced in the course of the study;
- to adjust the parameter "girth bundles" offered a set of wedges, increasing girth in 5 mm increments. Increasing girths stop can be caused by a large fullness deformation of the fingers, the spreading of the forefoot. Therefore we need both vertical and horizontal wedges;
- girth shin above the ankle is measured in increments of 5mm. Therefore wedges value should increase the volume of the tube blocks at the same pitch;
- in some cases the increase otblokovok under the ankle. For this design pads must be provided to install the process opening otblokovochnogo web.

Figure 9 schematically presents the structure with vertical flat and wedge-shaped inserts.

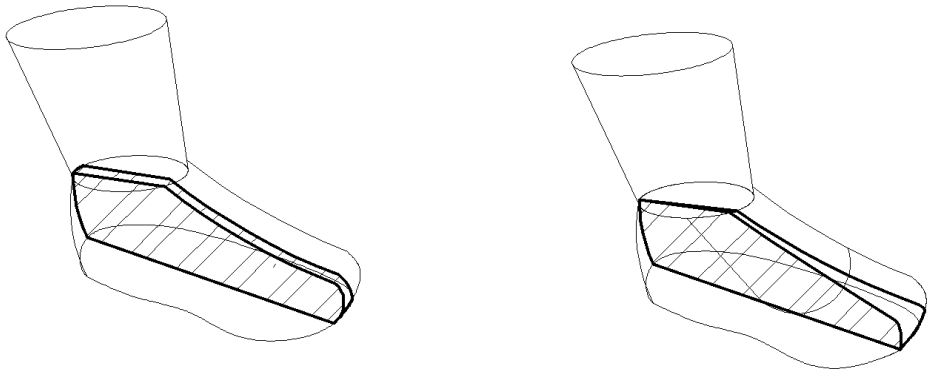


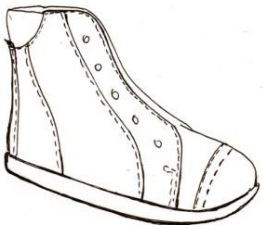
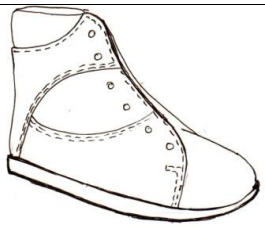
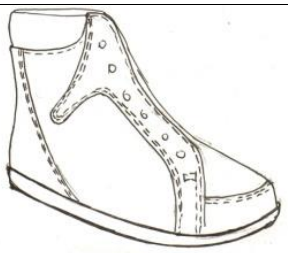
Figure 9 - Schemes structures vertical flat and wedge-shaped inserts

In addition to the internal shape of the shoe on the degree of rehabilitation effect influences product design. Therefore, the next section of the article is devoted to the analysis of the range of children's orthopedic shoe for patients with cerebral palsy disease.

Range of children's orthopedic footwear is wide, requiring its classification and identification of the basic models. To solve this problem we analyze the designs of shoes manufactured by enterprises of Russia specializing in the manufacture of orthopedic shoes. Thus, the construction of the "envelope" is made orthopedic Company Rostov-on-Don, Stavropol, Krasnodar, Sochi, Kirov and Lipetsk, Kaliningrad, Rostov, Syktyvkar [11].

Table 5 presents the photographs of models with insulated footwear, made from industrial catalogs orthopedic companies. For clarity, the structure transformed into a technical drawing in the description of their structural elements.

Table 5 - Construction of shoes with their configuration bertsami

illustration products	technical drawing	Structural and decorative elements
1	2	3
		Lace boots with soft edging. As a decorative use decorative stitches
		Shoes with laces. As used their configuration decor decorative elements contrasting color
		Lace boots with soft edging. In used as a decoration: the division of parts, parts contrasting in color saturation
		Lace boots with soft edging. In used as a decoration: the combination of colors, stitching in a contrasting color
		Lace boots with soft edging. As used decor division parts, parts of neutral colors
		Boots on the tapes "Velcro" with soft edging. As decor used: partitioning parts, parts related colors.

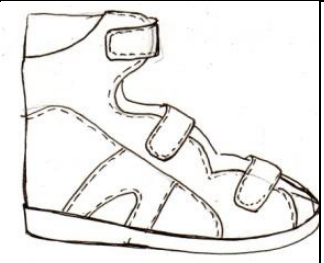
The most popular design is the type of "envelope" with bertsami boots, ankle closing for frame details. The shoe good detection is required, which is achieved by lengthening the tibia to the V baseline for or entering it. Methods pattern fixing different, they are priority laces, but it is possible to use tapes "Velcro" fasteners and - buckles [12].

The variety of structures in this case is achieved by partitioning parts, accessories and the use of different colors.

The range of summer shoes allocated 3 basic models.

Orthopedic shoes with high tibial part and full opening for the entrance of the foot are the most popular summer models as may be appointed for different strains of the lower extremities. Illustrations articles, technical design drawing and description are given in Table 6.

Table 6 - Construction of summer shoes with open toe part

illustration products	technical drawing	Structural and decorative elements
1	2	3
		Shoes with soft edging tape fasteners. In used as decoration parts division, a combination of flowers, applique
		Shoes with Velcro tape. In used as decoration parts division, a combination of flowers, applique
		Shoes with soft edging tape "Velcro" and buckles. In used as decoration parts division, a combination of flowers, applique
		Shoes with soft edging tape "Velcro." In used as decoration parts division and combination of colors

		Shoes with soft edging tape "Velcro." As used decor articulation parts
		Shoes with soft edging tape "Velcro" and buckles. As a decorative use: the division of parts and combination of colors.

In the analysis of structures, divided into 3 main methods of fixing the shoe on the foot: laces, Velcro tape, buckles. Laces across the arc of the foot to enter differences create the greatest degree of fixation in the ankle due to the minimum possible distance between the retaining elements (threaded through eyelets and laces changes polnotnyh parameters shoe by contraction or relaxation lacing.

In the manufacture of footwear occur combined foot on fixation methods. The most popular combination of "tape" Velcro "-pryazhka". This is due to the convenience of self-donning and doffing of shoes the patient. In connection with impaired motor skills to use fasteners with buckle in most cases almost impossible.

We consider the structure of summer shoes with high bertsami and vamp with an elongated tongue booster.[13]

Due to vamp with inflated tongue in the shoe is achieved enhanced fixation of the ankle joint. Embodiments of structures of this model are shown in Table 7.

The closed part of the shoe beam creates difficulty dressing shoes for patients with severe contractures of the ankle and foot paresis. There are 2-clamp technique, the shoe on the foot: Velcro tape and buckles, as well as in the previous model can be a combination thereof.

The third model - summer shoes oversized bertsami and closed toe portion (Figure 10). The model has a number of limitations: absolutely not suitable for patients with severe contractures of the ankle joint, paresis feet, deformities of fingers, etc.

Table 7 - Construction of summer shoes with high bertsami and vamp with an elongated tongue

illustration products	technical drawing	Structural and decorative elements
1	2	3
		Summer shoes with a closed nose and the vamp-tongue. fixing method on the foot - tape "Velcro." In used as decoration parts division and combination of colors

		Summer shoes with a closed nose and the vamp-tongue. fixing method on the foot - tape "Velcro." In used as decoration parts division, a combination of flowers, applique
		Summer shoes with a closed nose and the vamp-tongue. fixing method on the foot - tape "Velcro." In used as decoration parts division, a combination of flowers, applique
		Summer shoes with a closed nose and the vamp-tongue. fixing method on the foot - belt buckles. As a decorative use unusually shaped buckle and preformation on uppers
		Summer shoes with a closed nose and the vamp-tongue. fixing method on the foot - belt buckles. As a decoration used: stitching in a contrasting color and perforations on the vamp.

Figure 10 models of shoes with summer overestimated bertsami and closed toe part

For the purpose of this design for patients with paresis of the foot or slight contractions necessary soyuzochnoy shortening of the shoe to the foot uncomplicated input in vnutriobuvnoe space. For constructive vamp length standards used Velcro tape width of 2.5 cm and more which extend soyuzochnuyu of the shoe (Fig. 11).

Figure 11 Model shoe summer with increased due to belt vamp

Thus, allocated four basic constructions of shoes for patients with cerebral palsy disease. We take them as a base. Examples of designs are shown in Figure 12, and description thereof - in Table 8.

Table 8 - Description of basic models of orthopedic footwear for patients with cerebral palsy disease.

boots	Footwear summer with high tibia part		
their configuration ankle boots	open toe part	closed toe portion (vamp with an elongated tongue)	closed toe portion (vamp without tongue)
			

Figure 12 - Models orthopedic shoe for patients with cerebral palsy disease.

Various modifications to these models can be obtained due to the partitioning parts, their configuration using decorative items, decorative items and accessories, to ensure a comfortable child stop state.

conclusion

article

- Show biomechanics movements, causes and types of musculoskeletal disorders in cerebral palsy disease. It was revealed that a violation of the musculoskeletal system in children with cerebral palsy are associated with developmental disorders or damage to the central nervous system of motor mechanisms;

-Show that orthopedic footwear is a technical means of rehabilitation, performing a number of tasks of rehabilitation. The conceptcorrecting the position of the common center of mass of orthopedic shoes to ensure equilibrium of the balance when walking and raising rehabilitation effect;

-introduced concept of footwear design methods to ensure the equilibrium of the balance, which includes:

- analysis of morphological features of a figure and lower limb deformities of the child;
- acquiring a digital image figure of the child;
- the construction of a balanced geometric spatial and conventional mechanical child body model;
- determining locations of their configuration details latches for weighting;
- Testing the baby's body balance;

-given shoe 9 groups depending on the location of their configuration details for weighting-pockets that ensure the balance balance when walking;

-formulated concept "mass and a customized ultra 'shoes under the definition of "mass a customized orthopedic footwear" refers to shoes whose design is based on a medium-typical features of a homogeneous group of patients at diagnosis. Customization is done by adjusting the supplementary corrective elements, design features of models that regulate the amount of vnutriobuvnogo space and framework components that provide rehabilitative effect. Ultra-a customized shoe model are tailored to the individual foot anatomical features of the particular patient based on standard designs mass a customized shoe;

-Swipe anthropometric studies stop children with cerebral palsy, aimed at clarifying the parameters of pad mass a customized shoe. It was revealed that in the regions of the Southern Federal District and the North Caucasian Federal District shoe lasts for children's orthopedic shoes do not meet the statistical average parameters feet of children with cerebral palsy disease. Parameters of blocks for the manufacture of mass-a customized shoe for children with cerebral palsy disease;

3. Obtained the degree of customer satisfaction of orthopedic footwear constructions made with pads on the corrected parameters;

4. The concept of creating a pad with adjustable volume for designs a customized ultra-shoe;

5. The analysis range child orthopedic shoes, of which 4 is allocated basic design mass a customized orthopedic shoes with high effect of rehabilitation for patients with disease of cerebral palsy:

- shoes with their configuration bertsami;
- summer shoes with high tibia part with open toe;
- summer shoes with high tibial portion and a vamp with an elongated tongue;
- summer shoes with high tibial part and closed toe;

-given classification orthopedic shoes, based on the rehabilitation effect, which is based on data on the rigidity, methods of fixing the shoe to the foot, corrective elements supplementary orthopedic insole;

the continuation (second part)

Introduction

The most common disorders associated with cerebral palsy lower limbs are flat, hollow foot, foot valgus deformity, paresis of the foot, shortening of the lower limb, different deformation fingers. This requires the inclusion in the design of certain add-ons shoes.

Shoes for children with cerebral palsy should be made of high quality materials. Distinguishing features include a specially designed shoes that have a wide forefoot to provide a natural position of the toes and the foot of the child is not deformed and took a comfortable position. The shoe sole is recommended to use with sufficient resilience and flexibility. Some models have a preventive outsole with a special heel having an elongated krokul to support and unloading of the foot. This heel, extended from the inner side of the sole. This strengthens the sole under the middle part of the foot and prevents it from heaping up inside. Using the heel helps in the prevention and treatment of foot defects.

Orthopedic patients with droops software stack defined active mobility in the ankle and foot by the presence of lateral deviation. In cases where the dorsiflexion in the ankle kept and no lateral deviations of the foot, is assigned to shoes, combined with cuff and rubber rods. If the non-fixed sagging and there is very little lateral deviations of the foot, it is recommended to use orthopedic shoes in combination with the rubber cuff and rods, as well as shoes with double lacing.

Expressed lateral deviations droops feet require destination orthopedic shoe with rigid sided Burpee and removal of the heel, and mezhstelechny layer must be supplemented pronator or instep.

For fixed sagging or excessive mobility in the ankle boots are recommended with bilateral or circular rigid Burpee. Circular hard Berecz along with more reliable fixation creates some front stop required for rolling. The species range of products is limited. Constructs recommended for children with CP D are high boots and sandals. The height of the shoe is designed based on the doctor's prescriptions and are

presented in Table. 1 in accordance with the GOST P 54407-2011.

Table 1 Calculation of parameters of individual producing orthopedic footwear

Sex and age group footwear	The height of the shoe, mm, not less than
	boot
For toddlers	0.3 / + 53

main part

When constructing an orthopedic shoe, besides vnutriobuvnogo space and parameters orthopedic insole, considerable rehabilitation effect is achieved by frame parts [1].

The degree of the topography and product stiffness determined taking into account all complex foot deformities.The special carcass parts of orthopedic shoes for children with cerebral palsy are hard heel, ankle boots tough, hard toe, vamp tough, hard flank, etc. Hard flank in most cases combined with a rigid corset bertsami or backdrop.

Usage statistics of frame parts to fix the ankle joint according to Rostov orthopedic factory of the Ministry of Labor and Social Protection of the Russian Federation is shown in Figure 1.

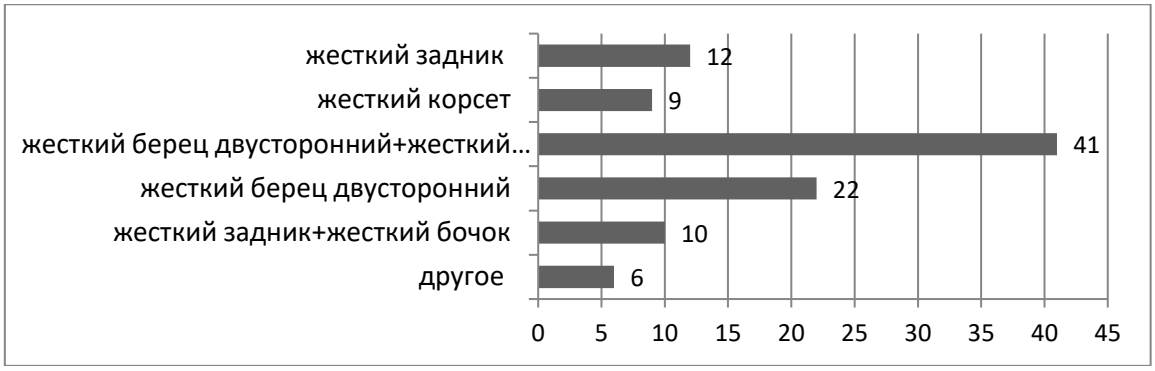


Figure 1 - Frequency of frame parts for fixing the ankle

The dominant frequency of use are hard Berecz in combination with a rigid edging (41%) and without (22%).

Shoes with rigid bilateral bertsami in conjunction with a hard edged recommended in the mass a customized shoes for people with cerebral palsy disease. The degree of fixation of the foot in space vnutriobuvnom influence fixation methods footwear on the foot. Typical methods of fixation are shown in Figure 2.

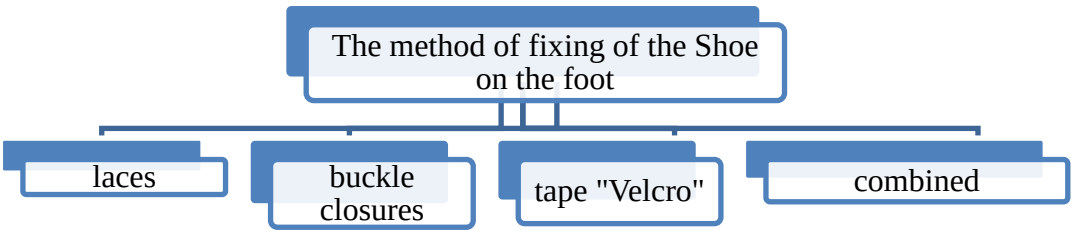


Figure 2 - Methods for fixing the shoe to the foot

The traditional methods of fastening the shoe to the foot, providing reliable fixation of the foot in space vnutriobuvnom are laces. In this case, the amount can vary vnutriobuvnogo space with high accuracy, thus increasing the effect of the rehabilitation orthopedic shoes.

With advances in technology and changes in fashion trends in children's shoes in the orthopedic shoe fixation method used on the foot with tape "Velcro", which is used by fashion designers in

various kinds of shoes. In the construction of shoes, on average, from 2 to 4 ribbons "Velcro", arranged uniformly at a distance of 2-3 cm from the edge of the tibia. To fix on a healthy foot baby that's enough. But when it comes to fixing the maximum by means of frame parts, the use of tapes "Velcro" can not create a sufficient fixation of the foot in vnutriobuvnom space. The leg does not take a fixed position, therefore, therapeutic and prophylactic significance shoe decreases.

To ensure the necessary degree of locking shoe on the foot ribbons "Velcro" bertsami design proposed in the recess in the crook of the ankle joint [], thus changing the distribution of resistance forces. EXAMPLE proposed constructive solution is shown in Figure 3.

Figure 3 - Possible changes in the shape tibia orthopedic shoes

In the embodiment represented type tape fasteners are arranged in two directions, for fixing the leg and dorsum of the foot. Increases not only fixation of the shoe on the foot, but also the comfort of use of the product. The design provides a high-quality relationship between consumer preferences and medical supplies. This model is included in the range of Rostov orthopedic factory and widely used.

When analyzing structures orthopedic shoes in terms of fixing of the foot in vnutriobuvnom space, which is achieved by frame parts [14], methods for fixing the foot and volume parameters of the shoe pad can be divided into 3 main fixation degree (Figure 4)

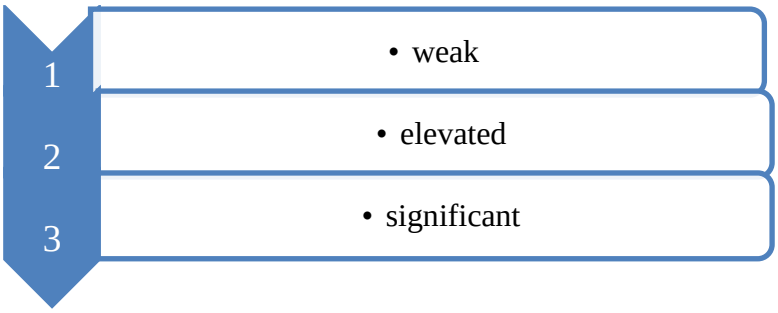


Figure 4 - The degrees of fixation of the foot in space vnutriobuvnom

Figure 4 shows a construction of the shoe with high rigid backdrop (shaded) with a weak degree of fixation. shoe design is indicated for minor deviations in the lower extremities. Hardness backs provided using polymer materials, or skins increased thickness.

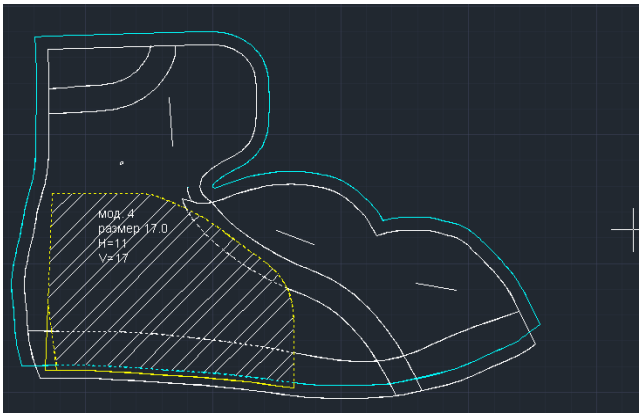


Figure 5 - Structure of shoes with high backdrop rigid (with a weak degree of fixation of the foot in space vnutriobuvnom)

In such designs, the recommended methods of fixing the shoe on the foot are buckles, belts "Velcro" or laces.

In the model with a higher degree of fixation of the foot (Fig. 6) as the frame parts used hard high Berecz (shaded). Recommended method of fixing the shoe on the foot are the buckles and laces.

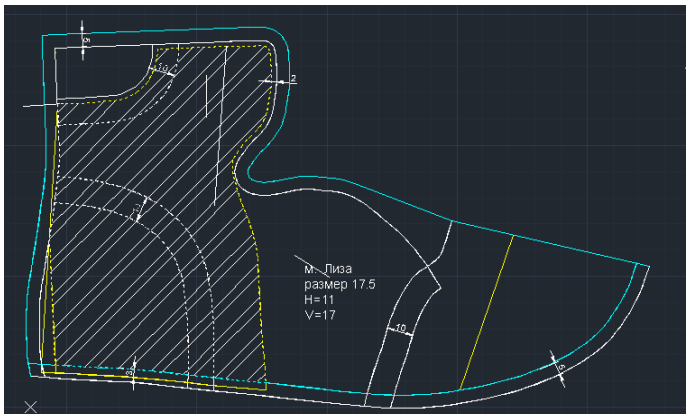


Figure 6 - Structure shoes with hard tibia (with a higher degree of fixation of the foot in space vnutriobuvnom)

In the model shown in Figure 7, the carcass parts are high rigid ankle boots in combination with rigid barrels, which ensures a significant degree of fixation.

This design of shoes designed for children with significant deformities of the lower extremities.

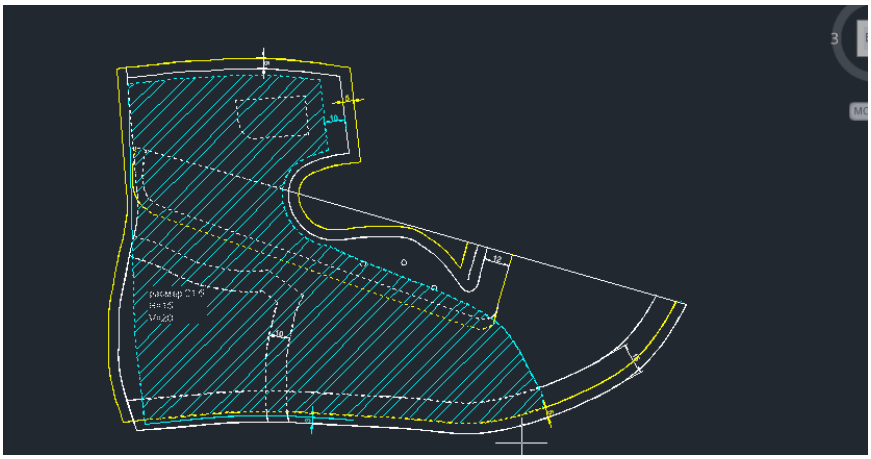


Figure 7 - Construction bertsami shoes with hard and rigid barrels (with considerable degree of fixation of the foot in space vnutriobuvnom)

Availability of renewals in gelenochnoy parts significantly increases the fixation foot during vnutriobuvnom space compared to the previous design. Recommended method of fixation on the foot are the buckles and laces.

Summarizing the data on orthopedic insoles, frame parts, fixation methods shoe on the foot, as well as standard designs making shoes, we proposed to allocate 7 rehabilitative properties of structural levels. These levels describe the main functions of rehabilitation using orthopedic shoes. The classification scheme is shown in Figure 8.

From the scheme should be that for patients with 1-3 levels of motor functions, footwear is made on GMFCS scale [].

For levels 2-5 pads should be used in accordance with the GOST P 53800-2010 "Pads orthopedic shoe. General specifications "[15], or individual blocks with parameters as close to the parameters obtained by measuring a stop. Particular attention should be paid to the angle between the chassis and the tibia parts pads. In levels 2-5 shoe remains fixed angle, which has a rehabilitation effect. Footwear layers 6 and 7 may be fabricated from a cast of the foot. The angle between the chassis and the tibia part of the foot may

be prescribed by the doctor - orthopedist on the results of examination of the patient.

A more detailed description of the frame parts orthopedic insoles and shoes at the level structures rehabilitation effect is given in Table 2.

