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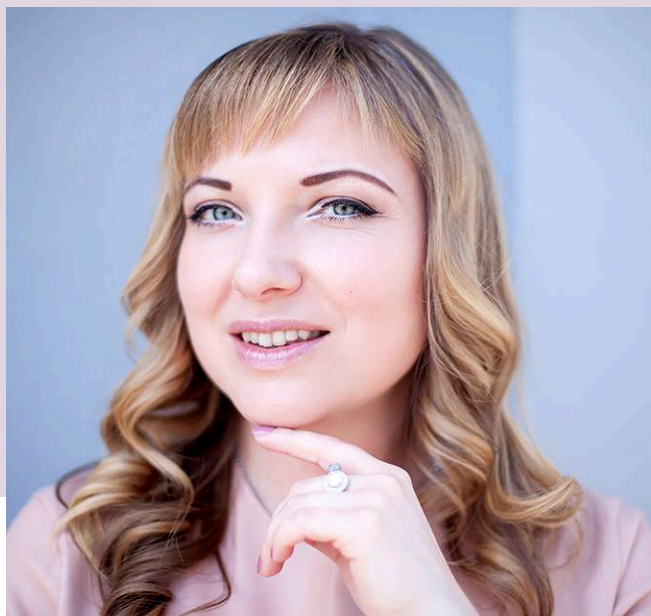
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**IN COOPERATION
WITH OUR MEMBERS:**





Digital devices and technologies have penetrated the social and professional life of people everywhere.

What are the implications of the digital transformation for education, especially vocational education?

How can new technologies help prepare professionals for a life in the digital world?

► The task of teachers today is not only to collect and provide relevant information about the opportunities and challenges of the modern world, but most impor-

tantly, to help students develop competencies for new jobs that do not even exist today.

Innovation requires that higher education institutions adapt the way they teach. Providing courses in the online format has become a mandatory attribute of any curriculum, especially in the vocational education. New technologies are transforming the learning process.

New scientific discoveries, technological changes, the emergence of innovative fields of activity occur at such an unprecedented pace that learning throughout life is no longer a choice but a moral imperative.

«Skills increase profitability,» says David Lister, a member of the Board of Directors of the UK innovation skills platform. Representatives of industry and government participate hand in hand in the work of this platform. Its goal is to help the UK citizens keep up with the necessary digital skills to stimulate economic growth. David Lister draws attention to the fact that 12% out of all graduates of technological universities remain unemployed six months after graduation. Thus, it is one more proof of the existence of a gap between the skills and competencies needed in the real sector of the economy and those the traditional education system can provide.

Therefore, it is necessary to constantly update skills and knowledge through participation in the distance learning and online courses, MOOCs, virtual learning networks. These formats allow make classes flexible, attractive, and more adapted to the needs of students. Students are no longer required to be in the classroom. They can watch video lectures whenever and wherever they are. Modern learning platforms allow students and teachers to interact with each other, upload and download study materials, complete assignments online, and much more.

Learning becomes a journey into the world of fascinating knowledge and new skills. At the centre of this journey, is a student. And teachers serve as conductors, facilitators, assistants.

The modern trend of lifelong education shows that the concept of professional development is not relevant anymore. Professional education takes its place. What is the difference between those two notions?

Professional development is often provided in a form of the traditional lectures or workshops that are designed to help professionals continue to grow in their careers. This is the format of passive learning. Moreover, traditional professional development implies providing information, while we know that active formats or learning with the use of innovative methods are paramount.

Professional education is based on the same ideas and goals as professional development. However, active and interactive learning strategies prevail over the passive development methods.

According to statistics of the CompTIA – The Computing Technology Industry Association, the use of digital technologies and methods in education can reduce time for understanding and mastering material up to 50% and increase the information retention time up to 75%.

Ekaterina Tsaranok

Director

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I. EDUCATION SCIENCES

BILDUNG DES GESUNDHEITSVERHALTENS DER SCHÜLER (10-14 JAHRE) IST DAS WESENTLICHE PROBLEM

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Die Inhaltsangabe

Die wichtige Aufgabe der Gesellschaft ist die junge Generation richtig, ehrlich und rechtmäßig großzuerziehen. Im vorliegenden Artikel werden die wesentlichen Problemen in der Bildung des Gesundheitsverhaltens der jungen Generation betrachtet.

Die Stichwörter: die Theorie der Werte, die Psychologie, die Integralumgebung, die medizinische Wissenschaft und Valueology.

► Die Bildung des Gesundheitsverhaltens in der Gesellschaft und die Gesundheit zu bewahren ist eine Nachfrage der Zeit. Diese Frage verlor die Aktualität zur Zeit nicht. Vom Anfang der 80-Jahre des XX. Jahrhunderts beachten die Gelehrten das Problem der Gesundheit. Mit diesem Problem beschäftigen sich viele wissenschaftliche Zweige: die Psychologie, die Pädagogik, die Medizin, Valueology. (die allgemeine Theorie der Gesundheit), die Physiologie und bei ihnen nach den Richtungen ist auch seine Positionen. Zum Beispiel, die Psychologie studiert die Besonderheiten der Bildung der Geisteswelt der Menschen, die Philosophie studiert die Weltanschauung, die Medizin studiert die Gesundheit, und Valueology. studiert die Bildung des Gesundheitsverhaltens.

In Zusammenhang damit, viele Gelehrten haben die wertvollen Meinungen über die Gesundheit.

Zum ersten Mal hat zur Wissenschaft das Wort «Die gesunde Weise» Psychologe I.I.Brechman beige-tragen. Der Autor hat gesagt, dass «das Wissen über die Gesundheit eine Integralumgebung aller Wissenschaften, und zwar der Ökologie, der Biologie, der Physiologie, die Theorie der Werte und der Pädagogik» sein soll [1].

Professor W.W.Kolbanow erklärt den Begriff «Gesundheitsverhalten» – «der Mensch soll nicht nur die Krankheit verhindern, sondern die Gesundheit bewahren, trainieren, auch soll, auf das Verhalten hervor-tun, soll die Bildung der wertmäßigen Bedürfnisse der Gesundheit beachten und in diesem Fall soll sich die Fertigkeiten auf das Leben bilden» [2].

Und zusammen damit betrachtete er ein Wesen des Begriffes «Die gesunde Weise», er hat die große Aufmerksamkeit auf die Bildung der Gesundheit mittels die Bildung auch gewandt. Er hat große Aufmerksamkeit zum Problem der Bildung in der Schule gewandt.

N.M.Amosow schrieb über das Gesundheitsverhalten viel, er hat betont, dass man die Gesundheit viel beachten muss, trainieren, er hat gesagt, dass «über die Krankheiten vieles schreiben, aber die Forschungen über die Wege seiner Behandlung ist sehr wenig» und er gibt seine Konzeption: 1) der Mensch ist von der Faulheit, von den schädlichen Gewohnheiten krank; 2) die Medizin behandelt die Menschen, aber nicht heilen; 3) im Menschenleben ist wertvollste nur die Gesundheit und sie kann von nichts ersetzen [3].

Der Psychologe A.N.Leontjew rechtfertigt seine Forschungen und betrachtet die Kategorien des Gesundheitsverhaltens getrennt:

- 1) «der Zustand des Lebens» – das System der Beziehungen der Menschen mit der Natur ändernd und soll mit der sozialen Umgebung, die Nutzung der moralischen und geistigen Werte, das Verhalten der Menschen die Bedürfnisse empfinden und, das Wesen des Gesundheitsverhaltens verstehen.
- 2) «das Wesen des Lebens» – die Empfindungen der Errungenschaft des Niveaus der Informiertheit und vom vollwertigen Leben zu leben;
- 3) «das Lebensstandard» – die Verbesserung der Wohnverhältnisse, die Befriedigung der materiellen und geistigen Bedürfnisse, das Werk und die Erholung zu verwenden;
- 4) «die Lebensweise» – in der Ausführung und der Befriedigung der sozialen Rolle der geistigen Seele;
- 5) «das Leben» – die Elemente der Bildung der lebenswichtigen Positionen und die Handlung des Menschen enthüllt in den natürlichen und historischen Situationen.
- 6) «die Lebenswichtigen Fertigkeiten» – die Energie, der Mensch die Fertigkeiten begriffen, die Handlung durch das Bewusstsein und das Verhalten haben.