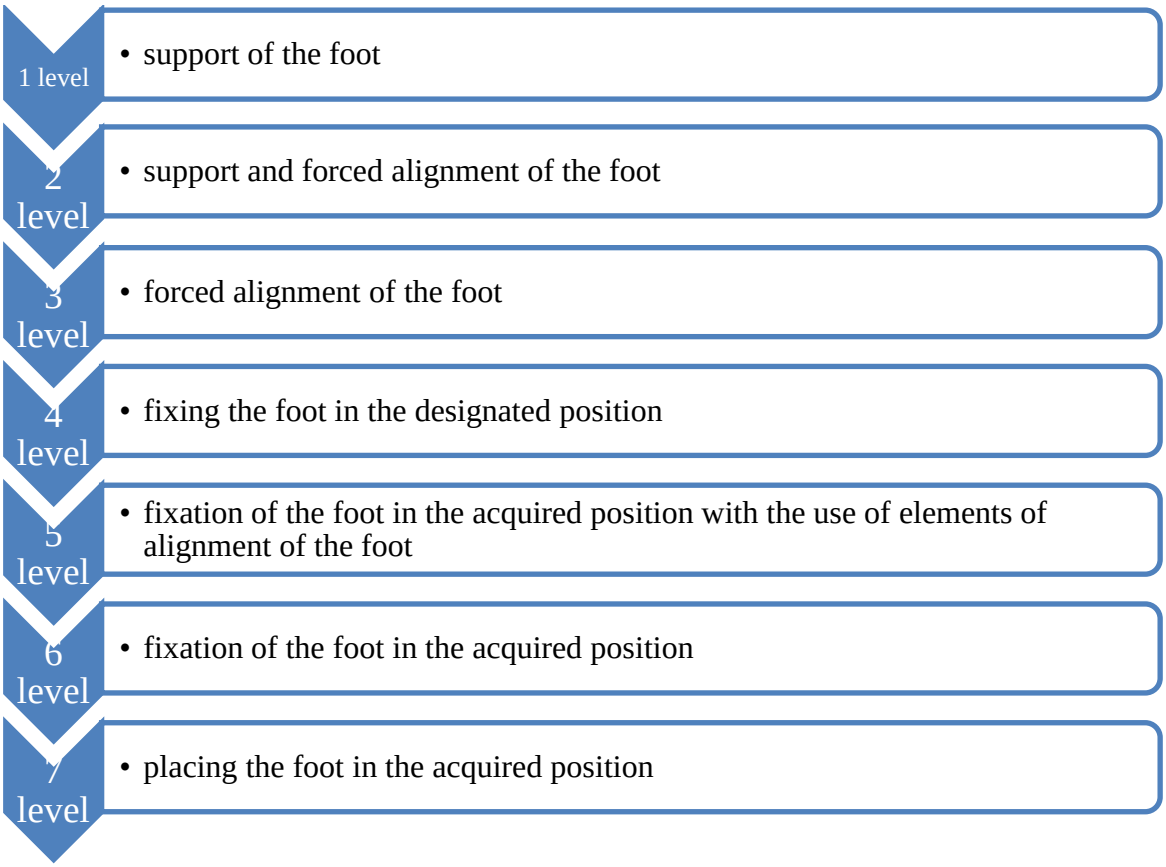


Figure 8 - Classification of rehabilitative properties of structures orthopedic shoes

Table 2 - Classification shoes at the level of the rehabilitation effect

levels	Frame details	Features of orthopedic insoles	Features design shoes
1	hard heel	supporting arch	Shoes with high tibia part with any method of fixation on the foot
2	hard heel	supporting arch and additional corrective elements (pronator, supinator)	Shoes with high tibia part with any method of fixation on the foot
3	high heel hard or hard Berecz	supporting arch and additional corrective elements (pronator, supinator)	Shoes with high tibia part with any method of fixation on the foot
4	Hard Berecz in combination with a rigid edging or use corsets	supporting arch and additional corrective elements (pronator, supinator)	Shoes with high tibia part with the fixation on the foot straps or laces
5	Hard Berecz in combination with a rigid edging or use corsets	supporting arch, additional corrective elements (pronator, supinator) and elements which compensate the deformation of the foot (the insole from a cast)	Shoes with high tibial part of the design of the "envelope" with the fixation on the foot straps or laces
6	Hard Berecz in combination with a rigid edging or use corsets	supporting arch, additional corrective elements (pronator, supinator) and elements which compensate the deformation of the foot (the insole from a cast)	Shoes with high tibial part of the design of the "envelope" with the fixation on the foot straps or laces

7	hard heel or other carcass detail required to move	with elements feet compensating strain	Shoes with high tibia part of the design of the "envelope" with any method of fixation on the foot.

To ensure full rehabilitation design effect, in addition to the design features of the model is important to its color, acting on the psyche of the child with cerebral palsy, which should be taken into account.

There are numerous methods of designing various shoe designs [16]: the design of boots, shoes, shoe, shoes, boats, moccasins and remeshkovo - sandalwood. In all cases, the design process is carried out on the block, meaning that parts of the right and left polupary complete shoes are symmetrical and do not differ.

When creating an orthopedic shoe frequent asymmetry that gives us reason to pay attention to the aspects of the techniques for the development of such structures, which are in accordance with the terminology adopted by us belong to the category of mass and ultra-a customized.

Currently there are various techniques of designing footwear, including computer-based technology arrays basic geometrical forms of structural elements forms of footwear. On shoe factories widespread specialized CAD designed for constructing footwear (ShoeMaker, «ASSOL-shoes", "ASCO-2D", "IRIS", etc.) []. They contain tools and functionality to develop and design all kinds of shoes, as well as creating a database, which is not about small businesses or workshops for the manufacture of footwear to order [16]. To improve the quality of drawings with simultaneous reduction, the complexity and the creation of electronic databases, we propose a technique shoe design using CAD broad spectrum.

Designing shoe according to [] is characterized by simplicity, adaptability, structuring, low material and labor costs.

However, in practice, the most common prosthetic - orthopedic companies is to design footwear of URC obtained with paper templates [16], which comprises the following steps:

- design sketch of shoes;
- obtaining averaged sweep surface side pads (URC);
- URC inscribing a coordinate axis, application of the basis grid, and auxiliary control lines;
- tracing constructive basis shoe upper, intermediate and inner parts;
- manufacture of parts of footwear patterns.

Therefore, maintenance works represent the proposed design techniques used in comparison with the practice of prosthetic - orthopedic companies (Table 3.).

In the second stage of the URC is placed into conventional coordinate axis with the heel heights and slanting girth. The upper edge of footwear is designed with an angle of inclination of 84-86 degrees starting from the foot or deformation. The inclination of the upper edge checked visually during the "fitting" bonding primer on the block model.

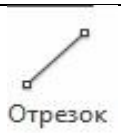
In AutoCAD package for the 2D- design digitizing circuit models and updating the drawing is carried out using the tools provided in Table 3.

Table 3 - Comparison of the initial stages and the proposed methods of designing footwear

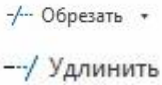
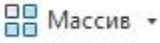
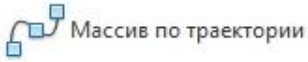
Stage	Traditional design methods	New design methods
1	Preparation conditional sweep the inner and outer sides of the side surface of the pad. Preparation averaged sweep surface side pads (URC)	Drawing on the grid block basis, control and auxiliary lines (technique Peshikova VF, Ars Sutor). Drawing a sketch of the future model on the outer side of the pad. Getting the URC. Preparation scanning trace pads.
2	Inscribing URC in the coordinate axis. Application grid basis, auxiliary and control lines	Building a high-rise options footwear, based on the results of measurements of the foot of the customer and the type of lower limb deformities
3		"Trying" gluing soil-derived models of shoes to a shoe with a note if necessary, further adjustments

4	Drawing constructive basis top, the pad parts and shoe mezhpodkladki	Digitizing circuit model, the construction of the structural allowances. Building pads and shoes mezhpodkladki
5	Getting templates parts of footwear	Getting template parts from the finished drawing with the commands "Copy" and "Paste"
6		Storing the resulting drawing into a database indicating the required information.

Table 4 - Tools AutoCAD, used in the design

Marking tools	functional tool
1	2
	The depiction of objects, the construction of direct lines
	Long edge delineation
	Construction of perforations, eyelets, decorative elements round shape
	Construction of the heel rounding; rounding, which can not be built by conjugation
	Construction parts with a line of inflection

Continued Table 5

1	2
	Tools to adjust the drawing
	Building rounded parts
	Building design of allowances and offset drawing lines by a predetermined amount
	Construction of perforations, decorative elements of shoes
	Building Blocks for a Markup
	grouping objects
	Ungroup objects to adjust

Adjustments to existing drawings in the database as a result of "trying on" gluing grnt - model on the block are carried out electronically.

Scope of work will vary depending on the characteristics of the developed model. If corrections are already located in the base of the drawing data, it is necessary to perform operations and ungrouping,

advantageously using tools "offset" with simultaneous change of altitude and latitude of design parameters.

Figure 9 shows as an example the basic models Drawings for patients with the disease cerebral palsy developed in AutoCAD.

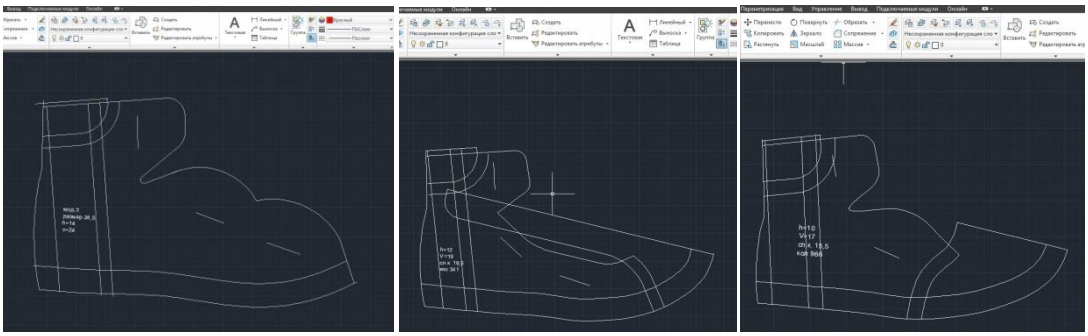


Figure 9 - The drawings of shoes designed in AutoCAD of the proposed method

Projecting contact shoes according to the proposed method accelerates DRAWINGS construction and allows to create a database based constructions as ultra - and mass a customized shoe.

In the manufacture of ultra-a customized orthopedic shoes, there are cases when the loops of the right and left feet of the patient are significantly different from each other. In this fashion designer, you must create an anatomically correct shoes and maximize the aesthetic appearance of the product. In most cases, the manufacture of shoes for patients with cerebral palsy Disease used shin pads, as to create a structure with a high rehabilitation footwear must effect a tight seal preform shoe uppers to the tube connector. In the case where the parameters of one of the stop corresponds to average and for the manufacture of shoes already has finished drawing the stack increased fullness, already ready-ground model must be applied to the most convex point heels and beams and lock (Figure 10). After determining where in enough volume, you must make the appropriate adjustments in the electronic ground.

Figure 10 - Position of bonding primer - patterns on the block

Important in terms of visual perception of the shoe is the construction details of the soft edge. Figure 11 is a diagram of the distribution of the views of consumers, a relatively soft edge sizes in the finished shoe.

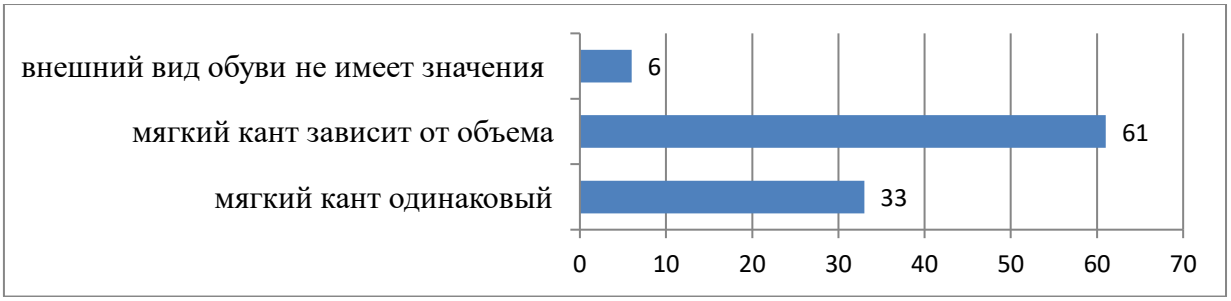
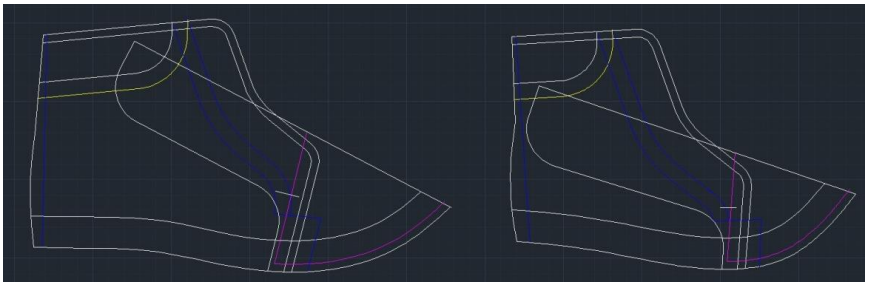


Figure 11 - Distribution of consumer views regarding the size of the soft edge in the finished shoes

Analyzing the difference in audio girths polupare found that visually soft edges recommended design of the same size with respect to the rear seam in that if the difference does not exceed 21% in girth. If the difference above 21% is recommended to increase the item soft edge, leaving the same distance from the edge of the tibia. Examples of the drawing and the finished shoe model presented in Figure 12 [17].



a

b

Figure 12 - Examples of the drawing (s) and the finished shoe models (b) ultra-a customized shoe with different parameters obhvatnymi

With increasing girths front arc tibia decreases. It is important to take into account the type of means of fixation on the foot. In the case with laces, it is appropriate to reduce the number of eyelets in polupare larger girth. The distance from the extreme edge of the eyelets to the tibia should remain the same.

If you are using tapes "Velcro" or belt buckles are kindly requested to take into account the width of the belt, with respect to both polupar. In agreement with the customer, the number of belts in polupare may be different.

The reason for varying heights of shoes in a pair can be a shortening of the limbs, and significant strain on only one of stop.Obuv different heights in the pair is assigned a doctor and agreed in advance with the patient. In the design of such structures need to strictly maintain the altitude and latitude parameters of the tibia part of the shoe. Examples of shoes with different heights tibial portion shown in Figure 13.

Figure 13 - Examples of ultra-a customized shoe with different heights tibia part

When the height difference tibia to 3 cm, the number of fixing elements, such as buckles, belts "Velcro", recommended to leave the same. In case of fixing laces - the number of eyelets may vary.

When the difference in heights bertsami than 3 centimeters, the number of bands and buckles "Velcro" should be sufficient to secure the foot. From an aesthetic point of view, we recommend cutting height zadinok and soft edges leave the same. When present in the cork mezhstelechnom layer, decorative elements stack folding assembly must be positioned in an anatomically correct level by stretching the edge parts up and down along the vertical axis of the shoe.

When producing a customized ultra-orthopedic shoes difference in trace length of 1 cm is common and is not complicated in terms of design. In this case, the addition may be carried out uniformly length by lengthening the vamp and the rear of the tibia.

When the difference of the track length to 5mm, during manual tightening shoe polupary can be manufactured the same size.

An interesting from the viewpoint of design is to provide a shoe construction with a difference of track length greater than 1 cm. As an example, Figure 14 is a drawing polupar summer shoes with a difference of 50 mm track length (220 mm and 270 mm, respectively).

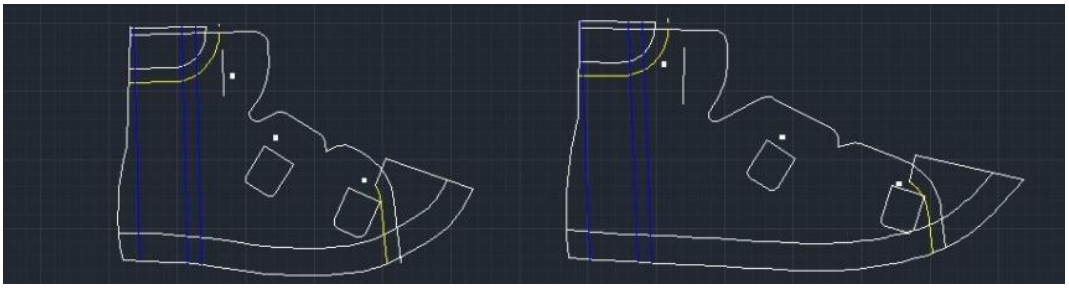


Figure 14 - Drawing of shoes with a difference on the track length of 50 mm

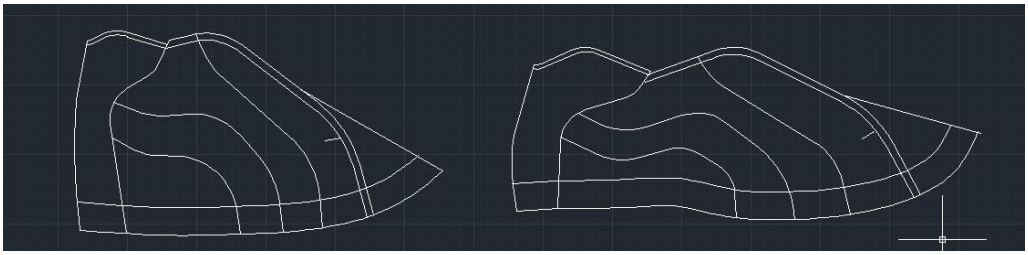
Construction of soft edging is performed by the method described above.

In the construction of uppers, it is necessary to calculate the length for both polupar shoes. The combination of different track lengths in the presence of the toe portion mezhstelechnogo layer compensating the shortening of the lower limb, it is necessary to take into account the height of the latter to determine the length vamp (Figure 15).

Figure 15 - Example ultra-a customized shoe with different lengths and the presence of trace layer mezhstelechnogo

The whole component or tibia part expands uniformly on the horizontal axis. In this assembly in the folding of the foot should be built for each polupary separately.

The length and height of the parts constituting Berecz drawn fashion, starting from the most harmonious visual perception of future construction. Drawing and photo of finished shoes with different trace length are shown in Figure 15[1].



a

b

Figure 16 - Drawing (s) and photograph (b) of the finished shoe with a different trace length

When the distribution of fixing elements (belts and buckles "Velcro") must first analyze the patient's disease and destination of frame parts of shoes. Recommendations on the distribution of fixing elements are shown in Figure 17.

Bilateral symmetrical shortening manifests itself in non-compliance of the proportions of the limbs and trunk. It occurs in achondroplasia (underdevelopment long bones leads to dwarfism) and other hereditary diseases. By asymmetrical shortening cause malformations of the upper and lower extremities. Unilateral shortening cause various diseases. Allocate following kinds of it: the true (anatomical), relative (dislocation), apparent (projection), total (functional or clinical). When true shortening the total length of the leg and the thigh of one lower limb than the other. It occurs when the bone due to organic lesions or congenital deformation of certain diseases. With relative shortening violated ratio between segments limb. This is due to the displacement of the articular ends of the bones due to congenital dislocation or intraarticular fractures. Relative shortening characterized in that one limb shorter than the other appears, but when measuring it turns out that the femur and tibia of the two legs have the same length. Apparent (projection) shortening occurs because the forced flexion due to pathological fixed installation in the spine or joints.

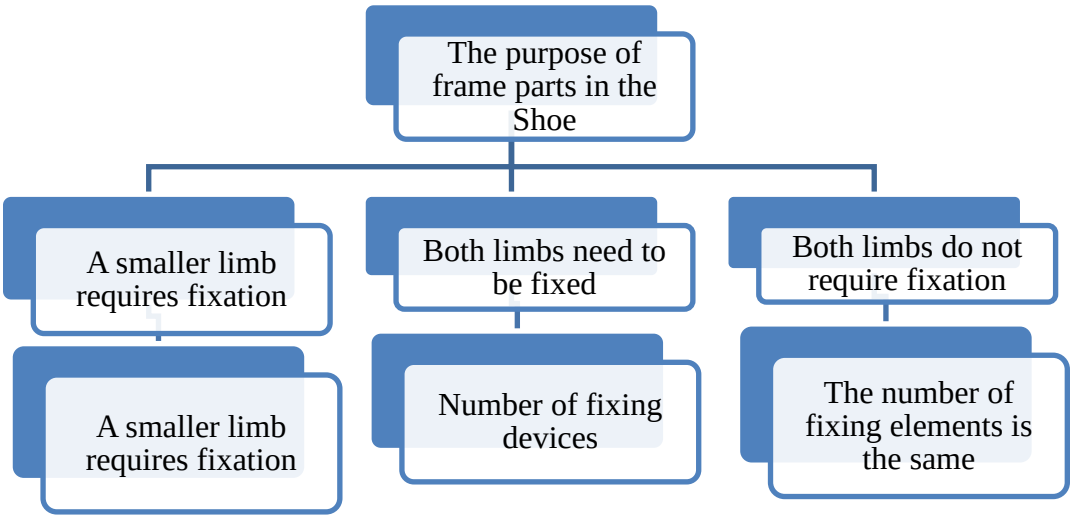


Figure 17 Recommendations for the distribution of fixing elements to shoes with varying trace length

As can be seen from Fig. 17, the number of the retaining elements depends on the purpose (functions) of frame parts of shoes.

Interesting from the point of view of designing a customized ultra-shoe is the creation of designs of orthopedic shoes for shortening the limb. Considered

pathological shortening one or two limbs of more than 2 cm [18]. The classification of lower limb shortening is shown in Figure 18.

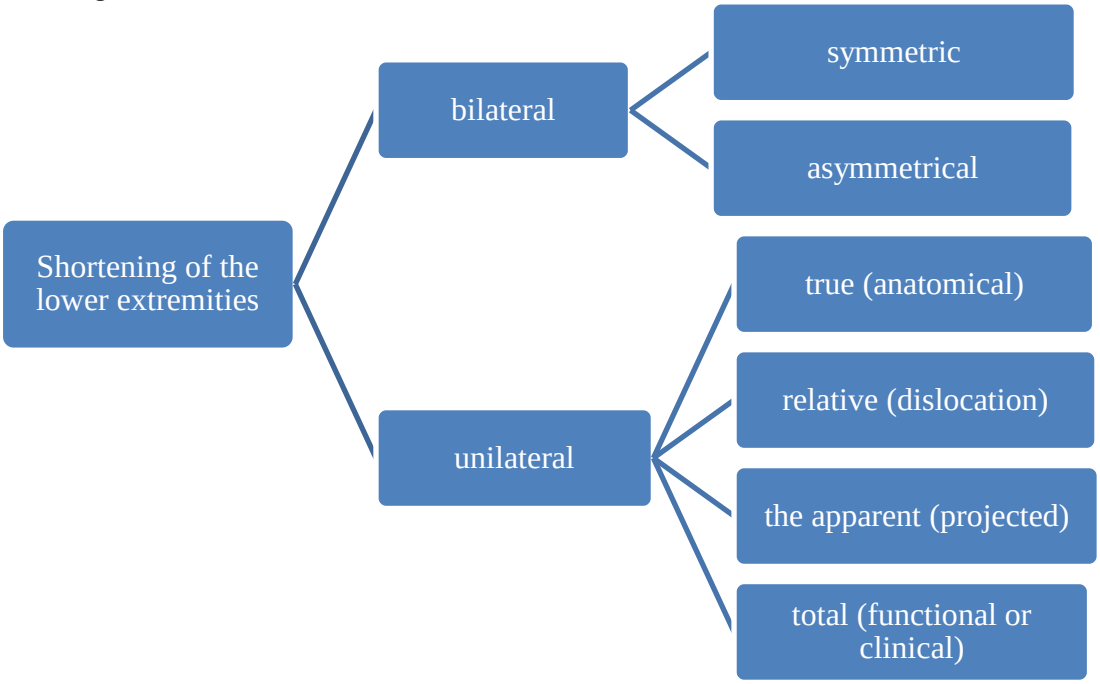


Figure 18 - Classification of lower limb shortening

The reasons for this flexion: post-traumatic contracture, occurs most often due to the development of ankylosis. When shortening the projection, as well as with a relative, length of legs seem different, but measurements show that they are the same. An example of such a defect can be scoliosis lumbar pelvic misalignment. Total (functional or clinical) shortening is characterized by the fact that the patient is several kinds of limb shortening. Orthopedic shoes in most cases appointed only for one-way true shortening when due mezhstelechnogo layer certainly less along the length of the leg is brought to the level of healthy. Figure 19 is a drawing and photograph of the finished product to the patient with track length 195mm and shortening of 35mm, which is used to compensate the tube 35 * 20 mm.

a b

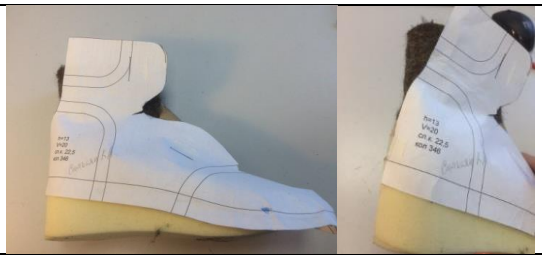
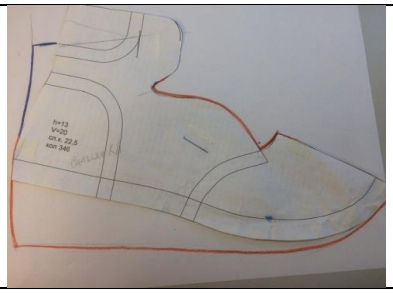
Figure 19 - Drawing (s) and photograph (b) of finished shoes for shortening the limb

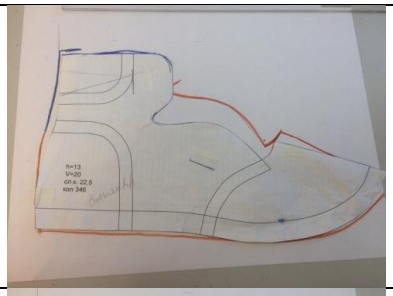
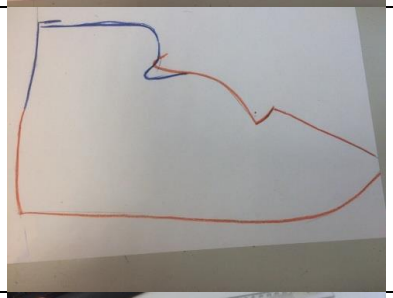
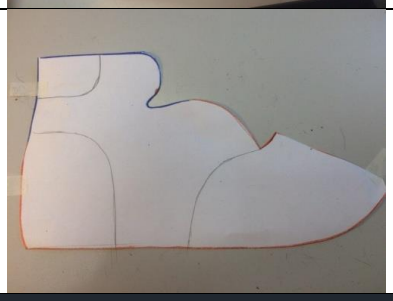
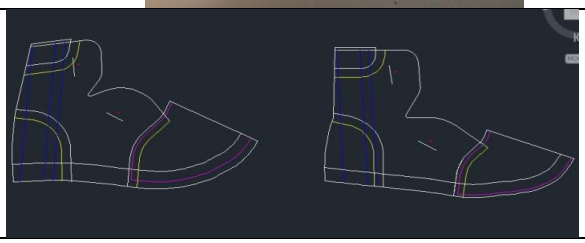
When the tube in the toe portion of a height greater than 3 cm for the most accurate landing pad to the workpiece is possible to provide the seam. An example of such a construction is shown in Figure 20.

Figure 20 The design of shoes with a seam on the vamp

Based on the analysis of the drawings, references and experience of the staff working in the field, developed a method of designing shoes for the shortening of the lower limb. Description of the method is presented as Table 5.

Table 5 - Methods for designing shoes for shortening the limbs

Description of the action	Illustration
1	2
The selection or construction of the ground-model to a healthy (without shortening) the leg (the original ground)	
Fixing bonding primer - patterns in the beam and the heel on the block with a stopper	
Gauging future adjustments: increase in the cap, gain on the rear seam retraction, correction adjustment, the adjustment of the angle of inclination of the upper edge of the tibia	
Adjustments to the drawing of the new model at a fixed ground-bonding patterns in the beam and the heel	

Adjustments in the drawing of the new model while fixing the original soil relative to the horizon	
Adjustments in the soil-model (in this case, reducing the height of tibia at the site of fixation of the ankle)	
Fitting gluing resulting preform to block	
Application drawing lines with the original soil with adjustments. (Performed manually or in electronic form).	
model Drawing Study	

The technique implemented in Rostov orthopedic factory. Analysis of the results is shown in the diagram (Fig. 21).

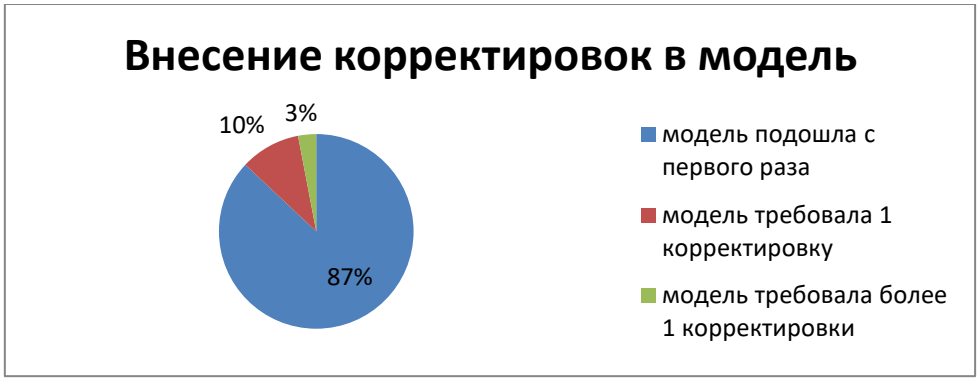


Figure 21 - A diagram illustrating the design quality of the shoe according to the developed technique

The diagram shows that with a probability of 87% obtained adjustments to the model is not required. In the remaining 13% require the inclusion of not more than 2 adjustments. This is due to the complexity of structures developed and the combination of shortening the limb with the other foot deformities.

When a large number of drawings there is need for their structuring and creation of databases (DB), whichThey are an effective means of representing and storing information []. ABOUTbedinenie drawings in the database makes it easier to access and edit information on the models of shoes, which reduces the burden on the staff and reduces the time required to find specific information. The software eliminates the redundancy and duplication of information. To create the database selected software MS Access software, which is included in MS Office, available at most enterprises []. Thus, the creation of databases in the program does not require the purchase of additional new software costs. Developed database [] has Switchboard form, which allows you to make the choice of model for further printing and adding new drawings, view reference information. When selecting a model of the previously proposed set displays a brief description and picture. Screen form MS Access program window, in which there is a variety of types and models of shoes are presented below.

When selecting a model of the proposed directory specifies the required size and high altitude latitude settings. The data base developed by one shoe size selected model can have a virtually unlimited number of drawings with different altitude and latitudinal parameters. When you select a drawing, there is a transition in the AutoCAD program. To avoid possible unintended corrections or deletions of the drawing, the changes in the open window are not saved. It is possible to adjust the drawing without further preservation (in the event that required printing is not all the elements of the file), as well as printing drawings.

Developed database can be extended by introducing new drawings at all stages DRAWINGS new altitude and latitudinal characteristics in the selected size; Adding a new dimension to the selected model; the introduction of a new model in the database. Such operations are carried out when you select "Add model" in the form of a database keypad. In addition to selecting and creating drawings developed database also includes references, where information necessary for the production of footwear with high technological properties and rehabilitation.

Screen form windows with a choice of background information as well as information concerning the pads for shoes.

Thus, database structures and combines information necessary fashion designer, shortens the time required to design and provide the consumers demand fabrication of orthopedic footwear considering abnormalities ditey stop.

Conclusion

On the basis of studies to determine consumer preferences found that [19]

- currently being implemented baby shoes with prophylactic properties has some drawbacks concerning both materials and design, and external signs;

- for deciding tight fit of the foot of the child and to provide the necessary rigidity of the heel portion of the shoe upper backs proposed design, retaining the ankle still further by laces, straps or "sticky";

- to fix the ankle proposed construction of the shoe heel, in which a certain stiffness is created at the expense of process parameters, namely the heel portion uses an additional assembly of the outer member, the intermediate member and the liner;

- developed design shoe upper together with the anatomical arch support provide the most effective support arch and correcting the angle of its inclination. Thus, it is important to have a permanent union between a doctor - orthopedist and manufacturers corrective detalny to garanitrovat stop child comfort and high confidence to him and his parents on the prevention education at their child patolgicheskih deviations;

- formulated the concept of "the masses - and ultra - a customized "shoes under the definition of"

mass a customized orthopedic footwear "shall mean footwear, which has developed a design based on typical features of the medium uniform in the diagnosis of patients. Customization is done at the expense of supplementary adjustments corrective elements, design features of models that regulate the amount of vnutriobuvnogo space and framework components that provide rehabilitative effect. Ultra-a customized shoe models are designed to meet individual anatomical characteristics of the foot of the particular patient based on standard designs mass a customized shoe;

- analysis conducted stop anthropometric characteristics of children with cerebral palsy to refine pad mass a customized shoe. It was revealed that in the regions of the Southern Federal District and the North Caucasian Federal District shoe lasts for children's orthopedic shoes do not meet the statistical average parameters feet of children with cerebral palsy disease. Parameters of blocks for the manufacture of mass-a customized shoe for children with cerebral palsy disease;

- revealed the degree of customer satisfaction designs orthopedic shoes, custom-pads with revised parameters;

- The concept of creating a pad with adjustable volumes for the construction of ultra-a customized shoe;

- an analysis range child orthopedic shoes, which are allocated from the base structure 4 mass a customized orthopedic shoes with high effect of rehabilitation for patients with cerebral palsy disease, namely:

- shoes with their configuration bertsami;
- summer shoes with high tibia part with open toe;
- summer shoes with high tibial portion and a vamp with an elongated tongue;
- summer shoes with high tibial part and closed toe:

- classification of orthopedic shoes, based on the rehabilitation effect, which is based on the results of studies on the structural rigidity, the methods of fixing the shoe on the foot, correcting elements supplementary orthopedic insoles;

- the technique of designing a customized ultra-orthopedic footwear using AutoCAD software for occasions:

- with different girths stop;
- with different heights in a pair of ankle boots;
- with varying trace length in the pair;
- by shortening the lower limbs:

- proposed database structures mass kastomizirvoannnoy orthopedic shoes for children with cerebral palsy, which includes standard design recommended for this disease to produce a comfortable orthopedic shoes.

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COGNITIVE MODELING OF DEPENDENCE OF QUANTITIES OF ITS IN APARTMENTS FROM CHANGES IN INCOME AND EXPENDITURES OF POPULATION REPUBLIC OF KAZAKHSTAN

Abstract: *The article solved a new problem: for a given real multidimensional sample of values m = 44 values of 6 x-factors and m = 44 values of the indicator "the number of individual telephone sets (ITS) for the population" to find from changes in income and population expenses of the Republic of Kazakhstan. Found 3 generalized factors containing indicators of changes in the shares of income (27.10%) and expenses (25.74%) of the population of the Republic of Kazakhstan and 3 measured indicators: "Subscription fee for a home telephone, 26.09%", "Number of employees", 38, 16%), strongly expressed "consumer spine in a separate telephone "(ITS) (civilized feud of an individual, 25.745). The explanation of the increase in expenditures over incomes is given.*

Key words: *number of ITS for the population, cognitive modeling of changes in changes in the shares of incomes and expenses of the population.*

Language: *Russian*

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Scopus ASCC: *2604.*

КОГНИТИВНОЕ МОДЕЛИРОВАНИЕ ЗАВИСИМОСТИ КОЛИЧЕСТВ ОТА В КВАРТИРАХ ОТ ИЗМЕНЕНИЙ ДОХОДОВ И РАСХОДОВ НАСЕЛЕНИЯ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация: *В статье решена новая задача: для заданной реальной многомерной выборки значений m=44 значений 6 x-факторов и m=44 значений показателя «количество отдельных телефонных аппаратов (ОТА) для населения» найти от изменений статей доходов и расходов нааселения Республики Казахстан.Найдены 3 обобщенные факторы, содержащие показатели изменений долей доходов (27,10%) и расходов (25.74%) населения Республики Казахстан и 3 измеряемых показателей: «Абонентская плата за домашний телефон, 26,09%», «Численность работающих по найму», 38,16%), сильно выраженная «потребность в отдельном телефонном аппарате»(ОТА) (цивилизованная потебноть индивида, 25.745). Дано объяснение првышению расходов над доходами населения.*

Ключевые слова: *количество ОТА для населения, когнитивное моделирование изменений изменений долей доходов и расходов населения*

Введение

«При определении успехов той или иной страны в области социального прогресса учитываются свыше 50 показателей, объединённых в три основные группы:

1.Основные потребности человека-питание, доступ к основной медицинской помощи,

обеспечение жильём, доступ к воде, электричеству и санитарным услугам, уровень личной безопасности;

2.Основы благополучия человека-доступ к базовым знаниям и уровень грамотности населения, доступ к информации и средствам коммуникации, уровень здравоохранения, качество окружающей среды;

3.Возможности развития человека-уровень личных и гражданских свобод, обеспечение прав и возможностей человека принимать решения и реализовывать свой потенциал.

«…индекс социального прогресса является одним из важных показателей, используемым в политических и финансовых решениях по всему миру. Показатель отражает достижения стран мира с точки зрения их социального развития. Индекс получает всё большее признание в качестве альтернативы экономическим мерам успеха и предлагает богатую основу для измерения различных аспектов социального прогресса, определения контрольных показателей и стимулирования улучшения благосостояния людей»[1].

«По категории "основные потребности человека" Казахстан занял 57-е место (85,39 балла), по категории "основы благополучия" — 68-е место (70,36 балла), "возможности развития человека" — 87-е место (48,84 балла)»[1]. Рисунок 1 из ресурса[1] иллюстрирует «глубину пропасти» между Казахстаном и развитыми странами в области социального прогресса.

«Казахстан занял всего 69-е место из 149 стран, оценка страны составила 68,2 балла. Примеча тельно, что Казахстан уступает всем странам ЕАЭС, кроме Кыргызстана (81-е место). К примеру, Беларусь заняла 48-е место, Армения-59-е, Россия -62-е место»[1].

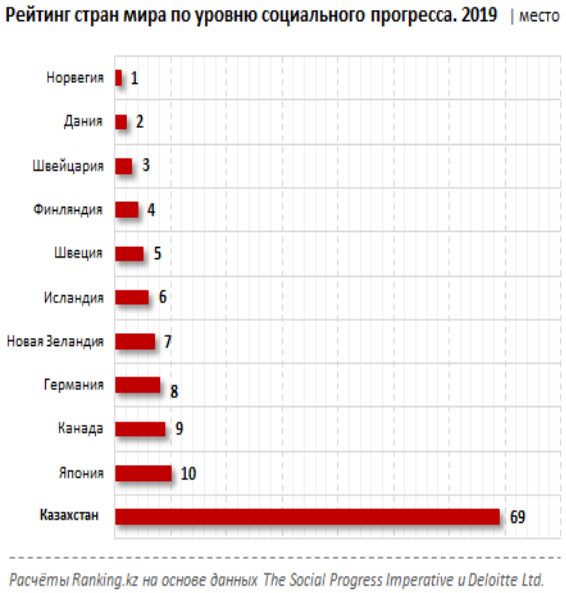

Рисунок 1 Рейтинг стран мира по уровню социального прогресса[1]

«Сильными сторонами Казахстана в социальной сфере являются питание и базовая медицинская помощь, доступ к базовым знаниям, вода и санитария, обеспечение жильём и доступ к информации и коммуникациям. Самые низкие оценки получили следующие компоненты: инклюзивность, доступ к высшему образованию, качество окружающей среды, личные права, здоровье и благополучие»[1].

В статье [1] приведены реальные числовые данные по фактическому потреблению интернет-услуги Dial-up. Чтобы ускорить процесс принятия решений, компании по всему миру проходят ту или иную оцифровку бизнеса. В статье [1] мы рассмотрели цифровые данные данные по показателям «обеспечение жильём» (группа 1), «доступ к информации» (посредством оцифровки интернет-услуги Dial-up, [1], влияющих на нее X-факторов).

В данной статье проведем анализ числовых значений неценовых X-факторов для удовлетворения потребности индивида «доступ к средствам коммуникации» (группа 2). Реальными данными являются 44 значений количеств

[1] www.zakon.kz/5002551-v-reytinge-sotsialnogo-progressa.html

отдельных телефонных аппаратов (ОТА в доме) в квартирах жителей Республики Казахстан (за 44 месяцев 1999-2001гг).

Поясним почему рассматриваем именно эти названные выше виды услуг связи.

Последствия Распада СССР отразились на экономике, политике и социальной сфере всех бывших республик Советского Союза. Произошло резкое увеличение информационных, телекоммуникационных видов услуг: отдельные телефонные аппараты (ОТА), dial-up услуги интернета, ИЖС, частные ремонтные услуги, чистка ковров, автомойки и т.д. В домах, в квартирах жителей городов и сел Казахстана происходят перемены. Появились в Казахстане филиалы зарубежных компаний, присутствия не только в тех регионах Одним из элементов благоустройства квартиры (дома) является наличие телефонного аппарата, подключенного к АТС, обеспечивающего для своих абонентов местную, междугороднюю, международную телефонную связь.

В начале 1990-ых годов в Казахстане наступил бум телефонизации населения. Телекомуникационная отрасль Казахстана обновила техническую инфраструктуру: обновилась элементная база (коммутаторы, шкафы монтажные, маршрутизаторы, трансиверы, комплектующие для энергооборудования, кабель для систем связи). У населения внезапно появилась «необходимость купить (копить деньги, строить) дом (квартиру)» (насущная потребность, 20,98%) и сильно выраженная «потребность в интернете» (цивилизованная потребность индивида, 25.745). Динамики этих факторов и показателей снизили покупательную способность населения» [1].

Очень низкая покупательная способность населения[2] не позволяла купить квартиру (кредиты недоступны).

Откуда у населения появлялись деньги при такой очень низкой покупательской способности, измеряемой одним из «индексов, используемым в политических и финансовых решениях по всему миру»[1]. Оказалось, в Казахстане существует свой «индекс благополучия». Его смысл и способ «измерения» совсем другой. Вот как описывается ситуация тех лет в заметке[3]. социально-материальное благополучие населения. «По сути дела, с развалом социализма в Казахстане сложился не один, а сразу три типа капитализма. И существуют они параллельно. Первый и главный-это капитализм, на котором и держится 90 процентов экономики. Он обосновался в сфере нефтегазовой и горнорудной промышленности и приводится в движение в основном иностранными инвесторами, работающими в Казахстане по соглашению непосредственно с самим правительством РК.»[3] «Второй капитализм – это капитализм русскоязычных (в том смысле, какой стал вкладываться в это слово со времен распада СССР) в основе своей казахстанских граждан и обосновавшихся здесь выходцев из других стран СНГ.»[3]. «Это - капитализм людей ремесла (технических специалистов самых разных направлений) и «белых воротничков» (управленцев-менеджеров, финансистов и т.п). Именно на нем держится сегодняшняя потребительская цивилизация Казахстана, тогда как его реальная экономика находится большей частью под началом первого капитализма. Капитализма иностранных инвесторов. … они не казахи, а именно европейцы, воспринимаемые в целом как русские. С ними казахская в своей основе власть вынуждена считаться. Такой вывод, кстати, принадлежит вовсе не нам, а Марте Брилл Олкотт, американской специалистке по Казахстану.»[3] «Ну а что же делает третий капитализм? Капитализм людей коренной национальности? Это -достаточно сложный вопрос. … Главная особенность третьего капитализма в том, что при ней законы и нормативно-правовые акты присутствуют большей частью как всего лишь внешний фон деятельности. Большинство же ключевой важности вопросов решается так, как у казахов издревле велась торговля. Называется этот прием «жең ұшынан қол жалғау» (соединить рукав). Описание этого приема изложено в заметке[2]. «Этот метод ведения коммерческих дел в современных условиях сохраняется именно в том, что основная черта доморощенного капитализма заключается в тенденции решать все и вся путем междусобойчиков»[2]. Ведение дел имело (и имеет) обоюдный интерес, «сближение взглядов на…», «пособничество в деле…», «наивные верования в…»[3]. У восточных народов на базарах если долго и умело торговаться, то можно «сбить цену» или по желаемой цене несколько большие по весу фрукты купить, чем хотелось в начале торга. Торгашы любят торговаться, им хочется больше знать от иных покупателей «плюсы» и «минусы» своего товара. Этим они дополняют словарный запас и «повышение квалификации» используется ими как повод поговорить и приобрести эмоциональный заряд при их однообразной жизни. Приходящие и уходящие деньги им

[2] http://www.titus.kz/?previd=102368

[3] https://zonakz.net/2020/01/24/pochemu-nekotorye-v-rk-schitayut-chto-prezhde-kogda-podushnyj-vvp-byl-menee-2-tys-zhizn-lyudej-byla-bolee-blagopoluchnoj-chem-teper-kogda-on-blizok-k-10-tys/

малоинтересны: хочется «отвести душу», поднять уровень самооценки.

В 90-х годах в процессе приватизации и «разгосударствления» переход государственной собственности в руки отдельных «агашек», физических и юридических лиц привел к формированию различных подставных «хозяев» (временных или постоянных) бывшей госсобственности, оформленной по «придуманному праву» формы собственности. Например, бывшим водителям грузовых машин вместо акций оформляли в качестве частной собственности ту же машину, на которой он возил государственные грузы. Это законный способ. В его услугах теперь нуждались знакомые ему выжившие и вновь появившиеся грузоотправители. Примеров нерыночного появления собственников можно привести много. Если руководитель приватизируемого предприятия в процессе цепочки сделок, бартерных обменов и иных махинаций сумел оформить на родственника 7 легковых автомобилей (высоко ликвидный пассив), то этот родственник был вынужден продать 6 автомобилей. Покупатели и перегонщики машин находились быстро и родственник превращался в богатого индивида, являющегося частью населения Казахстан. Конечно он становится пользователем описываемых нами новых видов услуг. Количественная доля таких индивидов и услуг мала, но неучтенные их доходы велики.

«Главное тут в том, чтобы быть избавленным от реальной конкуренции как таковой, от борьбы за успех или выживание»[3]. Конкуренция в современном смысле этого термина отсутствовала в СССР, было соревнование. Поэтому источники доходов могут появиться из «ниоткуда». И население находит ресурсы и пользуется новыми видами услуг связи.

По международным стандартам там, где нет неписаных правил «капитализма людей ремесла», казахских «междусобойчиков» (капитализма 2-го и 3-го типов), применяют сложно вычисляемые индексы. Их значения в шкале отношений позволяют определить во сколько раз значение индекса одной страны больше (меньше) значения индекса другой страны. На ресурсе http://www.titus.kz/?previd=102368 от 22 Января 2019 года приведена информация «на основе данных о стоимости жизни и покупательной способности денег, доступности жилья, преступности, уровне здравоохранения, состоянии окружающей среды и т.д.» «Также в Казахстане, по данным указанного сайта, очень низкий индекс покупательной способности (38,3) и стоимости жизни (29,64). При этом высокий уровень загрязнения (74,37). Что касается доступности недвижимости или соотношения ее цены к доходу, то статус значится как умеренный (11,55)» (www.titus,kz/?previd=102368).

Рассмотрим неценовые Х-факторы, и внешние причины, которые на практике влияют на показатель z_7=(Y2)=«количество ОТА для населения». Но будем использовать официально регистрируемые Х-факторы, а не измерители «междусобойчиков».

Мы не рассматриваем покупательную способность населения Казахстана. Мы выявляем зависимости и количественно вычисляем изменения регистрируемых доходов и расходов населения на «количество ОТА для населения» Республики Казахстан. Определяем доли (в %-ах) существенных неценовых Х-факторов в каждом обобщенном валидном показателе. Спрос ОТА для населения неэластичен по цене. Если полагаться на официальные данные. Поведенческую причину неэластичности мы объяснили выше.

Мы применяем апробированное ранее математическое и когнитивное моделирование, а не стандартную микроэкономическую теорию. Определяем число существенных валидных переменных и вычисляем по модельным формулам коэффициенты при валидных переменных. Число независимых валидных показателей определяем по критерию Кайзера-Дикмана (равно 3). Смыслы валидных показателей (у-переменных) определяются когнитивно (смотрите [2-4]) и соответствуют названиям статей расходов населения в практике управленческого учета. Для менеджеров управленческий учет удобен по сравнению с бухгалтерским учетом. Формально и по недостоверным учетным данным расчитывамые значения покупательной способности уменьшались. Мы эти значения не используем для моделирования зависимости изменений зарегистрированных доходов и расходов населения на количество ОТА в квартирах населения Республики Казахстан. А применяем реальные данные по существенным Х-факторам доходов и расходов, влияющим на фактическое на количество ОТА в домах (официально очень низкой платежеспособности) жителей Казахстана. У рассматриваемых доходов нам известен один источник – заработная плата, но не известны другие источники, про существование которых показывают расходы. Переход от измеряемых Х-факторов к валидным переменным в ПМ ГК позволяет выявить скрытые доходы.

3-х валидных показателей. Они соответствуют 3 выявленным у-переменным, когнитивно интерпретируемых по смыслу. Каждый из 3-х смыслов равен сумме смыслов своих измерямых показателей, влияющих на показатель «количество ОТА для населения». При

анализе вычисленных значений элементов спектра $\Lambda_{7,7}=\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_7)$ такого что:

Исходные данные по существенным Х-факторам, влияющим на количество ОТА в домах жителей Казахстана

Анализ значений 9 существенных Х-факторов, влияющих на «количество ОТА для населения» показал непригодность следующих 3-х Х-факторов X14, X17 («Покупка товаров для содержания домашних хозяйств (в среднем на душу населения)», X18 («Налоги, сборы, платежи (в среднем на душу населения)» для решаемой нами задачи. Нами были использованы значения 6 существенных для нашего моделирования Х-факторов и значения одной Y-переменной Y2 («количество ОТА для населения»).