Der Autor hat bemerkt, dass «das Gesundheitsverhalten» die Stelle im Leben zu wissen ist, den Wunsch zu leben und die Wege der Errungenschaft des Ziels zu finden. Nur verstehst du dann, den Sinn des Gesundheitsverhaltens, wenn das Wesen zu verstehen, das Niveau, den Stil des Lebens getrennt und im Laufe vom Tag in den Handlungen, so es wirklich zu verwenden und in die Fertigkeiten zu behandeln [4].

Professor A.S.Imangalijew hat das Gesundheitsverhalten wie den menschlichen Wert beachtet, sein moralisches Wesen aufgedeckt und hat gesagt, dass «man bevor den Jugendlichen über die Werte der Gesundheit, über die Sparsamkeit, über den Schutz der Gesundheit erläutert, muss den Zustand der gesundheitlichen Prinzipien» vertiefen [5].

Die obengenannten Kurzfassungen der Blicke der Gelehrten stimmen von unseren Blicken überein, dass die Gesundheit die Hauptwerte der Menschen ist. Tägliches Leben der Menschen, seine positiven Beziehung zur Gesundheit, das Alles heißt das Wesen der Gesundheit zu verstehen und bewusst zu sein, dass es die ersten Schritte der Medizin und Valeology sind. Nichtsdestoweniger, diese Prinzipien können je nach den Veränderungen in der Gesellschaft abwechseln.

So beachten wir die Begründung des Gesundheitsverhaltens der Reihe der Wissenschaften wie: die Philosophie, die Soziologie, die Psychologie, die Pädagogik, Valueology.

- Die Philosophie und die Sozialwissenschaften: «das Gesundheitsverhalten» ist der Wert des Lebens des Schülers, den sozialen Einfluss, beachtet die geistige Säuberung des Selbstbewusstseins der Schüler;
- Die Medizin und Valueology: «das Gesundheitsverhalten» ist das Herangehen an die Gesundheit, die geistige und moralische Welt der Menschen, die Harmonie physischen und gesunden Körpers der Menschen.

Die Psychologie und die pädagogischen Wissenschaften: «das Gesundheitsverhalten» ist der Reichtum der Innenwelt der Menschen (die menschlichen Qualitäten und das Werk), die Fähigkeit der Entwicklung der Fertigkeiten der wertmäßigen Normen des Verhaltens, die Gewohnheit, das Wissen und die Fertigkeiten notwendig im alltäglichen Leben.

Die Besonderheiten der Jugendlichen der 10-14 Jahre die Psychologen untersuchend schreiben in den Werken darüber, dass zu dieser Zeit bei den Kindern die Einbildung zunimmt, der Wunsch, ganz neu über die Umwelt zu erkennen, nimmt der Interessenbereich tagtäglich zu. Und der biologischen Wissenschaft schreiben darüber, was sich in diesem Alter (10-14) bei den Schülern die Geschlechtsreife entwickelt.

Die Forschungen die Gelehrten rechtfertigend haben bewiesen, dass in diesem Alter bei Mädchen die beschleunigte Geschlechtsreife, und bei den Jungen die Anfangsperiode der Reife stattfindet. In diesem Alter werden die bedeutenden Veränderungen im Organismus, der Veränderung der Blutdrüse, die Vergrößerung der Größe, der Hände, der Beine usw. die Ungestüme Größe des menschlichen Körpers unterscheidet sich vom physiologischen Standpunkt. In dieser Periode ändert sich (der 10-14) Körper des Menschen von allen Seiten. Diese Periode unterscheidet sich durch die normale Bildung der Körper des Menschen, aufmerksam die Anrede auf «die Bewegungen», der «Handlung» der Schüler. Folglich muss

man in Anbetracht der Altersbesonderheiten der Schüler «die aktive Bewegung» von 3-4 Stunden bis 5-6 Stunden deutlich organisieren.

Die Pädagogen untersuchend beachten den Schüler im Alter von 10-14 Jahren, die Veränderungen der Innenwelt, dem Verkehr mit der Umwelt und das Verständnis die Positionen unter den Erwachsenen. Die Jugendlichen nehmen zu Hause an den Haushalt teil und beobachten den alltäglichen Leben, damit entwickeln sie sich ihre Denken. Und deshalb hält sich die Jugendlichen für den erfahrenen, selbständig geltenden vollwertigen erwachsenen Menschen.

Diese Periode der menschlichen Entwicklung heißt die Reife der Kindheit oder das erwachsene Alter. In diesem Alter wird der Mensch schon kein Kind, aber er macht die ersten Schritte auf das erwachsene Leben. So versucht er sich vollständig, zu bilden und zieht die ganze Aufmerksamkeit auf sich heran. Zu dieser Zeit erscheint bei ihm die Begeisterung, und es ist der erste Schritt auf die Selbsterkenntnis.

Deshalb in diesem Alter vor dem Menschen steht die Frage «Von wer zu sein,» und «Welche zu sein»? Von diesem Moment beachtet er die Umwelt, bemüht sich schnell, erwachsen zu werden. So hilft das in dieser Periode bekommene Wissen und die Erziehung dem Schüler, die Fertigkeiten zu bilden, das Leben, die Gesundheit und die lebenswichtigen Positionen zu bewerten.

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METHODOLOGY OF PEDAGOGICAL MONITORING

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Abstract

This article describes the results of the earlier developed theoretical positions held in three stages from 2010 to 2015. For the pedagogical experiment it was necessary to identify a set of research methods, providing the scientific, objective and evidence-based validation of hypotheses, allowing us to prove the increase in the level of training in the field of computer science through the application of scientific and methodological support, including training complex, designed by taking into account the specifics of a particular specialty, guidelines, organizational forms and methods of training, aimed at the implementation of the design and components of communicative information and training activities.

Keywords: pedagogical monitoring, communicative information, training activities, pedagogical experiment.

INTRODUCTION

To achieve the objectives of the pedagogical experiment and test the assumptions in the 2010-2015 academic year, we used theoretical and practical methods such as the study and analysis of the psycho-pedagogical, educational-methodical normative literature on the subject of the study; the study of the content of the information resource of the Internet for educational purposes; the accumulation, analysis, systematization and generalization of experience of teaching, conducting of pedagogical experiment on testing of the main provisions of the research, questionnaires, observation, testing, analysis of experimental results using statistical methods.

The monitoring was conducted from 2010 to 2015 in three phases on the basis of the International educational corporation of the city of Almaty. The total number of participants in the experiment at all stages was 223 people, of which 202 students and 21 teachers, while 102 students are enrolled in the control group, 100 people were part of the experimental groups. For the experiment, we chose the group enrolled in the integrated programs, which are designed for specialties of HPE.

Experimental work was carried out during the whole of the research in three phases. In the first phase (2010-2012) *ascertaining experiment* was conducted.

The purpose and objectives of the ascertaining experiment identified his technique. In order to identify the initial level of training in informatics, study was conducted in the discipline assessments. According to the results of the preliminary study, it was concluded on the need to conduct the survey, which would more accurately determine the level of information preparation of students and teachers involved in the experiment, the results of the survey are presented in Table 1.

Table 1. The results of the input questionnaire to the participants of the pedagogical experiment

Possess complex knowledge and skills in the field of	know well		know partially		do not know	
	Control	Experiment	Control	Experiment	Control	Experiment
Automated data processing	10	12	65	67	25	21
System Software	11	13	64	66	25	21
Processing data using Microsoft Office applications	59	52	65	69	20	23
Using information retrieval systems	4	6	68	65	28	29
Means of communication, work on the Internet	10	8	72	73	28	29
Information Protection Organization	8	9	60	62	32	29

Analyzing the data shown in the table, we can conclude that most of the students in one and in the other group are equally familiar with the basics of computer science and information technology.

In the second phase (2012-2013) *formative experiment* was conducted. The goal – is development and assessment of the effectiveness of the use of the developed educational and methodical complex on the basis of the implementation of the activity approach to teaching science using MS Office applications.

Tasks:

- To prove the nature of the ultimate objective of the experiment and the ways to achieve this goal;
- determine the structure and content of the educational-methodical complex for the implementation of the activity model approach required for program and methodical support;
- develop teaching materials and to select the necessary materials;
- in the experimental and control groups, based on the input data testing, survey of trainees, record the experimental data (initial and final measurement); interpretation of experimental data.

Uptake factor is measured according to the following formula:

$$k_a = \frac{A}{R}$$

Where indicates the degree of success of assimilation by students of educational material, (A) – the number of correctly executed tasks, (R) – the total number of proposed training tasks. Assimilation rate (k_a) Can take values from 0 to 1. The learning process is considered complete, i.e. the student learned the knowledge to the extent sufficient for the subsequent improvement of their knowledge in the course of self-study, if the assimilation rate $k_a > 0,75$. When assimilation rate $k_a < 0,75$, the student will make systematic errors in follow-up and thus is not able to independently correct them (Galygina L.V., 2001). On the basis of the scale of the relationship of the results, we can assess the level of assimilation in the control and experimental groups, transferring the data to ordinal scale (Zeer E.F., 2003). We distinguish three levels of mastery of the material: Low) ($k_a < 0,75$), average $0,75 \leq k_a \leq 0,84$ and high ($k_a \geq 0,84$)

Indicators of *the level of development* of a constructive component of information and learning activities to assess the degree of development of skills and methods of operations needed to solve professional problems;

According to the results of input and final testing and implementation of practical work to make a comparative analysis of the results in the control and experimental groups.

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By the low level of training belong to those who could correctly answer the test questions 0-20. The middle level belongs to those who were able to respond correctly to the 21-25 test questions. For the highest level are those who answered 26-30 questions of the proposed test. By counting the number of students with low, medium and high assimilation coefficient, we obtain the results in the table below (Table 2):

Table 2. **The results of measurements of the level of training (cognitive component of information-educational activities) on the formative stage of the experiment**

The level of assimilation	The control group before the experiment	Control group after the experiment	Experimental group before the experiment	Experimental group after the experiment
Low	22%	16%	20%	7%
Average	28%	31%	30%	23%
High	50%	53%	50%	70%

Experimental data are statistical values that need description using descriptive statistics. For description of the results of measurements, it is possible to allocate the following indicators used for visual presentation and visual analysis of the results of measurements of experimental and control groups [3, 214];

Indicators positions describe the position of the experimental data on the number line:

- The maximum and minimum sample element (by which we mean the value of the test feature);
- Average (or arithmetic mean), calculated by formula:

$$M = \frac{1}{n} \sum_{i=1}^n X_i, \text{ where } \sum_{i=1}^n X_i, \text{ denotes the sum of the elements } \{X_i\} \text{ the index } i,$$

runs through a sequence of all the values from one to n : $n: X_1 + X_2 + \dots + X_n$

- Median value of the attribute in the right and left of which is the same number of sample units;
- Mode, the measured characteristic, which has the maximum number of sample units.

During the formative experiment we put forward a hypothesis: in the experimental group, the assimilation level of students in the field of computer science is higher than in the control group. In conclusion of the formative experiment to prove the hypothesis based on the data obtained for the indicators of level of assimilation of knowledge, the procedure of statistical analysis was carried out using statistical functions in Microsoft Excel, which data were obtained as shown in table 3.

Table 3. The results of statistical processing of test data

The statistical parameters	Control group before experiment	Control group after the experiment	Experimental group before the experiment	Experimental group after experiment
Average	0.696	0.712	0.702	0.787
Median	0.705	0.71	0.71	0.8
Mode	0.83	0.7	0.7	0.8
Standard deviation	0.158	0.155	0.147	0.143
The sample variance	0.025	0.024	0.022	0.021
Minimum	0.36	0.4	0.43	0.46
Maximum	0.96	0.98	0.96	0.98

The analysis of statistical data presented in Table 3, and the following conclusions:

- The distribution of values k_a in experimental and control groups are not normal, these distributions are effectively used nonparametric methods that do not rely on the assumption of a particular type of location to population and are used, as a rule, only assumptions about the random nature of the input data and of the continuity of the General population from which they are extracted [2, 321];
- A non-parametric test is applicable to our case χ^2 , which is used in relation to the sample of at least 20-30 items. It must be carried out a further condition of this criterion: Each interval should contain at least 3-4 Sampled Values. It should also be noted that we used one of the types of criterion χ^2 Homogeneity test of two independent samples, which tests the hypothesis of no difference between the two sampling distributions;
- Before the experiment the samples k_a of both groups belonged to one of the General population: the resulting value of the criterion χ^2 indicates that between the control and experimental samples no differences at a significance level of $\alpha=0.05$ $T_{obs.}=3,04; T_{critic.}=6, as T_{obs.} < T_{critic.}$ accept the null hypothesis.

Hypothesis <There are differences between the two distributions> – average values of the assimilation coefficient for the first test close: 0,698 in the control group and the experimental 0,703; average values of the assimilation coefficient for the second test are respectively equal to: 0,713 and 0,788 in the control and in the experimental, i.e. the significance of differences was proved by mathematical statistics.

In the third phase (2013-2015), there was carried out final control experiment. The goal is a comprehensive study to confirm the effectiveness of the developed scientific and methodological support of the use of IP in teaching computer science in college in the conditions of realization of the activity approach to teaching and research hypotheses in general. Discussion and Results

By the low level of training belong to those who could answer the test questions correctly 0-14, the average level to those students who were able to correctly answer the test questions 15-17, to the highest level are those who answered 15-20 questions of the proposed test. Table 4 represents the number of students with low, medium and high coefficient of assimilation:

Table 4. The results of measurements of the level of assimilation of the knowledge input test (the cognitive component of information-educational activities)

The level of Assimilation	Control group before the experiment	The experimental group before the experiment
Low	5%	5%
Average	40%	30%
High	55%	65%

The obtained experimental data were processed using statistical functions of spreadsheets MS-Excel program and STADIA, are presented in table 5.

Table 5. Data of statistical processing of the input test results (The final stage)

The statistical parameters	Control group before the experiment	Experimental group Before the experiment
Average	0.743	0.760
Median	0.75	0.775
Mode	0.85	0.9
Standard deviation	0.118	0.129
The sample variance	0.014	0.017
Minimum	0.5	0.5
Maximum	0.9	0.95

Analysis of statistical parameters in Table 5 and histograms allow us to conclude that:

- Experimental data have abnormal distribution pattern;
- Average assimilation coefficient for the first test is almost identical 0.76 in the experimental group and 0.743 in the control;

The analysis of statistical parameters in Tables 11, 12 and the curves depicted in Figure 80, lead to the conclusion that:

- Experimental data have abnormal character;

As the topics were studied previously within the framework of NGOs, a comparative analysis mastering constructive component of the educational activities is possible. In the allotted time (2 lessons of 40 minutes), it is necessary to perform the practical work. The indicator is calculated as the ratio of correct operations produced to a total number of operations for a certain time. As in the formative experiment, a low level of development belong to those who are able to correctly perform the job less than 55%, to the average – 55-75% jobs, and to high – more than 75%.

Thus, as a result of practical work, students showed a high level of development of a constructive component of the information and training activities at the expense of development of skills and ways of working, necessary for professional tasks using IP.