Рассмотрим 7-мерную выборку значений $X^0_{mn}=\{x^0_{i,j}\}$, m=44, n=7, значений 6 Х-факторов (первые 6 столбцов X^0_{mn}) и m=44 значений показателя «количество ОТА для населения», 7-ый столбец X^0_{mn}). Размерности 6 Х-факторов {X5,X7,X11,X16,X20,X21} разные. Показатели X16, X20,X21 имеют те же значения, что и в Таблице 1 из статьи [1]. После вычисления значений средних и стандартных отклонений для 7 переменных имеем матрицу $Z_{44,7}$ стандартизованных безразмерных значений 7 z–переменных. Полученную из исходной реальной матрицы $X^0_{44,7}$ стандартизованную матрицу $Z_{44,7}$ преобразуем в матрицу $Y_{44,7}=Z_{44,7}\ C_{7,7}$ значений y–переменных, решив Прямую Задачу АГК и применяя соотношения из модели ПМ ГК [2,3]. Для вычисленной корреляционной матрицы $R_{7,7}$ решаем Прямую Спектральную Задачу (ПСЗ): $R_{7,7}$ $=>(\Lambda_{7,7}\ C_{7,7})$. Здесь Λ_{77}=diag(3.4601, 1.5195, 1.0076, 0.5216, 0.4389, 0.0423, 0.0100), матрица $C_{7,7}$ является матрицей собственных векторов. ПСЗ - прямая спектральная задача диагонализации известной выборочной корреляционной матрицы $R_{nn}= (1/m)Z^T_{mn}Z_{mn}$,$R_{nn}=R^T_{nn}$. Она решается для симметрической матрицы $R=R^T$, в результате вычисляются 2 матрицы: ортонормированная матрица C_{nn} собственных векторов $\mathbf{c_j}$ $=(c_{1j},c_{2j}\ldots c_{nj})^T$,j=1,…,n, расположенных по её столбцам: $C_{nn}=[c_1|c_2|\ldots|c_n]$. Матрица C_{nn} согласована со спектром $\Lambda_{nn}= diag(\lambda_1,\ldots\lambda_n)$ таким образом, что $RC=C\Lambda$,$C^TC= CC^T=I_{nn}$, $diag(R_{nn})=(1,\ldots,1)$, $tr(R_{nn})=1+1+\ldots+1=tr(\Lambda_{nn})$ $=\lambda_1+\ldots+\lambda_n=n$, $\lambda_1\geq\ldots\geq\lambda_n\geq0$. Для нас существенными являются доминирующие собственные числа $\lambda_1\geq\ldots\geq\lambda_\ell\geq0$. Они играют свои роли при выделении заметных «весов» для 3-х y-переменных формирующих когнитивные смыслы 3-х валидных показателей. Они соответствуют 3 выявляенным y-переменным, когнитивно интерпретируемых по смыслу. Каждый из 3-х смыслов равен сумме смыслов своих измерямых показателей, влияющих на показатель «количество ОТА для населения». При анализе вычисленных значений элементов спектра $\Lambda_{7,7}=\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_7)$ такого что: $RC=C\Lambda$, $C^TC=CC^T=I_{nn}$,$diag(R_{nn})=(1,\ldots,1)$, $tr(R_{nn})=1+1+\ldots+1=tr(\Lambda_{nn})=\lambda_1+\ldots+\lambda_n=n=7$, $\lambda_1\geq\ldots\geq\lambda_n\geq0$,
число ℓ доминирующих собственных чисел определяется из условия (по критерию Кайзера-Дикмана): $\lambda_\ell\geq1$. Так как Λ_{77}=diag(3.4601,1.5195, 1.0076, 0.5216, 0.4389, 0.0423, 0.0100), то имеем ℓ =3 доминирующих собственных чисел.

Модели и задачи

Полученную из исходной реальной матрицы $X^0_{44,7}$ стандартизованную матрицу $Z_{44,7}$ преобразуем, применив соотношения из модели ПМ ГК [2,3]. Для вычисленной корреляционной матрицы $R_{7,7}$ решам Прямую Спектральную Задачу (ПСЗ):$R_{7,7}=>(\Lambda_{7,7},C_{7,7})$. ПСЗ - прямая задача диагонализации известной выборочной корреляционной матрицы R_{nn}. Она решается для симметрической матрицы $R=R^T$, в результате вычисляются 2 матрицы: ортонормированная матрица C_{nn} собственных векторов $\mathbf{c_j}$ $=(c_{1j},c_{2j}\ldots c_{nj})^T$, расположенных по её столбцам: $C_{nn}=[c_1|c_2|\ldots|c_n]$, согласованная со спектром $\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_n)$ таким образом, что $RC=C\Lambda$, $C^TC=CC^T=I_{nn}$, $diag(R_{nn})=(1,\ldots,1)$, $tr(R_{nn})=1+1+$ … $+1= tr(\Lambda_{nn})= \lambda_1+\ldots+\lambda_n =n$, $\lambda_1\geq\ldots\geq\lambda_n\geq0$. Для анализа вычисленных значений элементов спектра $\Lambda_{7,7}=\Lambda_{nn}=diag(\lambda_1,\ldots\lambda_7)$ такого что: $RC=C\Lambda$, $C^TC=CC^T=I_{nn}$, $diag(R_{nn})=(1,\ldots,1)$, $tr(R_{nn})=1+1+\ldots+1=tr(\Lambda_{nn})=\lambda_1+\ldots+\lambda_n=n=7$, $\lambda_1\geq\ldots\geq\lambda_n\geq0$, используем Математическую Модель Спектра Неизвестной Корреляционной Матрицы [4].

Для анализа вычисленных значений элементов матрицы собственных векторов $\mathbf{c_j}=(c_{1j},c_{2j}\ldots c_{nj})^T$, где его компоненты иначе интерпретируются. Матрица $C_{7,7}$ теперь в рамках разработанной новой Когнитивной Модели Зависимости Изменений Зарегистрированных Доходов и Расходов Населения на Количество ОТА в Квартирах Республики Казахстан интерпретируется также как и статьях [1,5-10]. Матрица $C_{7,7}$ одновременно является и матрицей коэффициентов комбинационных связей. [5]. «Комбинационная связь-связь между одной y-переменной и n z-перемеными, представляется в виде вектора $\mathbf{c_j}=(c_{1j},c_{2j}\ldots c_{nj})^T$. По определению [11] она является единственным решением ПСЗ и является матрицей собственных векторов. В задачах извлечения знаний из цифровых данных, представленных в виде таблицы типа «объекты-свойства» [6-10] анализу подвергаются коэффициенты комбиинационной связи из матрицы $C_{7,7}=[cor(z_i,y_j)]$, i=1,…,7; j=1,…,7, (z_i,y_j)-корреляций. В Обратных Спектральных Задачах матрицы коэффициентов комбинационной связи

C_{nn}, n=6, моделируются [11-19]. Компоненты вектора $\mathbf{c}_j=(c_{1j},c_{2j}\ldots c_{nj})^T$ комбинационной связи подчиняются условиям $c^2_{1j}+c^2_{2j}+c^2_{3j}+c^2_{4j}+c^2_{5j}+c^2_{6j}+c^2_{7j}=1$, i=1,…,7; j=1,…,7» [1,5-8]. В решаемой нами ниже Прямой Смысловой Задаче значение элемента z_{kj} матрицы $Z_{44,7}$, [6] интерпретируется как изменчивость «веса» c_{kj}:z_{ik}*c_{kj}. Если y_{i2}=-0.3768*z_{i1}+…,y_{i2}= 0.6177*z_{i1}+…, то в i-ых объектах изменчивости «веса» имеют разные значения изменчивостей (z_{11} ,…,z_{m1}) для одного фиксированного «веса», например, для «веса» -c_{12}=-0,3768. Для другого «веса» c_{13}=0,6177 в i-ых объектах имеются те же m разных значений изменчивостей z_{11} ,…,z_{m1}. Для элементов j-го столбца матрицы C_{77} выполняются равенства вида $c^2_{1j}+c^2_{2j}+c^2_{3j}+c^2_{4j}+c^2_{5j}+c^2_{6j}+c^2_{7j}=1$, j=1,…,7. Они выполняются при решении Прямой Спектральной Задачи, а при решении Прямой Смысловой Задачи преобразуются в равенства другого вида:
$corr^2(z_1,y_j)+corr^2(z_2,y_j)+corr^2(z_3,y_j)+corr^2(z_4,y_j)+corr^2(z_5,y_j)+corr^2(z_6,y_j)+corr^2(z_7,y_j)=1$, j=1,…,7. Для элементов i-ой строки нашей матрицы C_{77} (Таблица 2) в Прямой Смысловой Задаче применяемые равенства из ПСЗ имеют вид:
$corr^2(z_i,y_1)+corr^2(z_i,y_2)+corr^2(z_i,y_3)+corr^2(z_i,y_4)+corr^2(z_i,y_5)+corr^2(z_i,y_6)+corr^2(z_i,y_7)=1$.

Смысл z-переменной задан в ее имени (в Прямой Смысловой Задаче [2]) или когнитивно определяется (в Обратной Смысловой Задаче [15-19]). Смысловое имя z-переменной в ОСЗ когнитивно конструируется фразой, имеющей смысл, тесно связанный со смыслом y-переменной. Эта z-переменная такова, что обладает весомым «весом».

Значения «весов» при значениях этих z-переменных по абсолютной величине превышают 0.4. По шкале Чэддока пороговое значение 0.4 относится к интервалу «умеренных» корреляций. Поэтому мы должны использовать смыслы z-переменных z_1,z_2,z_4,z_5,z_6 для когнитивного конструирования фразы-смысла y-переменной с номером 1.

Мы ниже решаем Прямую Смысловую Задачу [6-10] и когнитивно конструируем одну фразу, имеющую смысл, равный сумме смыслов только тех z-переменных, которые имеют заметные веса из совокупности весов $corr^2(z_1,y_j)$, $corr^2(z_2,y_j)$, $corr^2(z_3,y_j)$, $corr^2(z_4,y_j)$, $corr^2(z_5,y_j)$, $corr^2(z_6,y_j)$, $corr^2(z_7,y_j)$, i=1,…,7;j=1,…,7.

Полученный общий смысл для y-переменной должен быть тесно связан со смыслами заметных по весомости z-переменным [6-10]. В результате, как показано ниже, конструируем новый, отличающийся смыслом от заданных смыслов z-переменных цифровой смысл-знание в виде фразы, имеющей обоснованный смысл. Источниками знания являются числа из таблиц (матриц $Z_{44,7}$, $C_{7,7}$ числовых данных), из векторов $\mathbf{c}_j=(c_{1j},c_{2j}\ldots c_{nj})^T$, $j\in\{1,\ldots,7\}$, подчиняющихся определенным равенствам многомерной математической модели. Суть «цифрового» знания отображается через смыслы y- и z-переменных.

В решаемой Прямой Смысловой Задаче элементы матрицы $Z_{44,7}$ [12-21] интерпретируются как квадраты коэффициентов корреляций:
$corr^2(z_1,y_j)+corr^2(z_2,y_j)+corr^2(z_3,y_j)+corr^2(z_4,y_j)+corr^2(z_5,y_j)+corr^2(z_6,y_j)+corr^2(z_7,y_j)=1$, i=1,…,7; j=1,…,7.

При когнитивном моделировании смыслов z-переменных, не используется формула дисперсии z-переменной: $corr(z_j,z_j)=1$, но используются доминирующие значения дисперсий $covar(y_j,y_j)=\lambda_j$, j=1,…, ℓ<7 y-переменных, вычисленных при решении Прямой Спектральной Задачи.

Матрица (z,y)-корреляций - другое название матрицы собственных векторов C_{nn}. Цифровые знания–фразы, имеющие обоснованные смыслы (являются новым знанием, дополняющим известные знания[12-21]), источником их являются цифры в числах из таблиц (матриц цифровых данных), векторов, подчиняющихся определенным равенствам многомерной математической модели.

Решаемая здесь ПСЗ отличается от Обратной Смысловой Задаче [20-21]. В ОСЗ для анализа значений элементов матрицы $C_{7,7}$ решается Обратная Спектральная Задача и Оптимизационная Задача [8-10]. Имеются несколько вариантов ОСЗ и Оптимизационных Задач. В 5 исследуемых таблицах данных [12-14] используются 2 математические модели (ПМ ГК, ОМ ГК). А на последнем этапе извлечения 5 разных знаний из 5 предметных областей: телекоммуникации, педагогика, финансы, ГЦБ - применяются 5 отличающиеся друг от друга когнитивные модели, приписываются 5 множества когнитивных смыслов 5 множествам z–переменных.

Нами будут использованы названия-смыслы следующих 7 анализируемых коррелированных z-переменных:

Смысл(z_1)=(X5)=«Численность работающих по найму»;

Смысл(z_2)=(x7)=«Среднемесячная заработная плата работников»;

Смысл(z_3)=(x11)=«Изменение цен на продоволь ственные товары»;

Смысл(z_4)=x16=«Потребительские расходы (в среднем на душу населения)»;

Смысл(z_5)=x20 = «Прочие расходы»;

Смысл(z_6)= x21= «Ввод в действие жилых домов»;

Смысл (z_7)=(Y2)=«количество ОТА для населения».

Эти 7 факторов отобраны из множества 9 X-факторов. Такие факторы как «Изменение цен на непродовольственные товары» (X12), «Изменение цен на платные услуги» (X13), «Денежные расходы населения (в среднем на душу населения)» (X15) не оказывают заметного влияния на показатель (Y2)=«Количество ОТА для населения». Хотя они (3 вида расходов) являются частью общих расходов населения, участвующих в формировании индекса общих расходов на виды товаров и услуг. Подавление этих факторов происходит под воздействием нерыночных факторов таких как неучтенные доходы, их источниками являлись спекуляция, присвоение бесхозного имущества (стройматериалов от заброшенных домов, строений, старые кирпичи и многое другое, купленное за символическую цену) с последующей продажей («капитализм людей ремесла», «междусобойчики»).

Новыми внезапно ставшими доступными услугами для населения РК, а именно новыми услугами связи в 1999-2001 годах, стали «Интернет Dial для населения», «Количество ОТА для населения», «Междугородный трафик для населения». Новый вид услуги связи«Интернет Dial для населения» (Y-переменная Y6) исследован по реальным данным в статье [1]. Переменная Y6 анализируется совместно с X-факторами {X12,X13, X15,X16,X20,X21} [1]. На другой новый вид услуги связи «количество ОТА в домах жителей» (Y2) статистически существенно влияет другой набор X-факторов {X5,X7,X11, X16,X20,X21}.

Ниже рассмотрим одно множество из 7 z-переменных, соответствующих набору факторов {X5,X7,X11,X16,X20,X21,Y2}, имена-смыслы которых были приведены выше.

Используя матрицу собственных векторов $C_{7,7}$ (Таблица 2) преобразуем матрицу $Z_{44,7}$ и имеем матрицу y-переменных $Y_{44,7}=Z_{44,7}C_{7,7}$. Применяемые далее при математическом и когнитивном моделировании параметры имеют следующие значения. Анализируем элементы спектра Λ_{77}=diag(3.4601,1.5195,1.0076,0.5216, 0.4389,0.0423,0.0100), значения его f–параметров: $f_1(\Lambda_{7,7})=7$, $f_2(\Lambda_{7,7})=15.7628$, $f_3(\Lambda_{7,7})=346.8049$, $f_5(\Lambda_{7,7})=0.5117E-03$, $f_6(\Lambda_{7,7})=21.5243$. Число ℓ доминирующих собственных чисел равно 3. Доля этих 3 собственных чисел равна $f_4(\Lambda_{7,7})=0.8553$. В статье [1] эта доля была равна 0.9056. общий уровень значений коэффициентов корреляции виден по значению φ =0.4568. В первых 3-х столбцах (ℓ=3) используем значимые» веса» c_{kj}, удовлетворяющие условию $abs(c_{kj})\geq 0.4$, $k\in\{1,2,3,4,5,6,7\}$, j=1,2,3.

В статье [1] эти величины были равны: $f_1(\Lambda_{7,7})=7$, $f_2(\Lambda_{7,7})=17.5105$, $f_3(\Lambda_{7,7})=5462.3340$, $f_4(\Lambda_{7,7})=0.9056$, $f_5(\Lambda_{7,7})=0.3390E-05$, $f_6(\Lambda_{7,7})=66.1478$, $\Lambda_{77}=diag(\lambda_1,\ldots\lambda_7)$=diag(3.5817, 1.8984, 0.8594, 0.5795, 0.0493, 0.0310, 0.0007).

Используемые при когнитивном моделировании весомые «веса» и их «координаты» сравниваются в Таблице 3.

Таблица 2. Матрица собственных векторов $C_{7,7}$

	1	2	3	4	5	6	7
1	-0,238	-0,3768	0,6177	-0,6213	-0,0709	0,0336	-0,1666
2	**0,5267**	0,0442	0,0705	0,0286	-0,2077	-0,4323	-0,6963
3	-0,219	0,4719	0,5502	0,368	-0,5223	-0,054	0,1245
4	**0,5206**	-0,0291	0,1142	0,011	-0,2109	0,8178	-0,0409
5	-0,0956	0,6371	-0,341	-0,6389	-0,2201	0,0792	-0,0762
6	0,2772	0,4608	0,4241	-0,0698	0,7201	-0,0286	0,082
7	**0,5108**	-0,12	0,0406	-0,2541	-0,2599	-0,3649	0,6766

Когнитивное моделирование зависимости количеств ОТА в квартирах от изменений доходов и расходов населения РК

Рассмотрим показатели, ранее в советское время отсутствовавшие в перечне регистрируемых социально-экономических факторов. Значения показателей приведены в Таблице 1 [1]. Обратим внимание на z-переменных с номерами 6 и 7. Они соответствуют новым потребностям людей.

Найдем смыслы y-переменных, имея формулы зависимостей y- и z-переменных.

Так как по критерию Джоллиффа число доминирующих собственных чисел равно $L_{Дж}$=3, т.е. доля дисперсий первых 3-х y-переменных (обобщенных факторов) равна 90.56%. Вариабельность наших 7 x-факторов примерно равна вариабельности 3-х y-переменных (обобщенных факторов) y_1, y_2, y_3, каждая из которых равна линейной комбинации некоторого числа z-переменных. Каждая z-переменная соответствует своему x-фактору. Используя матрицу собственных векторов $C_{7,7}$ преобразуем матрицу $Z_{44,7}$= и имеем матрицу y-переменных $Y_{44,7}=Z_{44,7}C_{7,7}$. В первых 3-х столбцах используем

значимые»веса» c_{kj}, удовлетворяющие условию $abs(c_{kj})\geq 0.4$, $k\in \{1,2,3,4,5,6,7\}$, $j=1,2,3$.

Имеем 3 y-переменные

$y_1=0.5267*z_2+0.5206*z_4+0.5108*z_7+\varepsilon_1$,

$y_2=-0.3768*z_1+0.4719*z_3+0.6371*z_5+0.4608*z_6+\varepsilon_2$,

$y_3=0.6177*z_1+0.5502*z_3+0.4241*z_6+\varepsilon_3$,

где ε_1, ε_2, ε_3 – погрешности, связанные с отбрасыванием z–переменных с малым весом (Таблица 2).

Каждая y-переменная содержательно интерпретируется.

Так как $y_1=0.5267*z_2+0.5206*z_4+0.5108*z_7+\varepsilon_1$, то смысл(y1)=смысл(z2)+смысл(z4)+смысл(z7) формулируется фразой «денежные потоки (доходы+расходы) населения» («денежные потоки населения»). Доля денежных, доходов равна $0{,}5267^2$=27,741%, доля расходов на установку и абонентскую плату за домашний телефон равна $0{,}5108^2$=26,09%), доля денежных доходов в виде заработной платы равна $0{,}5206^2$= 27,10%). Доля расходов на новый вид услуги по «нерыночным» тарифам равна $c^2_{71}=(-0{,}5074)^2$= 25.745476% из 100%. Доля затрат на новое меньше долей привычных затрат. Таким образом за 6 неценовыми измеряемыми Х-факторами, влияющих на потребность индивидов в домашних телефонах, скрыты 3 валидных фактов. Их смыслы «денежные потоки населения», «денежные потоки населения», «расходы наемных». Доля проявления этих трех денежных факторов равна 85.53%. А доля валидного фактора «денежные потоки населения» равна $\lambda_1/7$=3.4601/7=49,43%.

Так как $y_2=-0.3768*z_1+0.4719*z_3+0.6371*z_5+0.4608*z_6+\varepsilon_2$, то смысл(y2)=смысл(z1)+смысл(z3)+смысл(z5)+ смысл(z6) можно передать фразой «продовольственные и прочие расходы для наемных рабочих, привлеченных населением для строительства домов» («расходы наемных рабочих»). Доля таких расходов равна $\lambda_2/7$=1.5195/7=21.7071%. А доля новых расходов населения на «ввод в действие жилых домов» (причина установки ОТА в домах) равна $c^2_{61}=0.4608^2$ =21.7071% из 100%. Затраты на новые дома и услуги происходят одновременно с расходами на продовольственные товары, на платные услуги, на прочие расходы.

Так как $y_3=0.6177*z_1+0.5502*z_3+0.4241*z_6+\varepsilon_3$, то сумма смыслов смысл(y3)= смысл(z_1)+смысл(z_3) +смысл(z_6) формулируется фразой «изменение (повышение) цен на продовольственные товары из-за увеличения количества работающих по найму на стройках жилых домов» («цены продуктов для наемных рабочих»). Наибольший «вес» имеет показатель «Численность работающих по найму».

Мы выделили 3 независимых обобщенных факторов со смыслами: «денежные потоки населения», «цены продуктов для наемных рабочих». Доля проявления таких 3-х обобщенных факторов равна 85.53%(=49.43%.+21.7071%+ 14.3943%).

В структуре 1-го обобщенного фактора (««денежные потоки (доходы+расходы) населения»» пропорции между доходами и расходами адекватны реальной ситуации 1999-2001 годов. Доля новых расходов населения на «ввод в действие жилых домов» (причина установки ОТА в домах), доля денежных доходов (заработной платы) равна 27,10%, доля расходов на новый вид услуги по «нерыночным» тарифам равна 25.7%, при этом доля затрат на новое меньше долей привычных затрат.

В структуре 2-го обобщенного фактора ((«расходы намных рабочих») доля 21.7071% новых расходов населения на «ввод в действие жилых домов» реально соответствует уровню «1 аппарат на 5 домов». В последующие годы доли новых видов услуг уменьшались.

В структуре наименьшего по весу 3-го обобщенного фактора («цены продуктов для наемных рабочих») вклад Х-фактора «Численность работающих по найму» превышает вклады 2-х других Х-факторов: $0.6177^2>0.5502^2>0.4241^2$. Количество наемных рабочих играет гораздо большую роль, чем цены продуктов, это иллюстрирует отсутствие эластичности по цене спроса на продукты. Это еще одна демонстрация основной черты «доморощенного капитализма»[2] «решать все и вся путем междусобойчиков»[2], а «законы и нормативно-правовые акты присутствуют большей частью как всего лишь внешний фон деятельности»[2] .

Маркетологи ОАО "Казахтелеком" в те годы назначали тарифы на эти услуги связи такими, чтобы стоимости планируемых услуг превышала затраты на величину планируемой прибыли, используемой в будущем на покупку нового оборудования для новых видов услуг связи. С позиции традиционного бухгалтерского учета точка зрения менеджеров ОАО "Казахтелеком" на тарифы по новым видам услуг связи обусловлена необходимостью покрыть затраты. Но это противоречит традиционной точке зрения об эффективном ценообразовании: спрос потребителей зависит от конкурентоспособности цен. Мы видим возрастающие динамики показателей Y6, Y2. В начале текста статьи мы объяснили спрос на новый вид услуги поведением индивидов тем, что «в Казахстане сложился не один, а сразу три типа капитализма. И существуют они параллельно»[2]. Подробное исследование этих 3 типов капитализма в Республике Казахстан - не наша задача. Допущение микроэкономической теории о

существовании оптимальной цены в виде известной кривой спроса является неприменимой в условиях трех типов капитализма в Республике Казахстан. Следовательно, ценообразование для большинства компаний остается в ловушке между затратным подходом и подходом, опирающимся на потребителя, которые несовместимы между собой.

Корреляционный анализ также показывает слабое влияние цены на показатель Y2: коэффициент корреляции показателя X14=«Изменение цен на услуги связи для населения» имеет значение, принадлежащее интервалу «слабая связь». Поэтому показатель X14 не входит в число X-факторов, оказывающих влияние на показатель «количество ОТА для населения». Этот числовой факт служит основанием для вывода: спрос на виды услуг связи Y2 населения не эластичен по цене. Экономика РК в то время не стала рыночной, в рыночной экономике спрос должен быть эластичен по цене. Некоторое пояснение этому факту по цене другой услуги дано в статье [1]: «Индекс покупательной способности 38,3) оценивается по шкале порядка как «очень низкий»[1]. «Необходимость купить (копить деньги, строить) дом (квартиру)» (насущная потребность, 20,98%) и сильно выраженная «потребность в интернете» (цивилизованная потребноть индивида, 25.745). Динамики этих факторов и показателей снизили покупательную способность населения» [1]. «Причина - внезапно возникшая необходимость купить (копить деньги, строить) дом (квартиру) и сильно выраженная потребность в интернете (цивилизованная потребноть индивида)» [1].

Сравнение структур доходов, затрат двух типов потребностей населения

Сопоставим наши результаты. Здесь и в статье [1] рассматриваются потребности населения. В статье [1] мы анализировали 6 неценовых X-факторов «выделения неценовых факторов влияющих на количество отдельных телефонов в квартирах»: X12,X13,X15,X16, X20,X21. По микроэкономической теории спроса и предложения они должны влиять на Y-показатель вида услуги связи Y6=«трафик Интернет Dial up (минуты)». В результате когнитивного моделирования изменений цен и денежных расходов населения Республики Казахстан [1] выявлены (математически вычислены) 3 обобщенные факторы (y-переменные), аддитивно содержащие показатели изменений цен и денежных расходов населения (из множества X-факторов: X12,X13,X15,X16,X20,X21) и 2 других измеряемых показателей – «необходимость купить (копить деньги, строить) дом (квартиру)» (насущная потребность, 20,98%) и сильно выраженная «потребность в интернете» (цивилизованная потребноть индивида, 25.745).