The results of the formative experiment were the basis for the final control stage of the experiment. Developed educational and methodical complex on discipline for all levels of secondary vocational education on the basis of IP. Data analysis of statistical processing of the results obtained during the initial diagnostic work confirmed the null hypothesis of the experiment about the affiliation of both groups to the same General population for the estimated parameters. In the experiment, conducted a comprehensive study, i.e. implemented quantitative assessment of the level of proficiency on the results of the testing of knowledge (cognitive component of information and educational activities), execution of practical works (a component of constructive training activities) carried out a qualitative assessment of the level of formation of communicative and design components of educational activities. Obtained in the course of pedagogical experiment indicators of the effectiveness of educational-methodical complex on the components of educational activities (cognitive, constructive, communicative, design) allowed us to draw the following conclusions:

- indicators of level of assimilation, reflecting the degree of formation of the Gnostic (cognitive) component of the information-educational activities allowed us to estimate the completeness of knowledge and reflected a tendency to increase the average participants in the experimental group (0,692 to 0,891) compared with the control (0.674 to 0,715);
- indicators of level of development of constructive component of the information-educational activities allowed us to estimate the degree of development of abilities, skills and methods of operations required to solve professional tasks with the use of IP detected increase of the average values in the experimental group (0,692 to 0,891) compared with the control group (0.674 to 0,715);

- conducted a qualitative assessment of the level of development of communicative component of educational activities revealed a high level of mastery of communicative activity, which is confirmed by the results of the qualitative evaluation which determines the level of information exchange when performing group tasks, take into account the opinion of independent experts of public speaking at student seminars, conferences, copyright projects;
- confirmed a high level of mastery of the engineering design component of information training activities with a qualitative assessment based on observations over the course of the development and implementation of individual, practice-oriented projects, evaluation of final qualification works, self-assessment through the questionnaire, the evaluation by independent experts.

CONCLUSION

The following results were obtained during testing:

1. The secondary vocational education analysis of the current state of science education allows noting that existing approaches do not implement adequately the possibility of hardware and software and information tools and systems for organizing information and training activities.
2. Highlighted and disclosed informative, technological and subjective aspects of the activity approach to teaching computer science on the basis of new software products and information tools. *The Substantial* aspect determines the inclusion in the compulsory minimum content of education of certain ways of working, technologies and core competencies, *the technological aspect* involves the formulation of learning objectives in the form of actions aimed at receiving information of the product, the *subjective aspect* defines the personal qualities and abilities that are generated by different activities.
3. The functional structure of the information and training activities, which are marked subjective, reflective and objective parts that interact with each other, taking into account regulatory requirements for business. Isolated and disclosed components of the information and training activities: Gnostic (assimilation of theoretical knowledge) and constructive (the formation of practical skills in dealing with professionally-oriented problems), design (design of the educational process focused on creative self-realization of the person), communicative (performing group assignments, projects and the organization of information exchange).
4. A block-modular structure and content of the educational complex for training to computer-based hardware and software and information tools and systems in secondary vocational education in the conditions of realization of the activity approach.
5. The experimental verification of the level of training students in the field of computer science with a view of the basic content of lines for the development of constructive, design, components of communicative information and training activities.

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FUNCTIONAL LITERACY OF FUTURE TEACHERS: ESSENCE AND CONTENT

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Abstract

The article actualizes the problem of formation of functional literacy of future teachers, clarifies its content, structure, and suggests approaches to the formulation of learning outcomes that characterize the functional literacy.

Keywords: functional literacy, competence, learning outcomes.

► In the pedagogical science of the last decade, a direction is being formed, the object of which becomes competence-oriented learning, which is characterized by integration into the world educational space; fundamental and practice-oriented education; the change of the knowledge-based paradigm to the person-oriented one; continuity of education, i.e. education through life; health saving nature of education; subject-subject position of participants of the educational process.

In the normative educational documents of the state and strategic importance of the CIS countries, the formation of functional literacy is positioned as one of the main and leading tasks of competence-oriented learning.

The content and structure of the future teacher's functional literacy, the mutual correspondence between such concepts as «competence» and «functional literacy» was determined.

The concept of «competence» in the dictionary of S.I. Ozhegova [3] is interpreted as «knowledge, awareness, authority in any field». The most common interpretation is presented by A.G. Bermus [1]: competence is the possession of an individual's competence, which includes his personal attitude to it and the subject of activity. V.A. Slastenin offers the following interpretation: «... the teacher's professional competence is determined by the unity of his methodological, special, and psychological-pedagogical training» [4]. Of particular interest to us was the interpretation of the concept of «competence» proposed by G.K. Selevko [5], according to which it is broader than the concepts of «knowledge», «skills», and «skills», in addition, it includes not only the knowledge component, but also the operational-technological, motivational-ethical, social, and behavioral components. A.V.Khutorsky is similar in opinions with some authors of the above definitions, «competence is the possession, possession of a person with the appropriate competence, including his personal attitude to it and the subject» [6].

Analysis of the definition of «competence» showed that there is a slight range of opinions, in general, this conceptual series has its similarities and minor differences, this allows us to clarify the interpretation in the following presentation: competence is a person's possession of a certain competence that allows making judgments in a certain area and make appropriate decisions of a particular situation.

The analysis of the concept of «functional literacy» by using the citation method allowed us to come to the conclusion that the formation of functional literacy is ensured by the external conditions and internal needs of the student himself. The personal qualities of the future teacher are formed in the conditions of study at the university, including the personality of the teachers

themselves. Another important condition for the formation of functional literacy is the system of relations of the future teacher to yourself, as a professional.

Table 1. Citing the concept of «functional literacy»

DEFINITION	SOURCE
Functional literacy is a way of social orientation of the individual, integrating the relationship of education with multi-dimensional human activity.	O. Brand. Functional literacy in industrialized countries // Prospects. – 1988, № 2.
Functional literacy is the level of education that is a necessary component of modern vocational education, representing a set of subject, interdisciplinary, integrative knowledge, skills, abilities, and ways of solving functional problems that students apply in the process of activities related to the process of perception, information transformation and professional tasks, as well as tasks of interaction with society.	P.I. Frolova. Formation of functional literacy as a basis for the development of educational and cognitive competence of students of a technical college in the process of studying humanities. – Omsk, 2008.
Functional literacy is the ability to use reading and writing skills in the context of interaction with society, that is, this is the level of literacy that makes a full-fledged activity of an individual in the social environment (A specialized agency of the United Nations Educational, Scientific and Cultural Organization.)	A.A. Veryaev, M.N. Nechupaeva, G.V. Tatarnikova. Functional literacy of students: views, critical analysis, measurement. – p. 15.
Functional literacy is a person's ability to freely use these skills to extract information from a real text – for understanding, compressing, transforming it.	A.A. Leontyev. From the psychology of reading to the psychology of learning to read // Proceedings of the V-th international scientific-practical conference in 2 hours – Part I, ed. Usacheva – M., 2002.
Functional literacy is the use of the skills to read and write in everyday life. In other words, this is the literacy level of a person, which determines his activity using the printed word in everyday life.	O.V. Babushkina. Formation of functional literacy of students of basic school: theory and practice of international studies // electronic periodical edition «Continuity in Education». – № 10. – 2016 y.: http://journal.preemstvennost.ru/

Internal and external in unity determine the position of a specialist in his professional activity and in interrelation with other people.

We introduce such a level of education into the concept of functional literacy of the future teacher, which is characterized by the ability to solve standard life tasks in various spheres of life, including professional, to enter into relations with the external environment, to function and adapt to it as quickly as possible. Therefore, clarifying this concept, we believe that functional literacy is a combination of professional and communicative knowledge, skills, self-education activities, abilities to own information technologies and personal qualities of a specialist, which will allow him to achieve professional results in professional activities.

There are three levels of development of functional literacy of specialists, including teachers: personal, personal-professional and professional-technological.

The personal level of functional literacy is manifested in the suitability of a particular person to perform any type of activity. It is associated with an optimistic way of thinking, positive thinking, which assumes that the world is organized according to the laws of harmony, that good people are more than bad, in every person there is necessarily a good one. The strategy of optimism opens up new horizons, reserves and opportunities in professional activities. Another important personal quality of the teacher is the ability to

adequately assess their activities and exercise self-control, taking responsibility for their actions and actions on themselves, rather than looking for the cause in other people and situations. The personal component of FL is a system of stable personal characteristics and style of pedagogical activity.

Personality-professional level – suitability for the performance of educational activities. It is an activity for the implementation of the educational process. Professional development is a natural form of self-realization of the teacher's personality, the ability to establish interaction between all subjects of education, to ensure the development, education and training of students.