В настоящей работе мы рассмотрели 9 X-факторов «» {X4,X6,X8,X9,X10,X14,X17,X18, X19}, влияющих согласно традиционной микроэкономической теории спроса и предложения на Y-показатель вида услуги связи Y2=«количество ОТА для населения».Разговоры по телефону (в этом смысл ОТА) в конце 90-х годов были привычным делом, но недоступным для населения было подключение (из-за нехватки свободных телефонных номеров) через АТС. С переоборудованием АТС свободные 6-значные телефонные номера стали доступны населению, появилась возможность иметь в квартире (доме) 2 ОТА. Оплата абонентской платы за 1 ОТА была фиксированной (помесячной), безлимитной по времени разговора. Несмотря на низкую покупательскую способность многие индивиды находили ресурсы чтобы купить (копить деньги, строить) дом (квартиру, насущная потребность, ее доля равна 20,98%) и удовлетворяли сильно выраженную «потребность в телефоне» (цивилизованная потребноть индивида, ее доля равна 25.745). Эти «ставшие доступными» новые затраты - внезапно возникшие потребности. Эти виды затрат отсутствовали у «широких масс» в СССР. «Рост поребления этого вида связи и рост ввода новых домов наблюдался в рассматриваемый нами промежуток времени» [1].

Здесь мы рассмотрели другой вид связи. Показателями (X-факторами), существенно влияющими на показатель Y2, как показали расчеты, оказались 6 неценовых X-факторов («потребительские и новые расходы»): X5,X7,X11,X16, X20,X21. Сформируем из m=44 значений этих 6 X-факторов и m=44 значений показателя z_7=(Y2)=«количество ОТА для населения» многомерную выборку значений $X^0_{mn}=\{x^0_{i,j}\}$, n=7. Заметим, что показатели X16, X20,X21 (их 44 значений приведены в столбцах №6,7,8 Таблицы 1 [1]) влияют как на Y-показатель вида услуги связи Y6, так и на Y-показатель вида услуги связи Y2.

При когнитивном анализе применялась одна формальная теория. Когнитивный анализ когнитивных карт трех валидных показателей дает разные по смыслу результаты - знание в виде фраз, «вытянутых» из цифровых таблиц. Смысл каждой из 3-х фраз равен сумме смыслов-имен z-переменных. Например, если имеем математическую зависимость вида $y_1=0.5267*z_2+0.5206*z_4+0.5108*z_7$, то смысл y–переменной y_1 равен сумме смыслов z-переменных z_2,z_4,z_7.

Факторы X12 («Изменение цен на непродовольственные товары»), X13 («Изменение цен на платные услуги»), X15 («Денежные

расходы населения (в среднем на душу населения)» не оказывают влияния на показатель z_7=(Y2)= «Количество ОТА для населения». Показатели X12, X13, X15 являются частями общих расходов населения, участвующих в формировании *индекса общих расходов* на виды товаров и услуг. Но такие индексы расходов не вычислялись Агентством по статистике РК. Данные по показателям X12, X13, X15 отсутствовали в 1999-2001 годы.

Мы анализируем доступные значения z-переменных: z_4=«Потребительские расходы (в среднем на душу населения)» (x16), z_5=«Прочие расходы» (X20), z_6=«Ввод в действие жилых домов» (X21) входят в формулы y-переменных y_1, y_2, y_3 из статьи и в формулы y-переменных y_1,y_2,y_3, приведенных ниже. Это позволяет сопоставлять значения «весов» при z-переменных z_4,z_5,z_6 из двух разных исследований.

В статье [1] по «критерию заметности» когнитивно выявлены 2 существенных измеряемых показателя - «необходимость купить (копить деньги, строить) дом (квартиру)» (насущная потребность, 20,98%) и сильно выраженная «потребность в интернете» (цивилизованная потребноть индивида, 25.745). Динамики этих показателей (Таблица 1 из статьи [1]). Они снижали в 1999-2001 гг покупательную способность населения. Ниже мы когнитивно выявим другие вновь появившиеся существенные измеряемые показатели.

Сформируем многомерную выборку значений $X^0_{mn}=\{x^0_{i,j}\}$, состоящую из m=44 значений 6 сильно или умеренно зависимых X-факторов (первые 6 столбцов X^0_{mn}) и m=44 значений показателя z_6=(Y2)=«количество ОТА для населения», 7-ый столбец X^0_{mn}).

Они (y-переменные, соответствующие обобщенным факторам, вычислены с применением ППП «Спектр» [22]) некоррелированы друг с другом. Не только этим они отличаются своих от 6 X- факторов). Каждый из 3-х обобщенных факторов равен линейной комбинации некоторого числа X- факторов:

y_1=0.5267*z_2+0.5206*z_4+0.5108*z_7 + ε_1,

y_2=-0.3768*z_1+0.4719*z_3+0.6371*z_5+ 0.4608*z_6+ ε_2,

y_3 =0.6177*z_1+0.5502*z_3+0.4241*z_6+ε_3,

где ε_1, ε_2, ε_3–погрешности, связанные с отбрасыванием z–переменных с малым весом из Таблицы 2). В статье [1] получены линейные комбинации других подмножеств X- факторов:

y_1= 0.4696*z3 + 0.4999*z4 -0,5074*z7 + ε_1,

y_2 =-0.4969*z1-0,5372*z2-0,3681*z5 -0,4580z6 + ε_2,

y_3=-0,4706*z1 +0,8311z_5+ε_3,

где ε_1,ε_2,ε_3-погрешности, связанные с отбрасыванием z–переменных с малыми весами.

В Таблице 2 наглядно показана формальная сопоставимость когнитивных карт двух потребностей населения Республики Казахстан в двух новых услуг связи.

Таблица 3

	Заметные «веса» для 3-х y-переменных формирующих когнитивные смыслы 3-х валидных показателей, выявленных при анализе множества X-факторов, влияющих на измерямый показатель «количество минут Dial up для населения» [1].			Заметные «веса» для 3-х y-переменных формирующих когнитивные смыслы 3-х валидных показателей, выявленных при анализе множества X-факторов, влияющих на измерямый показатель «количество ОТА для населения».		
1	2	3	4	5	6	7
	y_1	y_2	y_3	y_1	y_2	y_3
C_1	5	-0,4969	**-0,4706**	0.5267	-0.3768	0.6177
C_2	0,3130	-0,5372				
C_3	-0,4796				0.4719	0.5502
C_4	-0,4999			0.5206		
C_5		-0,3681	**0,8311**		0.6371	
C_6		-0,4580			0.4608	0.4241
c_7	-0,5074			0.5108		

Каждому из 3-х обобщенных факторов соответствует своя категория клиентов-физических лиц, легко узнаваемых по структуре своих расходов. Эти 3 обобщенные факторы содержательно интерпретируются и являются существенными факторами, определяющими спрос на y=(Y2)=«количество ОТА для населения». Причем можно выделенные категории клиентов, разделить на группы по источникам дохода и потребительскому

поведению, соответствующие каждому из 3-х обобщенных факторов y_1,y_2,y_3. Вопрос: как воздействовать на каждую из категорий адресуем маркетологам. Наша задача: оценить долю каждой из категорий клиентов.

Заключение

Когнитивное моделирование изменений цен и денежных расходов населения Республики Казахстан проведены с использованием числовых значений неценовых Х-факторов для удовлетворения потребности индивидов «доступ к средствам коммуникации». Этими Х-факторами являются {X12,X13, X15,X16,X20,X21}.

Другой набор Х-факторов:{X5,X7,X11, X16, X20,X21} используется для когнитивного моделирования расходов населения на количество ОТА в домах жителей. Смыслы-имена из этого набора Х-факторов когнитивно определяют как показано ниже смыслы 3-х вычисленных ниже у-переменных y_1,y_2,y_3. Для этого в соответствии с этим перечнем {X5,X7,X11,X16,X20,X21} только 3 подмножества: {X7(=z_2),X16(=z_4),Y2(=z_7)}, {X5(=z_1),X11(=z_3),X20(=z_5),X21(=z_6)},{X5(=z_1),X 11(=z_3), X21(=z_6)} неценовых Х-факторов влияют на у-переменные y_1,y_2,y_3. Доля Y-показателя Y2 равна 26,09% ($0,5108^2$=26,09%), эта доля расходов дополняет долю потребительских расходов, равную 0.5267^2=27.741%) и долю расходов на оплату всех ОТА для населения, равную 0.5108^2=26,09%. Эти доли сопоставимы с долей среднемесячной заработной платы работающих, равной 27,10% (z_2(x7),0.5206^2=27,10%). Равенство 27,10%+27,741% +26,09%+ε=100% показывает только структуру у-переменной y_1. Доли Х-факторов X7(=z_2),X16(=z_4) в структуре у-переменных y_2,y_3 можно вычислить по данным из Таблицы 1. Здесь ε=19% равна доле неучтенных Х-факторов.

Мы рассмотрели как вычислялся относительный индекс цены услуги (в %-ах), т.е. «индекс, показывающий, происходило ли изменение цены на услугу более или менее быстрыми темпами, чем общий рост цен на товары и услуги. Относи тельный индекс цены услуги вычисляется путем деления дефлятора цен конкретного вида услуги на дефлятор общих расходов на виды товаров и услуг и умноженный на 100%.

«Именно такая относительная цена товара, а не его номинальная цена, определяет спрос на этот товар» [1]. Там же дано разъяснение: в каждом конкретном случае часть происшедших изменений цен объяснялась общим ростом цен, а часть – изменениями в монопольном рынке услуг связи или необходимостью покупки нового оборудования, внедрения технологии его эксплуатации».

Структура расходов y_1 характерна для наемных работников, живущих на заработанную плату, которые могут позволить себе расходы потребительские и на оплату ОТА. Структура расходов y_2 характерна для наемных работников, могущих позволить себе прочие расходы, выдерживающих расходы в связи с изменением цен (с ростом цен) на продовольственные товары и неработающих по найму, т.е. бизнесмены, промышляющие шоп-туром. Структура расходов y_3 соответствует категории населения, работающих по найму и высокооплачиваемых (президенты фирм, топ-менеджеры).

Эти факторы независимы друг от друга, что позволяет рассматривать их раздельно специалистами из разных отделов ОАО "Казахтелеком".

Вес фактора y_1 равен 3,4601/7=0,4943, т.е. доля таких клиентов равна 49,4% от общего числа клиентов, имеющих отдельный телефонный аппарат. Эту категорию клиентов можно назвать «ФЛ- клиентами, у которых среднемесячная зарплата покрывает (равна или чуть больше: 0,5267>0,5206) только потребительские расходы». т.е. большая часть наемных работников бюджетной сферы и частного сектора, живущие «от зарплаты до зарплаты».

Вес фактора y_2=1.5195/7=0.21707, т.е. доля таких клиентов равна 21,7% от общего числа клиентов, имеющих отдельный телефонный аппарат. Эту категорию клиентов можно назвать «ФЛ- клиентами, обремененные расходами как по вводу в действие жилых домов, так и прочие расходы и расходы на продовольственные товары («в связи с изменением цен на продовольственные товары» и прочими (на мебель и т.п.) расходами); Такими ФЛ- клиентами являются высокооплачиваемые чиновники, менеджеры, бизнесмены.

Вес фактора y_3=1,0076/7=0.1439. т.е. доля таких клиентов равна 14,39% от общего числа клиентов, имеющих отдельный телефонный аппарат. Эту категорию клиентов можно назвать «ФЛ- клиентами, работающих по найму, расходы которых возросли (в связи с изменением цен) на продовольственные товары и в связи с расходами после ввода в действие жилых домов. Но без прочих расходов, например, переселились в построенные дома со старой мебелью.

Такими ФЛ- клиентами являются не высокооплачиваемые руководящие работники бюджетной сферы, некоторые предприниматели. Доля других ФЛ-клиентов пренебрежимо мала и не поддается выявлению в рамках модели главных компонент Н. Hotelling-а.

Интерпретация 3-х категорий населения, имеющих отдельный телефонный аппарат, оценка их долей позволяет сформулировать практические выводы.

Отдельный телефонный аппарат установили 3 категории клиентов, независимых друг от друга. Это дает возможность ОАО "Казахтелеком" стимулировать (повышать спрос на ОТА по каждому из 3 категории клиентов) как посредством цен, так и при помощи регулирования неценовых факторов, влияющих на 1, на 2 или на 3 категории клиентов по каждому региону в отдельности.

Наибольшую долю (49,4%) клиентов ОАО "Казахтелеком" с отдельным телефонным аппаратом составляют «наемные работников бюджетной сферы и частного сектора, живущие «от зарплаты до зарплаты». Невысоко оплачиваемые руководящие работники бюджетной сферы, некоторые предприниматели составляют 14,39% от общего числа клиентов, имеющих отдельный телефонный аппарат. А доля высоко оплачиваемых чиновников, менеджеров, бизнесменов составляют 21,7%, остальные 14,47% клиентов с ОТА не выявлены в данном исследовании.

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QR – Issue QR – Article

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FEATURES OF PHRASEOLOGIES OF THE GERMAN LANGUAGE

Abstract: *This article discusses the phraseological units of the German language and the features of the functioning of phraseological units.*

Key words: *Language, phraseological unit, thought, translation, vocabulary, expression.*
Language: *English*
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Introduction

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Modern linguistic research is unthinkable without a comparison of the studied objects. The main task of linguistic comparison is to identify the identical and different signs of the studied facts of the language. The coincidence of phraseological units of different languages, including unrelated ones, is based on the commonality of logical and figuratively associative thinking processes of different peoples of the world. The study of the development trends of the modern German language applies to all linguistic levels, however, the vocabulary has always been the most responsive to extralinguistic factors. Along with narrowly focused research on the latest processes in the neologization of the lexical structure of the German language, there are fundamental works by E.V. Rosen, which became the basis for many interesting areas in the study of the lexical composition of the German language in general and German phraseology in particular. Phraseological units of the modern German language are being actively updated and, as P. Brown notes, primarily due to the activation of processes of contextually determined author's modification of phraseological units in the texts of the functional style of the press and journalism, as well as as a result of crowding out and changing traditional forms of phraseological units, the disappearance of dialects and replacement old family, community traditions influenced by the media on more modern ones. A considerable group of phraseological units included in the above processes is formed by phraseological units with national cultural elements of semantics, i.e. phraseological units, the imaginative basis of which is based on any cultural and historical information. The relevance of the units of the phraseological foundation for the German language is constantly and successfully studied on the basis of material from both modern German fiction of various genres and the German press. Phraseologisms are a reflection of folk wisdom in a language, many of them exist for tens and hundreds of years, since people love accurate, figurative expressions, with the help of which you can convey a funny joke and an evil taunt. In all comparable languages, phraseological expressions reflecting tolerance have the seme “patience”. The analysis shows that the key lexemes of English, German and Russian phraseological units and paremias expressing the concept of “patience” do not have an etymologically related similarity, but have only a small similarity in their meanings, and only in German and Russian languages, showing the specificity of the national expression of patience. If in English patience is diligence, a manifestation of diligence, zeal, when this or that work is meekly performed, then in German this patience is die Geduld, die Duldsamkeit in the meaning of Christian patience and humility; die Toler-anz, die Beharrlichkeit - patience, expressed in perseverance, in the ability to resist, and Russian patience - the desire

not to give in to circumstances - is connected with endurance in relation to moral stress. All that has been said once again confirms the idea that each nation in its own language reflects the surrounding world in its own way.

Features of the functioning of phraseological units expressing tolerance were considered on the basis of analysis of press texts. The expediency and relevance of addressing the comparative characteristics of the functioning of the phraseological units in the language of the press with national-cultural specificity is determined by the high frequency of their use in journalism. Studies of the linguistic and regional specifics of phraseological units in journalistic texts make it possible to identify the value orientations of a given linguistic collective, reflecting its social, historical and cultural experience. A comparative analysis of phraseological units expressing tolerance in modern journalistic texts of comparable languages shows a greater tendency to manifest differences. In journalistic texts in English, one can find the functioning of phraseological units and paremias to express the concept of “maintaining inner calm”, as well as perseverance, less often - compassion, compromise. A distinctive feature of German journalistic texts is the use of phraseological units and paremias, emphasizing the speaker’s detachment from what is happening, as well as the expression of a desire to get along with the surrounding reality. Having carried out a comparative analysis of the expression of concepts that reflect “tolerance” in phraseological units and paremias in modern journalistic texts in English, German and Russian, one can trace the percentage manifestation of both similarities and differences. Modern native English speakers, through the use of phraseological units expressing tolerance in speech, most often seek to show understanding of the interlocutor’s actions, trying to maintain inner calm and at the same time showing resistance to negativity from the outside world. Native speakers of modern German, evaluating current events and using phraseological units in their assessment, show restraint of their own emotions. An important factor in this is the preservation by the native speakers of patience and often the expression of a desire to distance oneself from expressing one’s own opinion about what is happening. Phraseologisms with animalisms continue to attract the attention of researchers, since they are one of the most numerous and internally diverse groups of a specific phraseological foundation and provide information on their encyclopedic (cultural-informative), social-informative, deictic, expressive and figuratively expressive functions. Animalistic phraseological units reflect centuries-old human observations on the appearance and habits of animals, convey the attitude of people to their "lesser brothers". Animalisms carry encyclopedic information both about typical features of an animal, and about less obvious signs that are not reflected in dictionary definitions. The encyclopedic meanings of animalism, actualized in individual phraseological units, are quite common. So, phraseologisms with animal names can reflect:- physical qualities, capabilities: strong (hardy) like a horse, weak like a chicken, swims like a fish, sharp-sighted like a lynx, the scent like a dog, nimble like a monkey;- appearance: black as a raven, goatee, wasp waist, dry as a roach, with gulkin (sparrow nose), as thick as a hog;- mental qualities (character traits):stubborn like a bull, a donkey; rested like a ram, cocky like a cock, annoying like a fly, gloomy like a turkey;- intelligence: stupid like a gray gelding, staring like a ram at a new gate, cunning like a fox, this is a no brainer;- habits, abilities, skills: bursting like a magpie, cackling like jackdaws, dumb like a fish, ostrich politics, repeating like a parrot.Черты, которыми человек наделяет животных, могут совпадать в разных языках, ср.:

Немецкий Русский
Rot wie ein Krebs красный как рак
Stark wie ein Pferd сильный как лошадь
Schwimmt wie ein Fisch плавает как рыба
Schwarz wie ein Rabe черный как ворон
Storrisch wie ein Esel упрямый как осел
Essen wie ein Spatz ест как воробей
Schlau wie ein Fuchs хитрый как лиса

Но эти черты могут и заметно отличаться. Сравним:

Dastehen wie die Kuh vorm neuen Tor уставиться как баран на новые ворота

Hungrig wie ein Вдг голодный как волк (собака)

B^e wie ein Wolf злой как собака
Sanft wie ein Lamm смирнее теленка
Wie iene Ratte schlafen спать как сурок

The components of the animal’s name easily go into the category of word-symbols reflecting the ideas that people have about different animals: hardworking like a bee, goose cinquefoil, cunning like a fox, cowardly like a hare, fearless like a lion, obedient like a lamb. Many animal names have become stable metaphors for the properties and qualities of a person, for example: a fox - “a cunning, flattering person”, a goose - “about an unreliable or stupid person”, a bear - “about an awkward, clumsy person”, a cock - “about a fervent person ".Thus, the names of animals here have an encyclopedic function - they provide data about the animal, necessary for the formation of phraseological meaning. From a large set of mental and physical qualities of the animal, its appearance, habits, one is selected, implemented in the context of phraseological unit. A socially informative function is performed by some animal names that have become symbols of negative qualities. In German and Russian, this is, first of all, Hund - “dog”, Schwein - “pig”, Ziege - “goat”, Esel - “donkey”, whose names have a negative connotation, based on both real observations and the prevailing stereotype ideas about the intellect,

character and other features of the animal. Some of these ideas have very ancient origins.Thus, the idea of a dog as a persecuted creature is already known from the Bible, the name of this animal gives the greatest number of negative connotations in both German and Russian phraseology: kein Hund, auf den Hund kommen, wie ein Hund leben, jmden wie einen Hund behandeln (Dog canine death, died like a dog, drive to all dogs, canine son, canine weather, chase dogs).Many negative connotations associated with the names (names) of animals in German and Russian coincide, for example: Ein Wolf im Schlafpelz a wolf in sheep's clothing Den Bock zum Gdrtner machen let goat in the garden Der Hund auf dem Heu dog in the manger Perlen vor die Sue werfen throw beads in front of pigs. General connotations based on observations of animals arise in different languages independently of each other and testify to the universality of human thinking. However, the "vision of the world" may be different for different (especially unrelated) peoples, and then the name of the same animal takes on different connotations. A classic example of such a discrepancy is phraseology with the noun “elephant”, which in German and Russian has become a symbol of awkwardness and heaviness sich benehmen wie ein Elefant im Porzelladen - “behave like an elephant in a china shop” (rude, awkward), while among the Indians, the “elephant” is a symbol of grace.

Deictic function.

The essence of the deictic function is that common nouns can be successfully replaced by demonstrative pronouns (one, this), since they do not name the properties of a particular denotation, but only indicate its difference from another object, “hint” at its location, for example: German: Vom Pferd auf den Esel kommen, weder Fisch noch Fleisch (nicht Fisch, nicht Fleisch);Russian: methyl in a crow, and hit a cow; change cuckoo for hawks; neither pava nor raven; neither ear nor snout. For household names, this function does not appear in isolation from other functions - the phraseological context also takes into account encyclopedic information about the denotation, for example: know, cat, your basket; every cricket know your hearth. This once again indicates that in the real process of phrase-formation, as a rule, several functions interact, one of which plays a major role. So, in both Russian and German, the components of phraseological units perform various functions. The most common is an encyclopedic function, reflecting the different sides of the concept of denotation. Phraseologisms can reflect the maximum number of properties, traits and attributes of an object, realizing them in different contexts, so most component words are polyconnotative.

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QR – Issue QR – Article

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APPLICATION OF DESIGN METHODOLOGY IN GERMAN LANGUAGE LESSONS

Abstract: *This article discusses the design methodology in the German language lessons and its role in mastering the topics.*

Key words: *Method, interactive methods, result, approach, project, German.*

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Introduction

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In the process of learning a foreign language, the project method is a comprehensive type of educational activity; it integrates various types of foreign language communication in order to solve certain constructive-practical, informational, research, scenario and other problematic and creative tasks. These tasks can be focused on students createng various types of constructive creative products. Among the variety of new pedagogical technologies aimed at implementing a personality-oriented approach in teaching methods, an important role is played by project training, which is distinguished by the cooperative nature of the tasks, being creative in nature and focused on the development of the student's personality. For several years, many teachers have been using new pedagogical technology: the project method in a foreign language lesson. This allows you to most fully take into account the individual characteristics of each student, i.e. implement a personality-oriented approach in teaching a foreign language. The basic principle of this direction is that the student should be at the center of training, not the teacher, the activity of cognition, and not teaching. Education is focused on personal characteristics, previous experience, the level of intellectual, moral and physical development of the child, especially his psyche. I can state with full confidence that the project method, training in cooperation can solve the problem of motivation, create a positive attitude of students, teach them not just to remember and reproduce the knowledge that the school gives them, but to be able to put them into practice to solve problems related to their life .The project method involves a certain set of educational and cognitive techniques that can solve any problem as a result of independent actions of the student with the obligatory presentation of these results. Project work and training in cooperation is becoming more widespread and recognized in educational systems around the world.

It should be noted that entry-level projects are mostly short-term. They last 1-2 weeks. And the requirements for the presentation of the project are drawn up in accordance with the age characteristics of students .Since there is no evaluation system at the initial levels, we usually introduce special nominations for assessment: "originality", "scientific", "relevance". This stimulates interest, motivates independent search activity. Many people associate the project method with middle and senior students, but work experience has shown that the project method can work successfully, taking into account the characteristics of younger students. And in the context of the implementation of GEF of the second generation, project activity becomes an integral part of the educational process. Beginners do

not have a large vocabulary, are not able to work with reference books, can not draw up and submit their work, do not have extensive experience working in pairs and groups. They must be taught all of this, so using the project method in elementary school requires considerable preliminary work from the teacher. At the stage of acquaintance with project activities, the time for preparing children also increases, which subsequently pays off with the quality of the knowledge, skills and abilities formed. Based on the experience of using this method, it is advisable to begin the gradual introduction of some elements of project training (for example, project tasks), phased familiarization with project activities and development of presentation skills before implementing long-term projects. []How do I apply the design method in German lessons? First of all, I look through educational material, analyze the importance of topics, as well as the ability of students to master this thematic material. It is important to highlight the appropriate course topics or sections that will be submitted for design. Further, I formulate a number of individual and group examples of topics per class, work on which will require students to learn the necessary knowledge in the program and form the necessary creative experience. Already in the second half of the 5th grade there are topics for the passage of which it is appropriate to use the design method. When studying topics Wir malen, bauen, basteln, Wir bauen unsere Stadt, I invite students to participate in applied projects. Children are happy to draw, make crafts, plan and build their city. This technique activates the activities of children, as it corresponds to their interests and age characteristics, and develops their creative abilities. Passing topics of Deutsche Schulen. Wie sind sie? (6 cl.), Wie ist der Verkehr in einer modern Großstadt (7 cl.), Auf dem Lande gibt es auch viel Interessantes (7 cl.), Sorgen wir gemeinsam für unseren Planeten Erde (7 cl.), Im gesunden Körper (gesunder Geist 7cl.) And others, children enthusiastically write compositions by Meine Schule, Eine Traumschule, Das Auto der Zukunft, in which fantasy is intertwined with reality, draw drawings, create posters Wir schützen den Wald, Unsere Freunde - Tiere und Vögel Im gesunden Körper - gesunder Geist and others. And at the same time there are practically no guys who would not participate in the work on such projects! It should be noted that projects in grades 5-6 are mostly short-term and somewhat simplified in design, but this does not detract from their importance, but only speaks about the age characteristics of schoolchildren of this age. It is well known that by the end of the 7th, beginning of the 8th grade, students' interest in a foreign language sharply decreases. Teachers say that at this age, children do not want to learn. Scientists, having studied this problem, found out the following: 60% of students in the 8th grade still have a desire to study, but interest in the subject disappears. The experience of applying the project method confirms the conclusions of scientists. I think that it is a good incentive to increase interest in the German language at this age. Projects are somewhat more complicated in form and content, a scientific approach to design is practiced, while, accordingly, the time for their preparation increases, they become medium-term. When working on topics Wir bereiten uns auf eine Deutschlandreise vor (8 cl.), Eine Reise durch die Bundesrepublik Deutschland (8 cl.), Students present their projects in various forms in German. These are: Collage, Dominospiel, Reklame, Schema, Karte, Album usw. The textbook of the 9th grade involves working on one large project throughout the school year, however, the selection of educational material provides an excellent choice of problems for students. Working on the theme Die heutige Jugendlichen. Welche Probleme haben sie ?, among traditional youth problems (drugs, alcohol, relationships with parents), students name and prove new problems (for example, the computer, its positive and negative effects), which undoubtedly implies a search, creative nature of independent activity. At the same time, the volume of statements increases, students give arguments, give an assessment of the situations discussed.