The vocational and technological level is a fairly complete mastery of knowledge with skills and abilities, modern educational and information technologies in a chosen activity aimed at the development of students.

With regard to the current social situation and cultural sphere, the following main features of the future teacher's functional literacy can be identified: readiness for continuous education, mastering modern information and educational technologies; the ability to independently solve a significant part of the problems in the professional sphere, to protect their rights and orientation in their duties; readiness for life in the modern world, orientation in its problems, values, moral norms, orientation in opportunities for satisfaction and development of its spiritual needs; orientation in the scientific understanding of the world; possessing critical and creative thinking; ability to communicate in various environments, possession of bright, convincing and competent speech.

Further, we will demonstrate the process of modeling the functional literacy of a future teacher, which is interpreted as the study of any phenomena, processes or systems of objects by building and studying their models [2].

The wording of functional literacy indicators is based on the concept of Benjamin Bloom. Its peculiarity is that by passing through 6 levels of the thinking process, the corresponding knowledge, skills, abilities and abilities are formed, the content of which is presented in the form of active verbs. Bloom's taxonomy is not just a classification scheme. This is an attempt to organize various thought processes as a hierarchy. In this hierarchy, each level depends on the student's ability to work at this level or levels below it. Below is a table that «offers» a ready list of verbs that can be used in the formulation of learning outcomes for each level of the thinking process.

Table 2. Learning outcomes for the cognitive sphere

Knowledge is the ability to reproduce or memorize facts, without necessarily understanding them.	To systematize, collect, define, describe, reproduce, list, analyze, establish, categorize, memorize, name, order, describe, present, refer, remember, recognize, fix, tell, correlate, repeat, reproduce, show, formulate, tabulate, to report
Understanding – the ability to understand and interpret mastered information.	Link, change, clarify, classify, build, compare, transform, decipher, hold, describe, draw differences, recognize, discuss, evaluate, explain, express, summarize, summarize, reveal, illustrate, point, draw conclusion, interpret, systematize, state in your own words, predict, recognize, describe, reformulate, make a (critical) review, select, decide, translate.
Application – the ability to use the learned material in new situations.	Apply, evaluate, calculate, change, select, complete, calculate, build, demonstrate, develop, uncover, stage, use, explore, conduct experiment, search, illustrate, interpret, manipulate, modify, exploit, organize, put into practice, predict, prepare, create, relate, plan, select, show, describe, outline, decide, convey, use
Analysis – the ability to break information into components	Analyze, evaluate, systematize, break up, calculate, categorize, classify, compare, connect, oppose, criticize, discuss, deduce, distinguish, select, subdivide, investigate, conduct an experiment, determine, illustrate, draw a conclusion, check, collect information, organize, schematically, mark, review, correlate, select, subdivide, check.

Synthesis – the ability to connect parts into a whole.	To argue, systematize, assemble, classify, compose, compile, compose, build, create, design, develop, develop, install, explain, formulate, synthesize, generate, integrate, invent, make, manage, change, organize, produce, plan, prepare, propose, remake, reconstruct, relate, reorganize, revise, rewrite, adjust, summarize.
Evaluation is the ability to judge the value of a material for a particular purpose.	Make an assessment, establish, argue, evaluate, give value, choose, compare, draw a conclusion, oppose, persuade, criticize, make a decision, defend, differentiate, explain, form an opinion, rank, interpret, judge, prove, determine, predict, consider, recommend, correlate, resolve (problem).

Structuring functional literacy, we identified its criteria and indicators. The criteries are expressed in the signs of functional literacy in the wording of competencies. The indicators are in the characteristics of the signs of functional literacy, that is, in the formulations of the expected learning outcomes that the student will demonstrate upon completion of the training module.

Table 3. **The content of the functional literacy of the future teacher**

CRITERIES	INDICATORS
Ability to solve problems in the process of cognitive activity.	• knows ways to solve problems in the process of cognitive activity; • classifies constructive and destructive ways of solving problems in the process of cognitive activity; • reasonably predicts the consequences of destructive ways of solving problems in the process of cognitive activity.
Ability to self-education	• knows ways and conditions conducive to self-education; • demonstrates schematically / cluster system of self-education processes; • designs self-education processes and interprets them with arguments; • reasonably assesses the level of self-education.
Ability to constructive interpersonal communication.	• lists and interprets the signs of constructive interpersonal communication; • predicts the importance of constructive interpersonal communication on the main activities (teaching, labor, communication); • demonstrates commitment to constructive interpersonal communication; • reasonably evaluates the process of destructive interpersonal communication.
Ability to self-organization and time management in the process of cognitive activity.	• describes the processes of self-organization and describes the rules of the process of cognitive activity; • summarizes the signs of self-organization and time management in the process of cognitive activity; • gives a reasoned assessment of the processes of self-organization and time management of bandmates, fellow students, friends, relatives
Skill of preventing and preventing conflict.	• classifies conflicts; • lists ways to resolve and prevent conflicts; • reasonably assesses the consequences of conflicts.

ICT (information and communication technologies) skills.	• selects adequate information and communication technologies for self-education processes; • demonstrates, through the presentation, a presentation of ICT skills; • reasonably lists and interprets the signs of high, medium and low levels of ICT ownership.
Ability to introspection.	• lists signs of meaningful and constructive self-examination; • demonstrates by graphical organizers an algorithm for self-analysis and summarizing the results of this process; • reasonably evaluates the process of introspection, listing the signs that determine its trajectory.

Thus, the formation of functional literacy is an important process that contributes to the professional and personal development of the future teacher. Assessing competencies is impossible, but it is possible to evaluate learning outcomes that characterize these competencies, since they are expressed in the form of active verbs and are formulated according to the levels of the thinking process of the Benjamin Bloom Concept. These formulations can serve as the basis for the goal-setting of the pedagogical process.

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PROJECTION AND REALIZATION OF MODULAR EDUCATIONAL PROGRAMS ON THE BASIS OF COMPETENCE APPROACH TO THE FUTURE SPECIALISTS OF NATURAL SCIENCES

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Abstract

Nowadays, in the context of globalization the competence approach to education is especially in demand the framework of the Bologna process, allowing to overcome the well-established cognitive orientation of higher education, a new looking on the existing content of education, methods and means of teaching. The scientific-theoretical substantiation of projection of the basic educational program requires recourse to the concept and stages of projection activities, which are disclosed in the theory of Projection of educational systems. The projection is considered as a special type of pedagogical activity. projection in education is associated with goal setting, forecasting, planning and organization of the educational process. Module-competence approach in higher and postgraduate education is the concept of the educational process, in which the aims of learning is the set of professional competences of the learners, as a means for achieving a modular structure of the content and structure of professional training. Thus, the purpose of development of professional education programs is the acquisition of certain competences of learners, means of their formation module as a separate unit of the educational programme and the system of accounting for the complexity of learning credits awarded for the development of each module.

Keywords: competence approach, higher education, training of future specialists, educational programme, individual educational trajectory

► Competence approach is a priority orientation of education on the results: the formation of the required cultural and professional competence, self-determination, socialization, personality development and self-actualization. This approach focuses the education system on the quality assurance of training in accordance with the requirements of modern society, which is consistent not only with the requirement of the individual to integrate into social activities, but the requirement of the society to use the potential of the person [1] Using in the projection of educational programs of higher education modular technology and focus them on the development of competencies, goals and learning outcome ensure the comprehensibility and transparency of the content of training for all participants in the educational process. In this case, the employers will be able to actively participate in the development of educational programmes, and students will clearly understand what they will be able to and what you can offer employers.

Very often, when talking about innovations in high school, continue to use the term «educational-methodical complex», referring to the substance of the module.

Under the module is stable is understood as a relatively independent part of any system, the unity of the interchangeable parts of anything [2].

Module-competence approach in higher and postgraduate education is the concept of the educational process, in which the learning goal is the set of professional competences of learners, as a means for achieving a modular structure of the content and structure of professional training. Thus, the purpose of development of professional education programs is the acquisition of certain competences of students, means of their formation module as a separate unit of the educational programme and the system of accounting for the complexity of learning credits awarded for the development of each module. The concept of a module in the pedagogical literature is interpreted in different ways. Under the module we will understand a relatively independent and logically complete part of the educational program, responsible for the formation of a certain competence or a group of related competencies. Therefore, the modular educational program can be considered as a set and sequence of modules aimed at the acquisition of competencies necessary for assignment to specific skills. Rules of organization of educational process on credit technology installed, what modules are divided into the following types:

- 1) common compulsory modules;
- 2) compulsory modules according to the specialization;
- 3) the elective modules for a particular specialty;
- 4) the elective modules beyond the qualification (information technology, foreign languages).

It is assumed that a one module can consist of one or more disciplines. The volume of one module depends on the work of the learners. The module can be composed of:

- 1) large volume (3 or more credits of the Republic of Kazakhstan or 5 or more ECTS credits) and is completed on time and the content of the disciplines;
- 2) small volume and mutually complementary disciplines;
- 3) several related, related disciplines, which ensure the continuity of the curriculum and represent different levels of the same discipline. Related disciplines ensure the interdisciplinary approach of the module aimed at forming a wide range of competencies that go beyond of one module [3]

The projection of modular programs is based on the following principles: first of all, the program answers the question about motivation, content, methods, means and results of activities of the learners and is projection based on the potential content of its educational activities and results of development content primarily describes the content and methods of action, who learns, not the one who teach; all modules are methodologically and ideologically consistent with each other, at the same time, each module can act as an independent program; each module should have its own purpose in the study of this module; modules can't be formed on ideas that are contrary to each other; the modules must be formed on a single methodological basis; all applicable methods of modules should be treated equally and to be understood by all participants in the educational process; the objectives of the module needs to be diagnosed comparable methods; the module must be provided with educational-methodical complex allows for studying independently (if necessary) to master the content; the modules must be secured to complement each other (agreed with each other) glossary; modules can duplicate to each other (using, for example, different projection approaches); in this case the listener can choose one of the suggested modules; the participants of the educational process, can choose a smallest number of modules (the principle of selection should be clearly identified) or to assimilate the whole program [4].

The central component of the educational program is a system of purposes, which characterizes the model of the graduate – result of activity of the educational system.

As a result of analysis of the requirements the purposes of the educational program of the specialty 5B060200-»Informatics»:

- education in the spirit of patriotism, respect for various cultures, customs and traditions of various nationalities; – formation of universal and social-personal values;
- formation of ecological, physical, ethical, legal culture and culture of thinking;
- formation of knowledge, ability and skills in the professional activity meeting the modern requirements;

- preparation of highly qualified specialists in the field of Informatics based on a single continuous educational process of acquisition, assimilation, diffusion and application of new knowledge;
- to be competitive, to have skills of creative thinking, to be able to orientate in constantly changing conditions of the labor market;
- training of future specialists to solve problems in new and innovative professional and life situations, taking into account social and ethical responsibility for the made decisions.

In order to achieve the objectives of the educational program identified meta-competencies (Educational, Personal, Communicative, Professional and specialized), and accordingly with meta competences certain composite competence.

The selected competences are formed among learners during the development of the modules of the educational program. Elective modules of the educational program allow learners to make a specific choice of trajectory of learning. The term «individual educational trajectory» is meant a personal way of achieving educational aims (or learning objectives) of a particular learners, appropriate to his abilities, motives, interests and requirement. In the process of learning in an educational institution individual trajectory of achievement of aims to form learners together with the teacher / lecturer how to using existing and proposed for general education elements, and with the optional set of method elements. Additional methodological elements of the structure of individual educational trajectory are alternative forms and methods of learning / mastering the material, alternative methods of control, alternative learning content, an alternative time and speed of mastering the material and the formation of the required competencies to the required level. Construction of individual educational trajectories is subject to the following principles: awareness prospects and the opportunity to participate in their own education, the flexibility and responsiveness of the educational system in accordance with the requirements of the labour market, individualization and creativity when working with a teacher mentor. Individual trajectory involves the following process framework: the flexibility of the timing of the discipline, the minimum educational standard and its extensions, virtual training systems modular training, the alternation of different forms of work and the attestation.

The choosing of educational trajectory during the period of university studies is a joint action of a teacher and learners aimed at the development of a learners or students that skills of independent educational activity, the formulation of appropriate educational aims and related objectives, select methods, forms, means and content of learning, reflection, self-assessment of personal achievement, initiative and responsibility for decision-making and problem solving. Learning to form individual educational trajectory in the period of study at school or university, the learners will be able to using this ability throughout life [5].

So, basically the curriculum has two individual educational trajectories: technology of programming and program supply. Educational trajectory programming technology includes the following elective subjects: mathematical and computer modeling, technology of program supply training, the basics of artificial intelligence, three-dimensional graphics (Open GL), the protection of information in computer systems, mobile application development, program supply products and standards for e-learning, development of WEB applications (PHP). The contents of the second educational trajectory is the following disciplines: simulation, management training program supply, expert systems, the technology of animation, basics of information security, the development of multimedia applications, basics of training information and educational resources. The correlation of the identified competencies with the modules of the educational program in the form of a matrix [6].

In management of EP it is used the system approach on the basis of the reached results of process. All processes are provided with necessary external and internal standard documentation.

Priorities when forming EP purposes are:

- compliance of the EP purposes and structure with requirements of the European and National frame of qualification;
- orientation on competitiveness on the international labor market;
- considering of the best practices of higher education institutions (both in the country, and abroad), carrying out this program;

- orientation on creation and support of favorable conditions to introduce educational innovations and develop creativity of the students.

It is known that the special place in structure of the state order is allocated for training of professional personnel, including specialists of informatics.

The conditions providing stability of a set of students for training on EP are: availability of the state order for training of bachelors on this EP; enrolment of students on the free basis (financing is provided by Authorized Council of the university); carrying out the systematic professional orientation work; availability of the department training specialists, and also serving departments with the stable highly skilled staff; modern material base; availability of long-term cooperation with RK higher education institution partners where students are trained on mobility; high rating positions in the national rating of programs; availability of the language preparatory faculty where more than two hundred pupils from the Turkic-speaking countries and Russia are annually trained; constant improving of work of the university site being used by foreign students [7, 8, 9].

It is necessary to note the stability of enrollment of students for this specialty, but thus there is a tendency that our services are generally used by enrollees from local regions and gathered rather low scores. Therefore in order to change this situation according to the decision of the Authorized Council the university granted \$75 of scholarship to the entered enrollees who have gained a high score and when choosing the specialty have selected our university as the first.

The modern socio-economic conditions put before a system of professional education with the task of training competent, competitive specialist able to work in a constantly changing environment, able to independently and creatively solve professional tasks, ready for further self-education and self-development. accurate and clear aims corresponding to mission of the university, and also the European and National framework of qualification. The purposes conform to market requirements, and are systematically improved.

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USING THE DIGITAL TECHNOLOGY IN TEACHING THE PHYSICS

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Abstract

Using the digital technology at teaching the physics is considered in this paper. It allows realize developmental learning goals: the development of thinking (spatial, algorithmic, intuitive, creative, and theoretical); the formation of skills; to make the optimal decision from possible options; the development of skills carry out experimental research activities (for example, by implementing the capabilities of computer modeling); formation of information culture (for example, using integrated packages, graphic editors, table processors, and special mathematical packages and systems). For the student-researcher the important moment is not only mastering a wide arsenal of powerful innovative means and methods, but also the ability to independently find and select the necessary means, that is, the development of research skills largely depends on mastering modern digital technologies and methods of scientific research.

Keywords: digital technology, physics, digitalization of education, computer modeling, learning process.

► Modern processes of digital transformation have a direct impact on all spheres of our life, especially in education. In connection with global digitalization processes taking place all over the world, the integrated use of digital technologies in the educational process to improve the quality of education and enrich learning content is particularly important. The State Program «Digital Kazakhstan» notes that the widespread use of digital technologies is the basis for accelerating the pace of economic development in the country [1].