In the process of individual, paired, group, collective work on projects, the formation of communication abilities occurs. During the project implementation period, the following skills are developed for schoolchildren: - general education: working with a textbook, with a dictionary, reference literature, drawing up a report plan, messages, presentations on the topic, etc .; - special: the ability to shorten the text and transmit it orally, carry out thematic selection of vocabulary, use a bilingual dictionary, make short notes on the problem, compose messages, etc .; - actually communicative skills by type of speech activity, including speech and non-speech behavior. The project method helps to develop linguistic and intellectual abilities, a steady interest in learning German, the need for self-education. [1]

Ultimately, it is expected to achieve communicative competence, that is, a certain level of linguistic, regional and sociocultural knowledge, communication skills and speech skills that allow for foreign language communication. The implementation of design and research methods in practice leads to a change in the position of the teacher. From the carrier of ready-made knowledge, he turns into the organizer of the cognitive activity of his students. The psychological climate in the lesson also changes, as the teacher has to reorient his educational work.

From an authoritative source of information, the teacher becomes an accomplice in the research, creative process, mentor, consultant, organizer of students' independent activities. And this is true cooperation. Work on the project is carried out in

stages: 1. Preliminary preparation. 2. Definition and wording of the topic. 3. Implementation of the project. 4. Presentation of the project. 5. Evaluation of work. 6. Practical use of the result. The main requirements for a training project: work on a project is always aimed at resolving a specific, and socially significant, research, information, and practical problem; planning actions to resolve the problem, otherwise the execution of work begins with the design of the project itself, in particular the type of project and presentation form. Next is the operational development of the project, which provides a list of specific actions indicating the results, deadlines and responsible. However, some projects cannot be immediately planned from start to finish; students' research work as a prerequisite of each project. A distinctive feature of project activities is the search for information, which is then processed, comprehended and presented to the project team members; the output of the work is a product created by the participants of the project team in the course of solving the problem. presentation of the finished product with the justification that this is the most effective means of solving the problem. Consider the phased work on the project "Wir empfangen Gaste" in grade 8. During the preliminary preparation (the first stage - Vorbereitung und Themensuche), students comprehend the main content of the chapter (students prepare to receive guests from Germany, discuss how to prepare a room for guests, make a list of products, buy gifts and souvenirs, then guests are invited to the table and are treated to and entertain), while they are supported by photographs, pictures (collage), they look through texts, through the selection of which a circle of topics for discussion can be determined, they are guided by the basic words contained in this chapter, I choose t additional material defining the substantive and country-specific aspect of the project work, in the framework of which the main problem (theme) will be developed. The second stage (Themenfindung und Konkretisierung) begins with the definition and wording of the topic. Guiding questions of the teacher can help students in this regard: what can be found in the pictures and texts of this chapter? What (what problem) can connect them together? How central students formulate the problem: "Wir empfangen Gaste" (Eine Party - ist es toll?). A sub-item at this stage can be used to highlight the stage of concretization of the topic using questions. Unsere Schwerpunkte: 1.Einkaufe machen. 2.Einladungen schreiben. 3 .geschenke fur Gaste kaufen. 4. Das Zimmer schmuken. Welche Fragen haben wir? - What products do you need to buy? (Welche Lebensmittel muss man kaufen?) - What national dishes can be prepared (what is served in such cases at the table in Germany, Russia)? (Wollen wir kochen? Was essen die Leute in Russland, in Deutschland besonders häufig?) - Where can I buy products, gifts, souvenirs? How much is needed for this? (Wo kann man Geschenke, Souveniers kaufen? Welche Summe brauchen wir dafür?) - Who should I invite to the party? (Wen willst du einladen?) - What to wear? (Wie siehst du aus? Was tragen Jugendliche in Russland, in Deutschland?) - What can be presented as a keepsake? (Geschenke zum Andenken.) - How to invite to a dance? (Darf ich Sie (dich) zum Tanz bitten?) - What music to choose? (Gibt es besondere Musik?) - How to decorate a room (Wir schmuken das Zimmer.) The third stage (Durchführung der Pröjektarbeit wie losen wir unsere Fragen und Probleme?) - direct implementation of a mini-project, i.e. how, how will solve this problem, given the forms of the future presentation of the project. When the topic is found and specified, it is necessary to draw up a sketch (sketch) of the project (Projektskizze), which should contain basic data on the content and organization of all work, for example, collecting, organizing and processing all information, materials: - We conduct interviews in the classroom. (Wir fragen und hören zu, was uns die Kinder erzählen.) We look at pictures (collages) in the textbook and other additional materials. (Wir lesen Geschichten, Märchen. Wir betrachten Bilder und Fotos in Lehrbüchern.) - We work on dialogs and texts in the textbook. (Wir arbeiten an den Texten.) - We listen to a tape with German and Russian songs. (Wir hören uns russische, deutsche Lieder an.) - We go to the store, to the market. (Wir kaufen in russischen, deutschen, Geschäften, auf dem Markt ein.) - Let's stage the dialogs. (Wir spielen Dialoge.) - We design an office for the future presentation of the project. (Wir schreiben, fotografieren, machen Dekorationen.) - We think over the presentation form. (Wir probieren Nahrungsmittel und Speisen, betrachten Geschenke.)

The organizational part of the project also includes assistance from parents. The fourth (Präsentation unser Projektziel) is the climax of the presentation of the project. The most important point here is the achievement of the project's goal in various forms: an exhibition of the finished product, group and individual presentation, presentation at any evening, a message (report) in the wall newspaper, etc. In the case of our mini-project "Wir empfangen Gaste", the goal was: 1) compile an invitation booklet (in two languages) (Gemeinsam ein Klassenkochbuch oder ein Einladungsbuchlein herstellen.); 2) make an exhibition of gifts or souvenirs made by oneself (Die Ausstellung der Produkte Unser Schaffen.); 3) to cook some national dish (Ein typisches Gericht der Region kochen.); 4) decorate the class accordingly (Das Klassenzimmer einrichten und schmucken.). Why are precisely such "man-made" ones that are often applied, practice-oriented in nature selected as project goals? - Because it is precisely such goals, this way of presenting the material that corresponds to the provision that the focus of project training should not be the subject itself, but a variety of activities related

to the topic of the project, i.e., a kind of integration of actual skills.

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QR – Issue QR – Article

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SOME WAYS OF TEACHING VOCABULARY THROUGH INTERACTION AT THE ENGLISH LESSON

Abstract: *this article discusses some ways of teaching vocabulary through two-way communication between a student and a teacher. The new vocabulary should always complement the previously acquired vocabulary of the student.*

Key words: *vocabulary, vocabulary, communication, learning, perception, grammar.*
Language: *English*
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Introduction

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"If language structures make up the skeleton of language, then it is vocabulary that provides the vital organs and the flesh." (Harmer)

It is necessary to begin this paper describing vocabulary itself. All languages have words. Language emerges first as words, both historically, and in terms of the each of us learned our first and subsequent languages. Vocabulary is defined as "all words known and used by a particular person" [7; 21].The word "vocabulary" generally represents a summary of the words or their combinations in a particular language. Vocabulary knowledge is not something that can ever be fully mastered; it is something that expands and deepens over the course of a lifetime. The coining of new words never stops, nor does the acquisition of words. Even, our first language we are continually learning new words, and learning new meaning for old ones. Vocabulary usually develops with age, and serves as a useful and fundamental tool for communication and acquiring knowledge. Vocabulary is an essential component for successful communication. While grammar is important, a lack of vocabulary may result in complete failure to convey a message. Vocabulary is a necessary ingredient for all communication. Language learners encounter vocabulary in a daily basis, and must be able to acquire and retain it. Vocabulary functions as a cornerstone without which any language could not exist. Speaking would be meaningless and perhaps impossible having only structure without vocabulary.

In mental lexicon words are stored, categorized and interconnected in many ways, according to their features such as meaning, form, collocation, syntactic properties, cultural background etc. Consequently, a word being retrieved is looked up through several pathways at once, which is extremely economical in terms in time needed.

And it goes without saying that vocabulary can also be divided into four: reading, listening, speaking and writing.

Reading vocabulary:

A literate person's vocabulary is all words he or she can recognize when reading. This is generally largest type of vocabulary simply because a reader tends to be exposed words by reading than by listening.

Listening vocabulary:

A person's listening vocabulary is all words he or she can recognize when listening to speech. People may still understand the words they were not exposed to before using cues such as tone, gestures, the topic

of discussion and the social context of the conversation.

Speaking vocabulary:

A person's speaking vocabulary is all words he or she uses in speech. It is likely to be a subset of the listening vocabulary. Due to the spontaneous nature of speech, words are often misused. This misuse- though slight and unintentional-may be compensated by facial expressions, tone of voice.

Writing vocabulary:

Words are used in various forms of writing. Many written words do not commonly appear in speech. Writes generally use a limited set of words when communicating: for example: if there are a number of synonyms, a writer will have his own preference as to which of them to use.

Besides explaining the meaning in vocabulary presentation, it is also important to focus on forms, since the sound of words is one of the aspects influencing the organization of the mental lexicon. This is arranged by various drilling activities. From experience, songs and chants are very suitable for drills, providing rhythm, catchy rhymes and an element of fun. As Thornbury suggests, introducing the written form of the word should follow not long after the presentation of the pronunciation [4; 86].

After presentation, learners should be provided with plenty opportunities to practice the newly gained language in accordance with the principles, since it is crucial for successful remembering. This is done by various forms of practice activities. In the first stage, usually mechanical practice is applied "in the form of some of kind of oral repetition" [2; 93].

Furthermore as Thornbury claims, it is necessary to integrate new vocabulary into existing knowledge in the mental lexicon, which is done by types of activities, where students make judgments about words, e.g. matching, comparing etc. This mechanical practice is then followed by more open and communicative activities "where learners are required to incorporate the newly studied words into some kind of speaking or writing activity." This is often provided by various pair-work or group-work activities [2; 93].

Using games

Many experienced textbook and methodology manuals writers have argued that games are not just time-filling activities but have a great educational value. W.R. Lee holds that most language games make learners use the language instead of thinking about learning the correct forms. He also that game should be treated as central not peripheral to the foreign language teaching program. A similar opinion is expressed by Richard Amato, who believes game to be fun but warns against overlooking their pedagogical value, particularly in foreign language teaching. There are a lot of advantages of using games. Games can lower the anxiety, thus making the acquisition of input more likely.

Drawing pictures

It is an easy and quick technique of introducing vocabulary to the learners. For students, drawing can be a fun medium to explain vocabulary. It is not necessary that teacher must be an expert in drawing pictures accurately. Pictures in foreign language teaching As Hill pointed out [1; 78], "the standard classroom" is usually not a very suitable environment for learning languages. That is why teachers search for various aids and stimuli to improve this situation. Pictures are one of these valuable aids. They bring "images of reality into the unnatural world of the language classroom" [1; 14]. Pictures bring not only images of reality, but can also function as a fun element in the class. Sometimes it is surprising, how pictures may change a lesson, even if only employed in additional exercises or just to create the atmosphere. Pictures meet with a wide range of use not only in acquiring vocabulary, but also in many other aspects of foreign language teaching. Wright demonstrated this fact on an example, where he used one compiled picture and illustrated the possibility of use in five very different language areas. His example shows employing pictures in teaching structure, vocabulary, functions, situations and all four skills [2; 6].

Furthermore, he pointed out that "potential of pictures is so great that only a taste of their full potential can be given" in his book [5; 6]. To be more specific, beside lessons where pictures are in the main focus, they might be used just as a "stimulus for writing and discussion, as an illustration of something being read or talked about, as background to a topic and so on" [6; 2].

However, "pictures have their limitations tool" [14; 115]. For example, in teaching vocabulary, pictures are not suitable or sufficient for demonstrating the meaning of all words. It is hard to illustrate the meaning of some words, especially the abstract ones such as 'opinion' or 'impact' [4; 115]. Therefore, in some cases, other tools are used to demonstrate the meaning, or alternatively pictures might be supplemented by other tools.

There are many reasons for using pictures in language teaching. As Wright pointed out [5; 2], they are motivating and draw learners' attention

Big picture flashcards

Big picture flashcards are very helpful tools in presenting and drilling forms of new words, since they draw learners' attention and make these often boring activities more enjoyable. And that is exactly what teachers need when presenting new language – to catch their learners' full attention, to raise their interest in the presented subject and hence also their motivation. At the same time flashcards (as well as other forms of pictures and visual aids in general) enable students to link the meaning of the words with real-world images immediately. When using flashcards in presentation, it is easy to involve learners actively and to combine the presentation with controlled practice. The presentation of vocabulary

with flashcards can be done in lots of various ways, for example in telling a story or just simply based on a set of vocabulary for a particular topic.

Word flashcards

Word flashcards are perhaps worth mentioning at this point, even though they are not actually pictures. However, being used in a similar way as picture flashcards, they can often enrich the lesson. On top of that, those two can be indeed combined and applied together, e.g. in a matching or labeling activity. As Wright pointed out, word flashcards are most typically used inteaching reading and writing [7; 59].

Nevertheless, they will find their use in teaching vocabulary too, offering valuable help mainly in teaching the spelling of newly learnt words, which definitely should not be neglected as it often is.

A plenty of variations of these cards are typically applied in communicative activities in pairs or small groups of students, thus finding a meaningful role in reviewing and practicing vocabulary. In a closer look, we will find one-side-only cards, both-sided ones and sets of pairs (antonyms or synonyms, a picture and the corresponding word or phrase) or sets of cards connected e.g. by their meaning. Being flexible in their way of use, these cards offer teachers and their students a large amount of possibilities in applying them in a number of activities and games such as 'domino' or various forms of word matching activities. Moreover, they are fit for a range of sorting or ordering activities, e.g. creating a story. These cards can also be used for games based on asking each other questions and exchanging them while searching for a set. On top of that, they might be helpful in individual practice of vocabulary, e.g. looking at a picture and guessing the meaning written on the other side.

Collocation

It's a widely accepted idea that collocations are very important part of knowledge and they are essential to non-native speakers of English in order to speak or write fluently. Nattinger in Carter and Mac McCarthy, "It teaches students expectations about which sorts of words go with which ones. Students will not go about reconstructing the language each time they want to say something" The term collocation generally refers to the way in which two or more words are typically used together [1; 56].

For example, we talk about heavy rain but not heavy sun, or we say that we make or come to a decision, but we don't do a decision [3; 111]. So, heavy rain and make a decision are often referred to as collocations and we say that heavy collocates with rain. Collocations include:

- Verb + Noun (e.g. break a code, lift a blockade)
- Verb + Adverb (e.g. affect deeply, appreciate sincerely)
- Noun + Verb (e.g. water freezes, clock ticks)
- Adjective + Noun (e.g. strong tea, best wishes)
- Adverb + Adjective (e.g. deeply absorbed, closely related)

The meaning of words such as the months of the year, the days of the week, the parts of the day, seasons of the year, ordinal numbers, cardinal numbers, etc. that form part of well-known series can be made clear by placing them in their natural order in the series. If you have several gradable words to introduce at the same, you can introduce them together on a scale. For instance, you can use frequency, such as always-often-occasionally or emotions in this way, with cheerful-happy-joyous-ecstatic.

Role play

Role-play is to create the presence of a real life situation in the classroom. It is important in the classroom communication because it gives students an opportunity to practice communicatively in different social contexts and in different social roles. The language applied in this activity is varied according to the student's status, attitudes, mood, and different situations. Blachowicz speaks, "Teachers can introduce some of the words which provide both definitional and contextual information about the words to be learned by making up a dialogue for students so that students can understand a further meaning and usage of the words."

Using video

Select a video segment that contains a series of actions or visual detail. Provide the learners with a list of target vocabulary words and ask them to construct a paragraph that incorporates as many of the words as possible. This activity is best done after the learners have seen the video. As they learn how to use more vocabulary properly, you will see an improvement in their writing and speaking. Teacher can also show a short film without sound and asking pupils to discuss what dialogue they would expect to hear. Showing a scene from a film without sound and asking pupils to use the facial expression to determine emotion.

To sum it up, learning vocabulary is a crucial issue when learning a language because it is an essential for communication. When we want to communicate something or with someone if we don't have the needed vocabulary we will be unable to achieve our goal. So vocabulary is a necessary ingredient for all communication. Language learners encounter vocabulary in a daily basis, and must be able to acquire and retain it. Vocabulary functions as a cornerstone without which any language could not exist. Speaking would be meaningless and perhaps impossible having only structure without vocabulary. Vocabulary teaching is one of the most important components of any language class. The main reason is the fact that it is a medium, which carries meaning;

learning to understand and express the meaning is what counts in learning languages. Vocabulary of a language is just like bricks of a high building. Despite quite small pieces, they are vital to the great structure.

Wilkins rightly says, "Without grammar very little can be conveyed but without vocabulary nothing can be conveyed" [6; 25]. Therefore, the study of vocabulary is at the center while learning a new language. English being a second language or foreign language, one needs to learn vocabulary in the systematic way.

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EFFECTIVE METHODS OF LEARNING TECHNICAL TERMS

Abstract: *This article discusses effective approaches and methods for teaching technical terms in groups with non-philological teaching of the English language. The article reveals innovative methods, the use of a communicative approach, new information and pedagogical technologies in teaching technical terminology.*

In particular, the types of communicative approaches and their theoretical validity, the effectiveness of using communicative and new pedagogical technologies based on effective techniques in explaining new terminology are examined.

Key words: *innovation, effective methods, technical terms, education, terminology.*

Language: *English*

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Introduction

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Nowadays huge tasks are set before teachers of English language. Teachers became one of the main subjects of educational reforms. Therefore, if a teacher is open to welcome new pedagogical innovations, he can provide goal-oriented introduction of innovative ideas into educational process.

New approaches in the system of education also influenced on the learning and teaching of foreign languages, as language is the major factor of person's development.

As we know, the teacher is the one who plans the learning process, he manages, partner in his educational work and in some time value of skills and knowledge of students. When talking about the role of the teacher as the educator we must realize that nowadays requirements and conditions everyday more and more to act as a teacher, friend, advisory, mediator, demonstrator, coordinator, model, observer, stimulant, reliable, certainly associate with students and of course, professional developed.

Communicative approach which is based on the idea that learning language successfully comes through having to communicate real meaning. When learners are involved in real communication, their natural strategies for language acquisition will be used, and this will allow them to learn to use the language. Communicative approach may assist students in becoming more efficient in learning technical terms. This means developing their ability to understand, interpret, process and use technical terms.

Technical texts vocabulary consists of common words, terms or technical terminology and connectors. Common words are the words we use in ordinary affairs (e.g. table, book). Terms are mostly used in special texts dealing with the notions of some branch of science. They are directly connected with the concept they denote. As the words have many meanings to know exact meaning of the technical term is very important. Most of the words in common use have more than one meaning and students often become confused because they put the wrong meaning on a word. They assume that words are always used with the same familiar meanings. That's why it is important to discuss the meanings of words and terms with students. When we confuse common definitions with meanings used in science, students' understanding suffers. For example, in common use, "car" means automobile, while in a railway sphere, a "wagon or carriage".

In order to develop terminology literacy of students, they need to gain knowledge of science

content and practice scientific habits of mind. This is impossible without knowledge of terminology in exact sphere.

Classroom time is often limited, and it is difficult to include all technical terms or terminology instruction to help students make sense of the exact sphere [3]

Lee, Buxton, Lewis, & Le Roy identify inquiry-based science instruction as beneficial to students in the following ways: [1]

a) students participate in activities as they learn vocabulary,

b) students work collaboratively and interact with others about terminology content,

c) hands-on activities offer students written, oral, graphic, and kinesthetic forms of expression. [2]

As students combine science experiences with discussions of words' uses and meanings, their vocabulary and content knowledge can grow.

Teachers can use lots of strategies for helping students learn and use technical terms. There exist research-supported strategies which help to build depth of terminology knowledge. Teachers can use the following strategies:

- Encourage brainstorming. Provide students with opportunities to brainstorm ideas about terminology and encourage them to work in small groups and discuss;
- Text cards help students interact with words and their meanings. Working individually or in small groups, students discuss the statements before sorting;
- True/false cards. These cards include statements drawn from the text. Students sort the cards into true and false piles;
- Matching pairs. Students are given a stack of cards and asked to match a term with its associated function, symbol, scientific name, etc;
- Word games. Word games using terminology promotes in-depth understanding of terms and their meanings.
- Graphic organizers. They can help to present words with a range of contextual information. Graphic organizer provides a template for presenting a technical term with contextual information.

Speaking about effective methods, strategies and techniques of teaching it is necessary to give information about methods which is used in learning process.

Cooperative learning is an effective way for students to learn and process information. [4] The jigsaw technique is a method of organizing classroom activity that makes students dependent on each other to succeed. It breaks classes into groups and breaks assignments into pieces that the group assembles to complete the (jigsaw) puzzle.

The Jigsaw method splits classes into mixed groups to work on small problems that the group collates into a final outcome.[1] For example, an in-class assignment is divided into topics. Students are then split into groups with one member assigned to each topic. Working individually, each student learns about his or her topic and presents it to their group. Next, students gather into groups divided by topic. Each member presents again to the topic group. In same-topic groups, students reconcile points of view and synthesize information. They create a final report. Finally, the original groups reconvene and listen to presentations from each member. The final presentations provide all group members with an understanding of their own material, as well as the findings that have emerged from topic-specific group discussion.

The jigsaw learning technique is a quick and effective way for students to work with their peers while learning technical terms. [5] For this activity each student is responsible for learning three or more new terms and teaching those words to their group. Students in a Jigsaw classroom could not succeed without one another, they had to learn to get along.

At the same time jigsaw method has several disadvantages:

- uneven time in expert groups
- students must be trained in this method
- requires in equal number of groups
- classroom management can become a problem

Advantages and disadvantages of jigsaw method we can define while using in classroom procedure.

Lesson procedure

Topic: Effective methods of learning technical terms. Discussion text **"**Carriages and Wagons**"**

Introduction

Before starting the lesson the teacher presents the subject of the lesson, its aims and objectives, gives information on the main discussion points and types of activities. Tell them that firstly they should work in pairs and then in groups.

Lead in:

Activity #1

Objective: To prepare students for the new topic trough brainstorming

Time: 10 min

Materials: Presentation, Pictures, board, markers

Procedure:

The teacher writes down the words "Carriages" "Wagons " on the board and asks students find out meanings and to give definitions of these two words in English. If some of words are unfamiliar for students encourage them to find out meanings and tell them to class in English. Then teacher writes on the board the question "What is the difference between carriage and wagon? Asks to give full answer to the questions.

Activity #2

Objective:

Jigsaw Reading. To share experiences around a specific terms. To encourage students to share each other's opinions through discussion

Time: 15 min

Materials: handout, colorful markers

Procedure:

T. explains Ss the stages of the activity and divides class into 4 person jigsaw groups. Distributes the handouts. Whole class reads the target text divided into 4 parts. The first part of the text is about freight cars, second box cars, third flat cars and forth is about carriages. Each student chooses one part of the text to become expert on. Give students time to read over their segment at least twice and become familiar with it. T. forms temporary "expert groups". Students who choose the same part of the text meet to form an expert group. T. gives students in these expert groups time to discuss the main points of their segment and to rehearse the presentations they will make to their jigsaw group Expert group research part of the text and do activities. T. distributes the handout 1 for;

- filing vocabulary graphic organizer with technical terms.

(rail, car, freight car, wagon, tarpaulin, box car, covered car, refrigerator car, flat car, container, warehouse, carriage, body, truck, train, route)

Activity #3

Objective: Matching technical terms with definitions

Time: 15 min

Materials: handout, card

Procedure:

Distribute each group handout with written strategies and methods that students can use while matching. Tell them that their task is to match these technical terms. After they have finished, checking them together and discuss.

Activity #4

Objective:

to encourage all students to fill Venn diagram according the discussion text.