The development of digital technologies makes new demands on the competencies that a person should possess as a potential creator of new knowledge. The introduction of digital technologies in the learning process helps to acquire basic ICT literacy: digital skills such as reading and editing digital documents, browsing the Internet and searching for information on the Internet; finding useful resources for self-learning.

For successful use in the educational process of funds in digital format, it is necessary to have certain skills in their use – digital competencies. Digital competence includes the confident, critical and responsible use of digital technologies for learning, working and participating in society. [2].

Perspective digital technologies, such as technologies of augmented and virtual reality, cloud technologies, 3D-printing can play key roles in the formation of digital competencies. Augmented reality adds digital information to the real, physical world, thereby enriching educational material and brings closer to reality the studied phenomena and processes in various subject areas. [3].

Currently, the entry of Kazakhstan into the world information community, the pro-

professional education of Kazakhstan is undergoing a period of modernization. The transition of vocational education to international educational standards implies profound qualitative changes in the priority tasks of mathematical education. In particular, teaching stochastics as information training for informatics teachers. These tasks are based on a single educational policy, orientation of education on the individual. Digital technologies (hereinafter referred to as CT), being one of the components of the subject of preparing a future computer science teacher, open up opportunities for creating effective methods and forms of education based on their application. When using innovative information and communication technologies in teaching stochastics, their didactic abilities can be realized more widely than when studying other subject areas. This is due to the fact that information and communication technologies include a mathematical component that is most noticeable for students in the process of studying physics disciplines using computer technology. The use of digital technologies in the teaching of disciplines in education is discussed in the works of B.S. Zhanbyrbaeva, K. Bektaeva, Ya.A. Vagramenko, Yu.S. Branovsky, Yu.G. Guzuna, V.A. Dalinger, G.L. Lukankina, M.N. Maryukova, V.R. Mayer, I.V. Robert, A.V. Yakubov and others. In particular, they deal with the creation of software and pedagogical tools for educational purposes with the method of their application, computer-oriented methods of studying various topics and sections of school and university physics courses. Work on the use of digital technology in the physics course is relatively less. The increase in the rate of increase in general human knowledge, the application of physics results in many other scientific fields, the tendency of transition to credit technology of education, reduction in the number of training credit hours, the existence of distance learning technology and other factors lead to a revision of the entire system of teaching physics, methods and technologies. In the course of physics, it is necessary to redistribute the amount of classroom time for the independent work of the trainer (SRO), devoted to working out the solution of typical tasks (mechanical computing actions), and to devote this time to solving developmental, cognitive tasks, to get acquainted with the modern branches of physics, to strengthen the applied focus course (creative, developing activities). A possible solution to the problem is the use of computer support for a physics course, in which it is possible to give the solution of typical problems to information and computing systems.

When teaching physics, due to the specifics of its content, a visual representation of experiments is necessary. Therefore, it is necessary to support the course of digitalization of education, which would allow the simultaneous implementation of the applied focus and availability of the presentation of the material and the maximum possible justification and explanation of the objective meaning of the physical conclusions related to the processing of experimental data. Analyzing the scientific study of the methodical system of teaching physics, we can single out the following motives for using CT:

- most of the information resources of the physics course are posted on the Internet and the library of electronic resources of the university;
- application of CT in the course of physics improves the quality of learning material, due to the optimal use of time and clarity of the lesson materials;
- the possibility of using interactive and network distance learning technologies;
- the possibility of using multimedia, flash and web technologies in training sessions;
- The use of CT in a physics course promotes the use of CT in the future activities of a physics teacher.

The use of CT in teaching physics makes it possible to uncover the nature of the concepts and facts of the theory, which is not only methodological, but also methodological. In practice, it is often necessary to receive and process a large amount of random information data. The task of organizing measurement results is solved much faster with the use of CT. In addition, the ability to display and analyze graphical and tabular interpretation of the results of the analysis of experiments using CTs is incomparably higher than is traditional.

With the help of computer experiments, in a number of cases, it is possible to simulate the situations described in the problems and to compare the results obtained in the experiment with theoretical calculations. Using computer simulation, many facts can be made statistically vivid. Analysis of the research of a number of scientists allows to formulate the following most significant problems of introducing CT in the process of teaching physics:

- 1) a significant gap between the technologies of developing information systems for training and the methods of using these systems in teaching physics;
- 2) the lack of uniform methodological standards for various types of information systems of education;
- 3) the lack of development of principles for the selection and storage of information resources of educational material for presentation in the training information system;
- 4) the lack of recommendations on the choice of CT for solving the set pedagogical and didactic tasks;
- 5) the inconsistency of the goals of the use of learning DH with the goals stated in the process of teaching physics;

insufficient studies of the negative impact of the didactically unjustified use of CT on the development of the learner, his intuition and thinking. We believe that one of the main reasons preventing the effective use of DH in the teaching of a course in physics is the lack of a methodical system of stochastic training of students on the basis of DH. Nowadays, there is an obvious tendency to shift the interests of students who are capable of exact sciences into the field of DH. Therefore, it is necessary to combine highly qualified teaching of a fundamental course in physics with learning to work with CT on examples of problem solving that naturally arise from a fundamental course.

As one of the tasks of preparing a physics teacher to work with CT should be the disclosure of the relationship between theory and practice and CT. Obviously, there is a discrepancy between the current level of development of CG and the degree of their use in physics. Most of the most powerful results in physics are asymptotic in nature. In practice, however, as a rule, they deal with limited observational volumes. And the properties of the data used in this case sometimes differ significantly from the asymptotic ones.

This leads to incorrect conclusions when solving applied problems in many branches of physics. In particular, when estimating the parameters of distributions, when testing hypotheses, processing, methods of analyzing observations under laws, etc. Many of the challenges are extremely difficult to solve with traditional methods. In addition, the number and level of complexity of the tasks put forward by the practice grow so fast that a person is not able to provide them with a solution without using the appropriate CG. Studying physics, students face such situations when real objects and phenomena are considered in a simplified form, i.e. a model is created in which, however, dependencies persist. Working with the model, future specialists learn to correctly set the tasks, correctly identify the main and secondary factors in the proposed situation, find the most optimal solution to the task. The use of modern CT provides an opportunity to automate complex physical calculations, more clearly present the situation, and reasonably explain the result.

In addition, students acquire skills in working with application programs, flash and web technologies. A special place is occupied by the experiment with the use of CT, which forms ideas about such general scientific concepts as experiment, hypothesis, theory, creates conditions for the development of individual, creative abilities of students, knowledge of the foundations of physics through analytical studies of the models under consideration. In the methodical plan, as already noted, the use of CT in the process of physics allows not only quantitatively but also qualitatively substantially expand the class of tasks and laboratory experiments offered to students.

The use of CT brings the formulation of tasks and experiments to real conditions, helps bring a scientific description closer to reality. This is of great importance for the formation of the correct scientific worldview of the students. In addition, the constant work of students studying physics with the use of CT provides an opportunity to acquire sustainable «navigation» skills in the modern information environment.

Note that for a student-researcher an important point is not only mastering a wide arsenal of powerful innovative tools and techniques, but also the ability to independently find and select the necessary tools, that is, the development of research skills depends largely on the mastery of modern methods of scientific research. Consider some of the possibilities of using CT in a physics course:

- to perform numerical calculations, which are required, as a rule, when solving statistical problems on the basis of analytical expressions or specified program modules;

- for demonstrations and illustrations of formulas, texts, sounds, drawings, graphics, video films and other multimedia images when studying a new material;
- for processing the results of the experiment: statistical data processing, etc .;
- To explain the theoretical laws.

The use of CT in teaching physics allows the realization of such developmental goals of learning as the development of thinking (spatial, algorithmic, intuitive, creative, theoretical), the formation of skills, the optimal decision making of possible options, the development of skills to carry out experimental research (computer simulation), the formation of information culture, the ability to process information (for example, through the use of various packages: graphic editors, spreadsheet processors, special packages and systems).

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MATHEMATICAL EDUCATION AT SCHOOL AS A CULTURAL PRACTICE

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Abstract

The article examines some significant aspects that determine the cultural direction of mathematical education at school and components that increase its cultural potential. The author reveals the role of task systems and the peculiarity of usage to realize cultural practices in teaching mathematics.