Time: 15 min

Materials: handout cards, colorful markers

Procedure:

Ask students return to their home groups to present what they learned. Others in the group asks questions for clarification. T. floats from group to group, observing the process.

Tell your students that they should work in groups and finish filling Venn diagram within 15 minutes. Explain them that they should present in front of others.

Activity #5

Objective: to encourage all students to fill Venn diagram according the discussion text.

Time: 15 min

Materials: handout cards, colorful markers

Procedure:

Ask them what they have learned, what a new thing they have discoursed and give a quiz on the material by asking Ss to look through the handout and answer the questions:

1. What is the characteristic feature of freight cars?
2. How did they covered and why?
3. Had the early trains lighting and heating? and etc.

At the end of the lesson ask Ss what they have learned, what a new thing they have discoursed today.

T. Revises all the material of the lesson and gives home assignment.

Gives feedback and evaluates students' participation during the lesson

In conclusion we can say that, at the same time, teachers can increase their students' competency in English and help them become fluent readers in English. It is important to realize that the increased fluency, confidence, and motivation that so often result from reading extensively will help students in their academic endeavors, such as improving exam performances.

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COMMUNICATIVE LANGUAGE TEACHING AS THE MOST EFFECTIVE WAY OF TEACHING FOREIGN LANGUAGES

Abstract: *This article considers the communicative method of teaching a foreign language as the most effective. This method uses real-life situations to teach students. In this training, students use the language creatively.*

Key words: *communicative method, training, development, competence, motivation.*

Language: *English*

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Introduction

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English is a compulsory subject at the university. During this period, students acquire basic knowledge of the English language, expand vocabulary and learn to read literary texts.

The origins of CLT are to be found in the changes in the British language teaching tradition dating from the late 1960s. With the founding of the European Community in 1957, research was encouraged and sponsored by the Council of Europe in the 1960s on the ways in which members of Europe could best learn to communicate with each other in common languages. Communicative Language Teaching (CLT) pedagogy which originated from the changes in the British Situational Language Teaching approach dating from the late 1960s deserves to be mentioned. Stemming from the socio-cognitive perspective of the socio-linguistic theory, with an emphasis on meaning and communication, and a goal to develop learners' communicative competence, CLT evolved as a prominent language teaching method and gradually replaced the previous Grammar-Translation Method.

CLT makes use of real-life situations that necessitate communication. The teacher sets up a situation that students are likely to encounter in real life. Unlike the audio lingual method of language teaching, which relies on repetition and drills, the communicative approach can leave students in suspense as to the outcome of a class exercise, which will vary according to their reactions and responses. The real-life simulations change from day to day. Students' motivation to learn comes from their desire to communicate in meaningful ways about meaningful topics.

There are two kinds of foundation of CLT, namely, Canale and Swain's communicative competence and Rogers's humanistic psychology.

Canale and Swain (1983) propose communicative competence, which can be used to interpret and guide second language teaching. Canale and Swain (1980) state communicative competence is the ability to use the language correctly and appropriately to accomplish communication goals. The desired outcome of the language learning process is the ability to communicate competently, not the ability to use the language exactly as a native speaker does. Communicative competence is made up of four competence areas: linguistic, sociolinguistic, discourse, and strategic:

1. Linguistic competence means knowing how to use the grammar, syntax, and vocabulary of a language. Linguistic competence asks: What words do I use? How do I put them into phrases and sentences?

2. Sociolinguistic competence means knowing how to use and respond to language appropriately, given the setting, the topic, and the relationships among the people communicating. Sociolinguistic competence asks: Which words and phrases fit this setting and this topic? How can I express a specific attitude (courtesy, authority, friendliness, respect)? When I need to? How do I know what attitude another person is expressing?

3. Discourse competence means knowing how to interpret the larger context and how to construct longer stretches of language so that the parts make up a coherent whole. Discourse competence asks: How are words, phrases and sentences put together to create conversations, speeches, email messages, newspaper articles.

4. Strategic competence means knowing how to recognize and repair communication breakdowns, how to work around gaps in one's knowledge of the language, and how to learn more about the language and in the context. Strategic competence asks: How do I know when I've misunderstood or when someone has misunderstood me? What do I say then? How can I express my ideas if I don't know the name of something or the right verb form to use? (Canale and Swain, 1980:20)

CLT stresses the need to allow students opportunities for authentic and creative use of the language. It focuses on meaning rather than form; it suggests that learning should be relevant to the needs of the students; it advocates task-based language teaching. Students should be given tasks to perform or problems to solve in the classroom. What's more, CLT emphasizes a functional approach to language learning (i.e. what people do with language, such as inviting, apologizing, greeting and introducing, etc.). Also, to be competent in the target language, learners should acquire not only linguistic knowledge, but also the cultural background of that language.

Richards and Rogers address the issue, saying that in practice there are some elements to be taken into account: the communicational principle (i.e. activities that involve real communication promote learning), the task principle (i.e. activities in which language is used for carrying out meaningful tasks promote learning) and the meaningfulness principle (i.e. language that is meaningful to the learner supports the learning process). Finocchario&Brumfit summarize the principles as follows:

1. Teaching is learner-centered and responsive to the students' need and interests.

2. The target language is acquired through interactive communicative use that encourages the negotiations of meaning.

3. Genuinely meaningful language use is emphasized, along with unpredictability, risk-taking, and choice-making.

4. The formal properties of language are never treated in isolation from use. language forms are always addressed within a communicative context.

5. There is exposure to examples of authentic language from the target language community.

6. The students are encouraged to discover the forms and structures of language for themselves.

7. There is a whole-language approach in which the four traditional language skills (speaking, listening, reading, and writing) are integrated.

In CLT, the teacher has two main roles: the first is to facilitate the communication process between all participants in the classroom and between these participants and the various activities and texts. The second role is to act as an independent participant within the learning-teaching group .The latter role is closely related to the objectives of the first role and arises from it. These roles imply a set of secondary roles for the teacher: first, as an organizer of resources and as a resource himself, second, as a guide within the classroom procedures and activities. A third role for the teacher is that of researcher and learner, with much to contribute in terms of the nature of learning and organizational capacities. The role of the teacher is not only that of a resource and lecturer but also a facilitator, an organizer, a guider and more important a creator of environment in which learners learn how to learn. It is quite obvious that teachers' roles is more than just the role of instructors. There are many other roles teachers should play. In CLT classrooms, teachers have multiple roles such as director, organizer, host, and coordinator and so on. A number of writers in methodology and teacher training have proposed various ways of labeling the second language teacher's potential roles in class.

In the traditional Grammar-Translation Method teachers are dictators in class. Teachers deliver the contents of a textbook to students and students just copy the information into their notebooks. They passively receive the knowledge in the class. On the contrary, in CLT, learners play a central role in communication and interaction. They are advocated to participate in classroom activities actively. Learners have greater autonomy in communicative activities; autonomy is where students take responsibility for their learning and undertakes all of the management tasks concerned with it. Learners come up with a mutual solution by exchanging ideas and opinions with each other. They help each other and learn from each other. In 1980 Breen and Candlin describe the learner's role within CLT in the following terms:

The role of learner as negotiator – between the self, the learning process, and the object of learning – emerges from and interacts with the role of joint negotiator within the group and within the classroom procedures and activities which the group undertakes. The implication for the learner is that he should contribute as much as he gains, and thereby learn in an interdependent way.

Teachers are motivated to look for the best language teaching method that will provide students with the English language skills they need.

Several roles are assumed by teachers in CLT; these are determined by the view of CLT adopted. In support of Harmer's principle and Breen and Candlin's theory about CLT teacher's potential role, the teacher's roles in the lesson were accessed from the following four aspects:

1) Initiator

For example the teacher taught four new words and she imparted six abstract nouns. In pair-work five adjectives were introduced. In the role-play, the two adjectives describing people's personality were presented. All in all, in the lesson she taught the pupils seventeen new words, passing on new knowledge of target language to them. She carried out the basic function of CLT teacher well on the whole.

2) **Organizer**

One of CLT teacher's important responsibilities is to organize the communicative activity. CLT teacher plays a vital role in classroom communicative activities although he or she talks less. In fact, the success of a classroom activity, to a great extent, depends upon the teacher's organizing capability.

It was worthwhile to mention that teacher should make great efforts to create authentic and vivid communicative environment and activities relating the language form to language leaning. These classroom activities, such as describing the pupils' own hand shapes and predicting their partners' fates, were based on the pupils' needs and interests, which to a great extent, motivated the pupils' interest in what they were learning.

3) Director

Directing students' performance and classroom practice is also CLT teacher's fundamental task. Guidelines for classroom practice .

Suggest that during a classroom activity the teacher monitors and encourages the inclination to supply gaps in lexis, grammar and strategy but notes such gaps for later commentary and communicative practice.

Sometimes the teacher assumed the responsibility of a director well in the lesson. When the students prepared for the role-play, she/he offered them some advice and assistance when necessary.

4) Facilitator

Teachers in communicative classrooms will find themselves talking less and listening more, becoming active facilitators of their students' learning. Facilitator means facilitating the process of learning, to make learning easier for students, to help them clear away roadblocks, to find shortcuts, to negotiate rough terrain.

In the lesson the teacher sometimes fulfilled a responsibility of being an active facilitator well. She/he stimulated the pupils' intrinsic motivation by setting up the vivid communicative activity –role-play rather than telling them about the meanings of the words.

Communicative Language Teaching, as an eminent second language teaching approach, lays emphasis on learning target language through communicative activities. The study which aims to evaluate the effectiveness of Communicative Language Teaching in English vocabulary teaching and learning in a comprehensive class in southern Sweden is a new trial to the writer indeed.

Guided by the relevant theoretical background, the study which is composed of an English lesson's observation, a dictation and an interview demonstrates that compared with the traditional Grammar—Translation Method, Communicative Language Teaching based on many modern humanistic and communicative theories is effective in English vocabulary teaching and learning in many aspects:

1.In the CLT classroom much vocabulary is not taught in the form of wordlist of isolated words any more, but taught in authentic contexts. Vocabulary teaching focuses on developing communicative proficiency rather than commanding the forms of the target language.

2.CLT makes learners acquire vocabulary knowledge naturally, rather than learning intentionally. Apart from it, the modified target language input which is gotten from conversational interactions between the teacher and learners enables them to get better understanding of vocabulary knowledge.

3.CLT promotes learners' communicative competence and stimulates their inner motivation since the communicative activities are close and relevant to their daily life.

4.CLT makes learners adopt the responsibility to their own learning and encourages them to discover the forms and structures of target language for themselves.

5.CLT prompts the development of learners' spirit of team cooperation by means of the communicative activities and cultivates learners' individuality by expressing their different views and ideas freely in the conversational interactions between them.

Additionally, through the observation of the English lesson, the writer thinks that CLT makes great demands upon the professional skills and competence of teachers. CLT teachers need to have other abilities as well as the proficiency of target language, such as organizing ability, insight into learners. Therefore, it is recommended that second language teachers should enhance their standard in order to improve the effects in practical teaching.

However, languageitself is not only individual lexemes put together, but it is necessary to followa set of grammar rules to assure correct comprehension of speaker's intention.

Therefore, vocabulary together with grammar rules acquisition playssignificant role in foreign

language teaching. The purpose of research paper is to find out the appropriate principles and methods for teaching vocabulary.

In conclusion,we can say that teachers should prepare themselves for the following principles and methods of teaching, only in this case foreign language training will be more efficient. Changes are quick and inevitable. The need to teach English language effectively in particular is in some case a challenge for most of the teachers. Today, it has become mandatory for the educators to rethink and revamp their teaching strategies with the changing times.

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THE SIGNIFICANCE OF UZBEKISTAN RAILWAYS IN THE FORMATION OF ITC "EUROPE - ASIA"

Abstract: *In modern conditions meet the needs of consumers by introducing new economic mechanisms are urgent issues of railway transport development. The development and modernization concept of rail transport technology foresee the expansion of the logistics in the transportation process. In this context, this research work is devoted to investigate the carrying capacity of the railway section Andijan-Tashkent transcontinental corridor between Europe and Asia, and its development.*

Key words: *development Concept, modernization, railway transport, Europe and Asia.*

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Introduction

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In the context of international cooperation and the deepening the integration process formation of **international transport corridors** (later ITC) has a leading role in solving the traffic problems associated with the provision of international economic, cultural and other connections, the desirability of establishing an international transport infrastructure, which has agreed technical parameters and provides application compatible transportation technologies as a basis for the integration of national transport systems in the world transport system. It is international relations led to the further development of logistics approaches to transport system, which resulted in the creation of transport corridors on the most important directions of movement of goods and passenger flows.

The railway is an important element of an integrated transport system in our country. They carry a large amount of transportation work, providing a reliable and cost-effective transport links between major economic regions and centers of the country. On the share of railways accounts for more than half of the total turnover and more than a third of passenger traffic.

Uzbekistan is the flatland country, needs access to the ports of the Black Sea, the Baltic Sea and the Persian Gulf. Output ports provide international transport routes in neighboring countries. Uzbekistan Railways are also treated as ITC link.

An important role in this link belongs to a new electrified railroad Angren-Pap. In this regard, research freight corridor ability Tashkent-Andijan, its capabilities in the implementation of transit transport in the direction of Europe and Asia, its further strengthening is important.

The total length of railways in Uzbekistan is 4400 km., 600 km of them are electrified. The country share of railway transport is 75% of foreign trade freight traffic and 66% of turnover.

The annual volume of freight traffic is 65 million tons and turnover is 20 billion tons / km. Annual growth in freight volumes is 15%.The structure of the international freight transport comprises:

- export 27%;
- import 28%;
- transit 45%.

Geographical distance from Uzbekistan's major maritime communications centers makes it difficult for the growth of the national economy. Dependence

on transit countries entails high cost of transportation and prevents the full development of transport, transit and export potential of the country. It was and remains the development of new transport corridors in all geographical directions in this regard, one of the main priorities of the strategy for social-economic development of Uzbekistan. And if at the beginning of the 90s of Uzbekistan used only 3 routes of export-import cargo, at the present time there are at least 6 different directions. At the same time in recent years there has been a significant reduction in the use of traditional transport corridors that ran in a northerly direction on the territory of Russia and Kazakhstan (mainly to the ports of Latvia) and decreased the volume of cargo transportation through the Ukrainian ports and border stations. Uzbek exporters use the Iranian port of Bandar Abbas, the path to which runs through Turkmenistan.

However, the route is not popular because of the state border crossing difficulties. It is advisable for Uzbekistan if it will focus on the shortest way to the sea through Afghanistan to the sea ports of Iran and Pakistan to the Indian Ocean. The route through Afghanistan is shorter than already used routes to the ports of the Black and Baltic Seas is more than 2 or 3 times, respectively, and nearly 5 times shorter routes to the ports of the Pacific. In addition, according to preliminary calculations, the total income of the Uzbek side to participate in the implementation of projects in the sphere of transport communications in Afghanistan could reach more than 100 million dollars. Table 1.1 summarizes the main transport corridors used by the Republic of Uzbekistan.

Table 1.2. Main transport corridors used by the Republic of Uzbekistan

Destination	Transit countries	Distance km
Far East ports of Russia	Kazakhstan	8 610
The north-eastern areas of China and south Korea	Kazakhstan, Russia	7 160
The western and central regions of China, the ports in eastern China	Kazakhstan	6 402
The Baltic states	Kazakhstan, Russia	3 849
Port of Mersin in Turkey	Turkmenistan, Iran, Turkey,	3 800
Ukraine and Belarus, countries of Eastern Europe, ,	Kazakhstan, Russia	2 978
Port of Ilyichevsk, Ukraine	Kazakhstan, Russia	2 964
Trans-Afghan corridor to the ports of Iran	Afghanistan	2 176
Turkey and Europe through the railways Baku-Akhalkalaki-Kars	Turkmenistan, Azerbaijan, Georgia, Turkey	2 158
Southeast Asia, the Persian Gulf and India through Bandar Abbas port in Iran	Turkmenistan, Iran	2 109
Trans-Caucasus corridor to the ports of Poti and Batumi	Turkmenistan, Azerbaijan, Turkey	2 025
Western China through the railways of Andijan-Osh-Kashgar	Kyrgyzstan	439

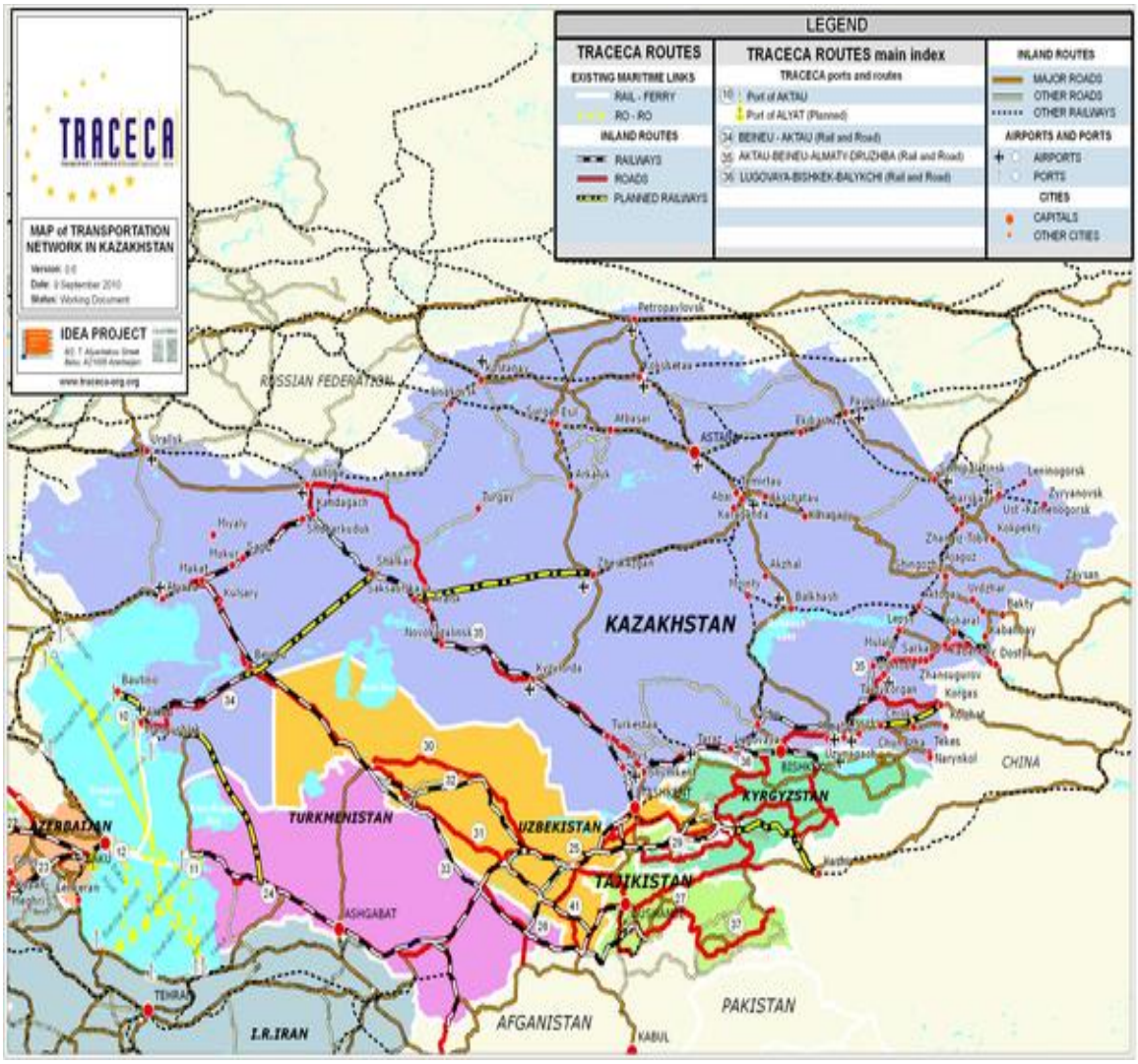
Uzbekistan welcomes the development of international transport corridors, which are designed to ever connect Central Asia with the ports of the Persian Gulf and the Baltic Sea. During the past four years, the Uzbek government has spent a lot of investment in the construction of transport infrastructure and plans to further develop relations with foreign partners. Uzbekistan's market for freight traffic is growing, requiring more infrastructures for functioning. Transport services and freight - is 9% of the GDP of Uzbekistan. But over the last 10 years the volume of freight traffic increased 2 times. Uzbekistan is located in Central Asia, it has an ideal position to profit as a mediator in international traffic. Uzbekistan constantly works under integrating their routes in international transport communications. This can be seen in the Trans-Afghanistan route from Afghanistan to the Persian Gulf, one more corridor to the west of East Asia through Kyrgyzstan and Uzbekistan, and the other from Uzbekistan to Oman. All three corridors pass through or originate in Uzbekistan.

In addition, the territory of Uzbekistan as transit routes of these transport corridors as "Europe-Caucasus-Asia", the so-called TRACECA transport corridors within the framework of the Central - Asian Regional Economic Cooperation, as well as a highway of international importance Eurasian corridor E - 40 and other destinations .

For the first time TRACECA program was initiated at a conference held in Brussels in May 1993

with the participation of trade and transport ministers from 8 countries: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The participants of the conference adopted the Brussels Declaration, which laid the foundation for the implementation of inter-regional technical assistance program "TRACECA", financed by the European Union for the development of a transport corridor from Europe through the Black Sea, the Caucasus the Caspian Sea with access to the Central Asian country. In the period from 1996 to 1998 joined the program Ukraine, Moldova and Mongolia. In March 2000, at the first meeting of the Intergovernmental Commission in Tbilisi, Bulgaria, Romania and Turkey officially appealed to the European Commission concerning the accession to the TRACECA program, and as a result have become members of the "Basic Multilateral Agreement on International Transport for Development of the" Europe-Caucasus Asia "(OMC). In July 2009, to the MLA TRACECA joined Islamic Republic of Iran and by the end of the Seventh Meeting of the IGC TRACECA June 16, 2009 the Republic of Lithuania was granted observer status in the TRACECA Intergovernmental Commission.

These transport corridors are important for the economy of Uzbekistan, as it is carried out by transporting the bulk of export cargo. The most active by far used transportation corridors to the Iranian port of Bandar Abbas in the southern direction and the Georgian port of Poti in western direction. First of all, transport corridors are characterized by different physical and economic parameters such as length, time of delivery, and most importantly the cost of transportation. These two directions in its complex parameters are now more competitive in comparison with other existing transport corridors.



Pic 1. Map of international transportation routes of Kazakhstan.

In the near future, residents and guests of the republic of Uzbekistan, traveling in the Ferghana Valley will have a worthy alternative of using air transport or highways. The final stage includes a project to build a railway line Angren-Pap with a unique tunnel. Construction of an electrified railway line "Angren-Pap", which connects the east with the system of Uzbekistan and Kyrgyzstan, the Chinese railways. The new steel pipe, in addition to the fact that the complete creation of a single railway network and open up interesting possibilities in the field of transit, will favorably influence the further development of the economic potential of the three most populated areas of Uzbekistan, will allow several times to increase the volume of passenger and freight traffic, significantly reduce travel time .With the commissioning of the new line will not only be connected to the area of the Ferghana Valley with the central part of the country, and thus completing the formation of a unified railway transport system in Uzbekistan. In addition, this site will be an important link in the international transit corridor China - Central Asia - Europe.

Pic 1.2. Type of tunnel

Chinese companies have already calculated how much more profitable to use the railroad instead of sea or air routes when transporting their goods to Europe.

Pic 1.3. Map of railways in Tajikistan

This railway will reduce the dependence of Uzbekistan from Tajikistan. Now Tashkent needn't to transit through the territory of a neighbor. At the same time Uzbekistan become stronger position in relation to the Kyrgyz Republic. What does the construction of the railroad Angren - Pap for Uzbekistan itself and its neighbors? Let us see from a different perspective:

In conclusion It should be noted that. Uzbekistan eliminates transportation isolation of his part of the Ferghana Valley. Earlier on Uzbek territory to Tashkent could come only by road through the pass Kamchik, now parallel to it there is a railway that does not so much depend on the weather in winter. Also, if earlier Uzbek trains were forced to walk from Bekabad to Kokand through Tajik Khujand, now it is not. In general, the completion of the railway meant a sharply improvement of transport connectivity Uzbekistan. From a geopolitical point of view railroad reduces dependence of Uzbekistan on Tajikistan. Now Tashkent needn't any transit through the territory of a neighbor. At the same time the position of Uzbekistan become stronger in relation to the Kyrgyz Republic.

Uzbekistan may at any time to transfer a large number of troops in Ferghana Valley through this railway eliminate any problems, both internal or with its neighbors. This increases the political stability of Uzbekistan.

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QR – Issue QR – Article

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TYPOLOGICAL CLASSIFICATION OF DICTIONARIES

Abstract: *Dictionary explains the meaning of either information about the described words or their translation in different languages; every dictionary serves a clear purpose. General purposes of monolingual, bilingual, and multilingual language dictionaries are derived from the communicative and cognitive needs of the society. In this article, we discuss compared typological classification of the dictionaries offered by majority of scholars.*

Key words: *dictionary, monolingual, bilingual, multilingual, compare, typology, classification, language,*

Language: *English*

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Introduction

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French philosopher Voltaire defines the dictionary as "the universe in alphabetic order". The scholar Landau offers the following explanation of the term: "a dictionary is a text that describes the meanings of words, often illustrates how they are used in context, and usually indicates how they are pronounced". He says that modern dictionaries often include information about spelling, etymology, usage, synonyms, and grammar, and sometimes include illustrations as well (Landau, 2004). Such "classical" view of dictionaries was criticized by Yong and Peng, who found the definition of dictionary as "a wordlist or a wordbook providing information about orthography, pronunciation and meaning of words in a language" to be narrow (Yong and Peng, 2007). The dictionaries were classified by many lexicographers. Scholars give different criteria on the basis of which dictionaries can be classified. One of the most obvious typology of dictionaries was offered by Ilson Rey who distinguished between four major kinds of dictionaries: a) monolingual, linguistic dictionaries, which can range anywhere between short, simple synchronic learner's dictionaries and vast cultural, often historical descriptions; b) bilingual and multilingual general dictionaries; c) terminological works involving one or several languages; d) ethnographic dictionaries (Ilson,1986).

Materials and methods

According to Malkiel, dictionaries are classified based on three categories: range, perspective and presentation: the category of range primarily covers the questions: how well does the dictionary cover the entire lexicon? And how many numbers of languages are covered (whether it is monolingual, bilingual or multilingual) and what is the extent of concentration on lexical data; the category of perspective is based on how the compiler views the work and what approach is taken. The key issue is to distinguish between diachronic (covering an extended time) and synchronic (focused on one period of time)

approaches and the organization of the dictionary: whether it is organized alphabetically, by sound, by concept, or by some other means. (Malkiel, 1968). According to Landau, the category of presentation offered by Malkiel is concerned with how material of a given perspective is presented. This category deals with the problem of completeness of definitions. For instance, explanatory dictionaries tend to have fuller definitions than bilingual dictionaries. Furthermore, the category of presentation also deals with the form of verbal documentation employed. Forms of verbal documentation may include cited quotations, invented phrases, bibliographic references, etc. (Landau, 2004).

Crystal suggested that there are certain elements ever present in the dictionary entry, on the basis of which systematic comparison between different dictionaries. These elements are as follows:

1. An abstract definition;
2. An illustration of its use from the reader's language;
3. An illustration of its use from other languages;
4. An amplification of the definition or some of its terms;
5. An account of its historical provenance or current theoretical status;
6. An evaluation of its significance;
7. A list of historical sources or corpus citations (Crystal, 1997).

Another typological classification of dictionaries was offered by Arnold who distinguished between unilingual and translation (bilingual and multilingual) dictionaries. Unilingual or explanatory dictionaries are further subdivided with regard to the time into diachronic and synchronic dictionaries (Arnold, 1986:272).

Diachronic dictionaries display the development of English vocabulary by recording the history of form and meaning for every word registered, whereas synchronic or descriptive dictionaries are concerned with the present-day meaning and usage of the words. (Arnold, 1986:273). Moreover, Arnold states that both bilingual (or multilingual) and unilingual dictionaries can be subdivided into general and special. General dictionaries usually present vocabulary as a whole, they bare a degree of completeness depending on the scope and bulk of the book. A fine example of general dictionaries is "The Oxford English Dictionary". According to I.V. Arnold general dictionaries often have a very specific aim, yet they are still considered to be general due to their coverage. Examples of such dictionaries may include frequency dictionaries or even rhyming dictionaries (Arnold, 1986:273). Furthermore, general dictionaries are often compared to special dictionaries that aim at covering only a certain specific part of a vocabulary. Special dictionaries may be further subdivided according to certain criteria. First of all, according to the sphere of human activity in which words covered by a dictionary are used (Cf.: technical terms). What is more, these dictionaries can be classified according to the type of units themselves (e.g. phraseological dictionaries) and relationship existing between words may also be used as a criterion for classification (e.g. dictionary of synonyms).

The last pattern of classification was offered by Arnold that suggested division of dictionaries into linguistic and non-linguistic. Arnold states that non-linguistic dictionaries give information on all branches of knowledge and are also known as the encyclopedias. Encyclopedias deal with concepts rather than words. Whereas, linguistic dictionaries deal with all the possible aspects of lexical items, including spelling, pronunciation, categorical features, semantics, etc. (Arnold, 1986:274).

Tekorienė & Maskeliūnienė offer a following typological classification of English dictionaries. First of all, distinction can be made between dictionaries that are arranged alphabetically and dictionaries that follow semantic arrangement pattern. From the point of view of typological classification, dictionaries can be divided into general and restricted dictionaries. (Tekorienė, Maskaliūnienė, 2004).

Landau offered a model of typological dictionary classification based on the following characteristics:

1. *Number of languages***.** According to the number of languages used in the dictionary, monolingual and bilingual dictionaries could be distinguished. Furthermore, bilingual dictionaries can be unidirectional (monodirectional) or bidirectional; that is , they may go in one direction only, from English, let us say, to French, or be combined with another dictionary that goes from French to English. There are also dictionaries in which the entry words are translated into two other languages (trilingual dictionaries) or more than two other languages (multilingual dictionaries).

2. Variety of English. English dictionaries vary according to the variety of English they represent. For example: Dictionary of American English, A Dictionary of Canadianisms, The Australian National Dictionary, Dictionary of Jamaican English, etc.

3. *Primary language of the market.* Monolingual dictionaries differ in the primary language of their intended users. Some monolingual dictionaries are intended for native speakers of English, and others are designed for foreign learners, a market thatis divided pedagogically into English as a second language (ESL) and English as a foreign language (EFL).

4. *Form of presentation***.** Dictionaries and other language reference books differ in the manner in which access to their information is provided, especially as to whether their word list are arranged alphabetically or thematically, and, allied to this, whether they are produced in books or exist in electronic form.

5. *Manner of financing***.** Dictionaries differ in how they are financed and in the expectation of profit. Scholarly dictionaries are usually funded by

government agencies or foundation grants in addition to university support, supplemented by individual donations, and are not designed to make money for investors. Whereas commercial dictionaries are supported by private investors who expect to make money.

6. *Age of users.* Dictionaries differ in the age of the intended user: some are aimed at children, others at adults.

7. *Period of time covered.* Dictionaries differ in the period of time covered by their lexicons. Diachronic, or historical, dictionaries deal with an extended period of time with the chief purpose of tracing the development of forms and meanings of each headword over the period covered. Synchronic dictionaries, on the other hand, deal with a narrow band of time and attempt to represent the lexicon as it exists or existed at a particular point in time.

8. *Size***.** Dictionaries differ in how fully they cover the lexicon.

9. *Scope of coverage by subject.* Dictionaries differ in scope in respect to the subjects they cover. Here we can make a distinction between general dictionaries, special-field dictionaries, subject-field dictionaries, etc.

10. *Limitations in the aspects of language covered*. Dictionaries differ in scope in respect to the aspect of language covered. This allows us to speak about special-purpose dictionaries (Landau, 2004).

The classification models offered by above mentioned scholars were further investigated and compared typological classification of dictionaries by many contemporary linguists.

The first person to approach the problem of typological classification of dictionaries in Russian language was Scherba. He offered typological distinction of dictionaries based on six kinds of opposition between them (Scherba, 1974).

1. Academic dictionary – glossary. According to the author academic dictionary was seen as a regulatory dictionary describing lexical system of a given language. It must not have any facts that would contradict synchronic usage of the words in the language in question. Glossaries, on the other hand, may include a wider variety of words that may sometimes cross the borders of regulatory literary language.

2. Encyclopaedic dictionary – general dictionary. The opposition between these two dictionaries is, according to the author, misleadingly obvious. The author focused on the problem of the semantic component of proper names, and whether they had to be included into the general dictionary. It was stressed that encyclopaedic dictionaries were the ones that included most information concerning proper names and terms.

3. Thesaurus – general (explanatory or translational). The scholar stated that any dictionary fully covering words that were used in the language in question at least once could be referred to as thesaurus.

4. General dictionary – ideological dictionary. According to the researcher, the concepts in the ideological dictionary should be arranged in such a way that they reflected their relationship.

5. Explanatory dictionary – translation dictionary. Explanatory dictionaries, as stated by the author, appeared in order to either be applied to a particular literary language, or to regulate the language (e.g. French Academic Dictionary), whereas translation dictionary emerged from the need of translating one language into another.

6. Non-historical – historical dictionary. A fully historical dictionary, according to the author, gave information on the history of all the words in a particular period of time. Such dictionary included not only the information on the birth of new words, but also on the “death” of words or change in their linguistic features (Scherba, 1974).

Conclusion

A brief outline of the compared typological classification of dictionaries of this article enables the following conclusions: the typology of dictionaries were classified by many lexicographers that most of them distinguished between four major kinds of dictionaries: a) monolingual, linguistic dictionaries, which can range anywhere between short, simple synchronic learner’s dictionaries and vast cultural, often historical descriptions; b) bilingual and multilingual general dictionaries; c) terminological works involving one or several languages; d) ethnographic dictionaries. This typology is more appropriate for English dictionaries.

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QR – Issue QR – Article

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THE PORTRAYAL OF WOMEN IN EASTERN AND WESTERN LITERATURE AND THEIR ROLE

Abstract: *As far as we know, the role of women in science, literature, politics and in other fields is quite prominent today. The role of women is being promoted not only at the present time, but also they also contributed a lot in the eastern and western literature. We can point to the women such as Jahonotin Uvaysi, Nadira, Zulfiya who were famous for their true masterpieces in the scientific literature. The portrayals of women were vividly described through songs, poems, ghazels in the eastern and western literature. In this article, I shall discuss the role women in poetry as the feminine soul is important factor in the literature.*

Key words: *world literature, poetry, ghazals, dominant feudal lords, feminine excellence, eastern and western literature, love, human rights.*

Language: *English*

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Introduction

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We know that many of the best representatives of world and Uzbek poetry are women. Nadira, Jahonotin Uvaysiy, Zulfiya whose great literary works are great examples for us. These poetesses made a significant contribution to the development of literature and art. We do not know enough information about the life of Jahonotin Uvaysiy, however, it is not difficult to comprehend her life experiences through her poems.

Uvaysiy concludes that her time was a prison for women, she says:

"Bu kun rizo bo'luram o'lmakimga, ey oqil". (Uvaysiy, Devon 1963,p 12)

Meaning: *Hey wise man, I will agree to die for this day.*

In this poem, the poetess expresses her "agreeing to death" on behalf of the oppressed women, as the women were treated poorly at that time. Despite being deprived of human rights and living in captivity for the rest of their lives, she contributed greatly to the development of literature. This is an evident in her works.

"Uvaysiy nola qilma, shodlig' o'rniga g'amdur deb,

Bu dunyo mo'miniga qulli zindondir, nechuk aylay" (Uvaysiy, Devon 1963,p 12)

Meaning:

"Uvaysiy, Do not lament, but grief instead of joy,"

The believer of this world is a dungeon. " (Uvaysiy, Devon 1963,p 12)

"These ideas can be found in almost all poems of Uvaysiy whose poems also echo the pure heart of mother's love, human love, kindness, and hatred for tyrants.

For example:

"Ko'zim sarchashmasidin dam-baland obi ravon jori,

Nechukkim ul sitamgardin manga jabri nihon jori.

Ko'ngulga qoni tamkin o'ldi obi zamzamidekkim,

Anningchun zohid ahlin ko'ngli soridin gumon jori". (Uvaysiy, Devon 1963,p 12)

Meaning:

"Fluid flow of my eyes,

What a sad man!

The blood of the soul has died from the smoke;
For the sake of the unaware,
it is a question of suspicion" (Uvaysiy, Devon 1963, p12)

Uvaysiy's poems surpassed those of the poets of the Kokand Khanate Palace in terms of ideological and artistic superiority. " (Uvaysiy, Devon 1963,p 12)

It is clear that even in these tombs, despite the feudal system, women's scientific creativity was much higher than men. Uvaysiy was one of the most prominent poets of the 19th century in Kokand literary environment. Her poems have been considered a factor in the people's life, because they would not be without the poetess' work at weddings, holidays and other mass gatherings. Specifically:

"Zaboningni keturgil, ey sharaqlab, to'ti guftora,
*Nechukkim marhamat bo'lsin necha mendek dilafkora" (*Uvaysiy, Devon 1959, p5)

Meaning:
"Get off your tongue, you roaring and dangling,
*No matter how sorry I am… " (*Uvaysiy, Devon 1959,p 5)

This beautiful ghazal was composed by Uzbek singers. In addition, Nadira who was one of the prominent figures as Uvaysiy of that time. Both poetesses were close friends. Nadira's works are not difficult to understand. For example:

"Bu chamanda, ozor gulidan boshqa gul hargiz unmade,
Bu gulzorda bitta ham rohat guli unmadi.
Bu past dunyo bir uyda har kuni yuzta kasalni o'ltirdi,
Yuz bemor iloji uchun bitta ham tabib kelmadi." (Nodira, Devon 1971, p 203)

Meaning:
"It has never blossomed except flowers,
Not a single flower blossomed in this flower garden.
This low world puts a hundred sick people in one house every day,
Even a doctor did not come to a hundred patients for a feasibility. "
(Nodira, Devon 1971, p 203)

Another great representative of the literary genius is Alisher Navoi. The poet's work is mainly devoted to love.

"Tushimga kirdi jannat ichra huri, to'biyu kavsar,
Magar kuyida topqum orazu, qaddi labidan bar.
Men ettim ishqi tarkimhamul etti vaslidin va'da,
Ne andindur manga bovar, ne mendinduranga bovar." (Navoi, I did not find, 1975 p 131)

Meaning: *"In the garden of Paradise, in the garden of the garden,*
Except for my dream and my lips.
I promise to love seven orphans,
What a say, and what you can believe in." (Navoi, I did not find, 1975 p 131)

Novoi's works provide a clear indication of the human nature. His highly written ghazals dedicated to expressing "love for woman".

Bag'rimni tig'i hajr ila pora qildilar,
To yor kuyidin meni ovora qildilar.
Butgudek erdi vasl to konglim jarohati,
Hijron qilichi birla yana yora qildilar
Meaning:
"They brutally bribed my luggage,
I was worried about my fiance.
As with a deadly wound to my heart,
The Hijran sword struck him again. " *(Navoi, I did not find, 1975 p 131)*

"The poetry of Navoi describes pure and sincere love and devotion are expressions of loyalty and friendship, compassion and affection, love for the people, homeland, love for humanity, human beauty, human beauty and dignity.

"Olamu odam fidoing o'lsinki borsen, ey habib,
Sen g'araz insondin, al olamdin insondur g'araz" "(Navoi, I did not find, 1975 p 131)

Meaning: Let the world go to death, oh dear one,
You are a woman of prejudice, a woman of every kind.

As we all know, scientific issues concerning women are not left unnoticed by world literary scholars. A striking example : Annemarie Shimmel who is one of the famous German literary critics. Despite being of German woman, she created beautiful works of Islamic women. She deserves a great praise, as the Muslim women were adequately reflected in her works. One of these works is "Janon is in my soul." (Shimmel 1999). Ms. Shimmel says: "In order to properly understand Muslim women's issues, one needs to look at their literary activity. A large collection of women's poems and ghazals can be created". (Shimmel, "Janon is in my soul, 1999 p 8). I would like to cite an example of the poems of the poetess Sanoi, who died in Ghazna in 1331.

"Qizlar, juvonlarga to'la bu dunyo,
Ammo Hayrinuso Fotim qayda?"
Meaning: *"Girls, this world is full of women,*
But where is Hayrinuso Fatima?

Obviously, the title " *Hayrinuso* " meant "the best of women," was granted to Fatima, later this rank was given to Khadija who was a daughter of Fatima" (Sheikh Muhammad Sodiq Muhammad Yusuf . p24]

There are many hadiths and hadiths about the believing women of the Quran. The Prophet (peace and blessings of Allah be upon him) said: "Whoever believes in Allah and the Last Day should not oppress his neighbor and always do good to women as they were created from the ribs. The most curved part of the rib is the upper part. If you try to fix it, you break. If you leave it, it will remain curved. " Sheikh Muhammad Sodiq Muhammad Yusuf , Happy family 2002, p 224]

In another narration, “a woman is created from a rib. It does not stand in the way of you. If you enjoy it curiously, you enjoy it. If you try to fix it, you will break. His fracture is a divorce. ” (Sheikh Muhammad Sodiq Muhammad Yusuf , Happy family 2002, p 225). It is clear that a woman is respected and accepted as much as possible. It is also believed that the first woman, Eve, was created from Adam's crooked ribs. The great German poet Johann Wolfgang Goethe was fascinated by this story.

"Don't oppress women, be cruel,
They are the ones made of crooked ribs.
Oh, God created them so
If it breaks, try to fix it.
If you leave it alone,
it will bend to you,
Son of Man. make your own choice.
Fight, even if they attack you.
If it does not crack, just fry it. ” (Shimmel, "Janon is in my soul, 1999 p 29)

Conclusion

To conclude briefly, most of the poems and ghazels of women in Eastern and Western literature are currently being carried out by young literary scholars. The poems and ghazels of women's peninsula show similar and different views. I would like to conclude with the following narration from the German scientist Annemarie Shimmel's work "Janon in My Soul". It has been reported that the Prophet (peace and blessings of Allah be upon him) said, "I saw that the majority of the inhabitants of Hell are women."

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THE MAIN PSYCHOLOGICAL CHARACTERISTICS OF LABOR POTENTIAL

Abstract: *The article investigates the psychological factors of the labor potential of the enterprise.They prefer to recruit staff from outside, which helps in closing of short-term goals, which leads to doubts on the possibility of further improving the dynamic of company. The theoretical aspect highlights the phenomenological description of the structure and psychological model of labor interests. The practical aspect proves the relevance of the influence of the workers' labor interests on their labor activity and productivity. Sound approach to the development of internal staff and using of their best qualities in the work, will certainly lead to the successful development of organization in the future.*

Key words: *labor potential of the organization, the formation of professional capacity, capacity building within the organization, the potential of employees.*

Language: *English*

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Introduction

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Economic growth of any business entity primarily is due to labor potential (LP) as an integral part of the economic potential. Labor potential, with one parties - this is an integral characteristic of the able-bodied population, and on the other hand, it is very important and an integral part of human potential (HP). The social essence of man allows him to transform not only the natural environment in order to provide more optimal conditions of his life, but also of himself.

At the same time, a person as a social being receives the opportunity to be realized in labor activity, in social activities, in family life, and each a person, being a person, has his own inner the world. It is personal characteristics that determine the potential person. Accordingly, the realization of its potential occurs in working, social and family life. In other words, initially of course, in the socio-economic development of society the main role is played by labor, which "represents appropriate human activities

aimed at production of goods and services related to mental and physical effort and acts as unique factor production process ”[14, p. 17]. Moreover, “the goals of labor activities are set by society ... the needs of society form, define, direct and regulate” [16, p. 23]. In relation to labor activity, the human life cycle can conditionally be divided into three stages: pre-labor, labor and post-labor. Age limits of working age established by state legislative acts and historically, as socio-economic changes conditions, these boundaries also changed. It should be emphasized that the working ability of citizens is associated with above age conditionally, because, despite the fact that Uzbek law sets a lower age limit for employment, under certain conditions, people can work from 14 years. Persons with a certain disability which can be allowed to work depend on the state of their mental and physical health, as well as abilities and skills.

Methods and materials

General disability is a person’s ability to perform work under ordinary conditions that does not require special training; Professional - the ability to perform work on specific profession (position). Sometimes doing professional responsibilities occurs in production deviating from normal conditions, for example, in special climatic conditions, in such cases more than just professional and special disability. At all stages of the life cycle, a person has human potential, an integral part of which is labor potential. The emergence of the term "labor potential" is associated with the fact that the 1970s. in economically developed countries, man has become be considered as a subject with its own needs and interests in the world of work, and to characterize a person as labor resources and labor, began to use the term “labor potential". In the domestic scientific literature, the term “labor potential ”gained distribution in the 1980s and has various interpretations. Most often it is considered as combination demographic and socio-economic characteristics, as well as professional and physical qualities of the working population. The concept of "labor potential":

• Currently available and foreseeable in the future labor opportunities, characterized by the number of able-bodied population, its vocational and educational level, other qualitative characteristics [9, p. 354];

• These are specific workers, the degree of possible use of which in production is known [15, p. 37];

• is a concept that includes both implemented and unrealized opportunities of human resources from the point view of social production [14, p.18].

The labor potential of an individual worker is “ his possible labor capacity, his resource opportunities in the field of labor ”, which during practical activities are often not fully utilized. Since the labor collective of the enterprise is occupied by him workers, then "under the labor potential of the enterprise implies his total labor capacity collective resources in the field of payroll the composition of the enterprise, based on their age, physical abilities, available knowledge and professional qualifications ”[5, p. 94].

In this aspect, labor potential human characterizes a qualitative assessment of the intellectual and physical abilities of the individual, as well as the level of development self-awareness and moral qualities in relation to labor human activities.

The labor potential of the employee (person) is the initial structure-forming unit of labor potentials of higher structural levels (enterprise, region, etc.) and includes both realized and unrealized possibilities of human resources in terms of social production [16]. The labor potential of an individual employee has only quality characteristics.

The concept of "mental development" includes both the features of the intellectual sphere, and so the personality as a whole. It should be noted that intelligence is an individual characteristic of a person, which is largely due to its biological (congenital) features and characterizes its ability acquire new knowledge and solve diverse intellectual tasks. In the framework of the problem under consideration the intelligence of a particular employee can be represented in the form of his intellectual potential successful performance of specific professional duties. Personality is a social characteristic of a person. Within the problem under consideration, personal potential characterizes, first of all, the possibility of successful adaptation of a person to specific social conditions of professional activity. The psychological potential should include both individually psychological and personal characteristics of the employee. Among these characteristics include: mental health and level of mental development (including intellectual development and personal adaptive potential), features worldview and motivation. It should be noted that the definition of mental health criteria is one of the complex problems of philosophy, sociology, psychology, medicine [8, p. 301]. In relation to labor potential employee's worldview includes the level of civic consciousness (i.e., understanding of socio-political processes, basic civic values) and professional ethics (first of all, the degree of mastering the norms of attitude to work). Each individual person is an individual, because it has a unique combination of physiological and personality traits. That is why people do the same work perform with varying degrees of success. It should be noted that for successful professional activity a person must possess relevant qualities that to one degree or another characterize the level of development of the above potentials. AT psychology, these qualities are called professionally important qualities (PIQ). In all likelihood, in assessing the labor potential of a person

as an employee of an enterprise, one should analyze the conformity of the requirements of the profession to the level development of professionally important qualities of the employee who determine the possibility of successful work. In psychology, understanding is widespread.

Categories of "ability" are formulated by B.M. Teplov [11], who identified three main features of the concept of "ability":

• firstly, abilities are understood as individual psychological characteristics that distinguish one person from of another. In this case, one should distinguish abilities from properties in respect of which all people are equal;

• secondly, not the entire list is called abilities individual characteristics, but only those related to the success of any activity or several activities;

• thirdly, the concept of ability is not limited to the knowledge, skills or abilities that a person has developed in the course of life. As noted above, the labor potential of an individual employee is characterized by a combination of various qualitative characteristics. Qualitative assessment of the labor potential of an individual employee on the current stage can only be performed by specialists' psychological services. Labor potential of an enterprise (region, countries) is characterized not only by quality, but also quantitative indicators, such as the number of labor resources; distribution by profession, type of activity, territories, sectors of the economy; efficiency of use labor resources, the proportion of the economically active population in the number of labor resources, as well as the share of employees in economically active population, etc.

Conclusion

As a review of scientific sources has shown, most authors' assessment of labor potential focuses mainly on quantitative indicators, not considering that in conditions the transition of the economy to an innovative development path is profitable qualitative characteristics of the labor potential of the enterprise (region, country) are strategic advantages. In conclusion, it should be noted that only effective use of labor potential at all structural levels economics can create the conditions for socio-economic development.

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Contents

p.

88. **Malikov, R., Abdirashidova, G., & Abdirashidov, A.**
Numerical analysis solution of the problem bimolecular reaction. …….. 501-507

89. **Blagorodov, A. A., Bordukh, D. O., & Prokhorov, V. T.**
About improvement of the union of the orthopedist and producers of corrective means for reduction of pathological deviations of feet at children (message 2). …….. 508-542

90. **Zhanatauov, S. U.**
Cognitive modeling of dependence of quantities of its in apartments from changes in income and expenditures of population Republic of Kazakhstan. …… 543-555

91. **Khaidarova, R. S.**
Features of phraseologies of the German language. ……. 556-558

92. **Begasheva, S. N.**
Application of design methodology in German language lessons. ……... 559-562

93. **Ismatullayeva, I. I.**
Some ways of teaching vocabulary through interaction at the English lesson. …… 563-566

94. **Mamajanova, G.**
Effective methods of learning technical terms. ……. 567-570

95. **Mirakhmedova, Z. E.**
Communicative language teaching as the most effective way of teaching foreign languages. … 571-574

96. **Artikova, B.**
The significance of Uzbekistan railways in the formation of itc "Europe - Asia". ……... 575-580

97. **Gapporov, B., Vositov, V., & Ibragimova, G.**
Typological classification of dictionaries. …… 581-584

98. **Ismoilova, H.**
The portrayal of women in eastern and western literature and their role. ……. 585-587

99. **Muhtorov, I., Sultonaliyev, H., Boysunova, D., & Kosimova, S.**
The main psychological characteristics of labor potential. ……... 588-591

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