Keywords: mathematical education, culture-specific approach, tasks system.

► To date education is seen as a process of familiarizing students with the world culture. Designing the educational process in the aspect of the cultural approach requires culture-specific teaching to develop student's intelligence.

Self-improvement and self-development bases of individuals, which are laid in the school education, are largely determined by the moral, aesthetic, ideological assessment of events based on the person's value orientations, which act as a regulative component of any culture. «A person always acts within the framework of universal human values, i.e. within the framework of a certain culture, being simultaneously the object of cultural influences and the subject, the creator of values» [3, p. 9].

Cultural approach to the study of pedagogical systems and processes is realized in the context of the general philosophical understanding of culture and at various levels. The analysis of works of a cultural orientation allowed to reveal a variety of scientific approaches, which helped to interpret the concept of culture. Researchers conditionally distinguish three main directions, i.e. the interpretations of the concept:

- as a complex, which includes main culture components: knowledge, beliefs, art, laws, morals, customs;
- as a system for the reproduction of spiritual values, their preservation, distribution and consumption, a system that provides spiritual (intellectual, emotional, moral) formation of members of the society and satisfaction of their spiritual needs, in accordance with certain historical and social conditions;
- as the unity of all traditional behavior forms of people communities, the transformational unity of man with nature and society, the people's common way of life, which has both material and spiritual features of the system of storage and transfer of social experience.

Taking into the account the ambiguity of the interpretations of the concept of «culture» B. S. Gershunsky notes that «the most significant attributes of it are a deep, conscious and respectful attitude to the heritage of the past, the ability to creatively perceive, understand and transform reality in a particular sphere of activity and relationships» [2, p. 85].

Thus, the educational process must be considered not only as a form of mastering the past cultural experience but also as a way of entering the present culture. It is also seen as the creative potential of a future culture.

Mathematics is one of the most ancient sciences. In fact, our civilization is founded and exists thanks to mathematics. Mathematics is an international language that is used and understood throughout the world. There is a mathematization of various scientific fields in the modern world. This discipline has firmly established itself in various parts of society. Mathematics at school is educational subject with a great humanitarian potential. The personal development that the student acquires in the process of receiving mathematics is more valuable than the proper mathematical knowledge, because correctly organized instructions in mathematics are connected with formation of moral values.

Regarding this statement Fatima R. notices: «Mathematics is interesting as a high degree among human achievements, because it has a universality that can provide us with a way to bridge across and transcend the insignificant geographic and historic differences that split a society. It is the common language our brains are hardwired to produce, the one that drives our scientific and technological development and is at the same time a deeply philosophical and artistic kind of endeavor» [1].

Traditionally, mathematics plays a significant role in cultural development of an individual and humanity. As for the cultural direction of mathematical education, the authors emphasize:

- the methodological foundations of mathematics, which determine its role as a method of cognition;
- the philosophical principles of mathematics, which reveal the nature of mathematical knowledge;
- the importance of mathematics for the development of the humanities (sociology, linguistics, etc.);
- the connection of mathematics with music, painting, architecture, etc.

At the same time, a person's mathematical culture is recognized by the authors as a significant component of its general culture. Modern understanding of the sociocultural content of teaching mathematics defines it as «a component in the mastering of mathematical knowledge, skills, experience, cultural base abilities as forms of mastering cultural values, whose carriers are mathematical concepts, categories, methods» [4, p. 28].

P. Roland assumes: «...learners get to know the contents of mathematics and science better when these contents are embedded in relevant historical and cultural contexts» [5, p. 3].

Such understanding of contemporary mathematical education has been reflected in many researcher's works, where is the main function of such field of science as Mathematics is building up the perception that Mathematics is a part of world culture and how it relates to the modern world.

The basis in which an individual becomes a successor, i.e. the one who bears a universal human culture, as well as the creator of his own cultural senses with the help of maintaining personal motives, values, outlooks; where aforementioned become culturally appropriate and create culture-educational environment. Therefore, this orientation is the formation of a human culture within the framework of teaching mathematics, in turn, is reflected in the requirements for a meaningful organizational and active component of the educational process.

The cultural orientation of the content of the school course of mathematics is already largely determined by the peculiarities of mathematics as a science and an academic subject. However, when designing and organizing each lesson, the teacher needs to think through the possibilities of the educational material to strengthen the cultural component of the mathematical content.

Among the components that increase the cultural potential of the teaching mathematics at school, we distinguish:

- historical which includes in the content of the lesson not only historical component, but also mathematical problems of historical themes, but also reveals the importance of mathematics in the development of human society;
- aesthetic which relates to accentuation of students' attention to the fact that the sure proof, the most rational decision, and the correctly executed drawing are aesthetically attractive;
- practical which represents the inseparable unity of mathematics with other sciences, as well as with practice;
- communicative which connects not only with the logical way of reasoning, the literacy and accuracy of the use of mathematical terms and symbols, but also with the development of a general student's speech culture.

Strengthening the cultural orientation of the organizational and activity component of the educational process can be carried out through such an organization of educational and cognitive activities of students,

which is based on their awareness of the values of scientific knowledge and their place in this process. Value orientations make up the emotionally valuable layer of a person's experience; determine his worldview and the boundaries of individual freedom in the process of cognition, which are developed during the cognitive activity; contribute to the transformation of knowledge into beliefs and play a stimulating function. At the same time, educational and cognitive activities acquire an individual and creative character.

Since the task-solving activity is one of the main types of educational and cognitive activity in the mathematics teaching, and the tasks implement a wide range of functions in the educational process, the cultural potential of mathematical education can be increased through working with specially selected or compiled tasks. However, practice shows that often, the most didactic value in the aspect of implementing the cultural approach in the educational process is not the unusual formulation of the task, but the way, how its solution is organized. At the same time, the systematic development of enriching the student's cultural experience through the inclusion of all the components of lessons and the strengthening of the cultural orientation of educational and cognitive activity will be more effective if there can be used task systems instead of separated tasks and random combinations.

Numerous psychological and pedagogical studies confirm the idea that a well-designed task system not only ensures the completeness of the educational material's presentation but also gives the personal significance of cognitive activity, which leads to the liberation of the educational process from a narrow orientation toward mastering certain facts of mathematics and filling it with cultural meanings.

To construct a system of tasks, the teacher needs not only to understand the contribution that each task will make to the achievement of educational goals, including culturally oriented ones, but also to have a clear idea how the system properties reflect in it: integrity, hierarchy, structure, availability essential links of interaction between elements, the presence of integrative properties.

If the teacher does not have enough experience, he can orient himself at the tasks of the textbook and its set of problems when he designs this system. But even in this case, to strengthen the developing potential of each task and its cultural orientation, it is necessary to try to transform it, think through additional questions and requirements for it, introduce orientations aimed at identifying new or generalized knowledge and skills, include subject material which affects the sphere of students interests.

It is useful to introduce emotional value judgments, appraisal statements, elements of historical information, facts related to environmental, production problems which provide personal acceptance and experience of the learning situation posed by the task system. At the same time, the communicative component, established by the system of tasks, organically fits into the structure of each stage of educational and cognitive activity and will determine its psychological structure.

Thus, the task systems will allow not only to form the content of the educational material, but also to become an essential factor in enriching the cultural experience of the students.

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YOUTH WORK IN YOUTH CONSCIOUSNESS (sociologic analysis of pilot study)

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Abstract

The article was prepared within the framework of the state scientific grant implementation of the Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan on IRN APO5132539 project on the topic: «Yunogogics: theory and practice of youth work in the conditions of public consciousness modernization» In the article, the team of authors systematizes the results of a pilot sociological research among the youth of Kazakhstan on the subject of a modern view concerning the problems of youth work.

Keywords: youth work, youth policy, youth organizations and associations, youth consciousness, youth self-organization...

➤ Kazakhstan is one of the few countries in the post-Soviet space where the process of public consciousness modernization and understanding the importance and significance of supporting young people as a guarantee of future democratic and economic changes is actively underway. The practice of recent decades more than convincingly shows that in a fast-changing world, the strategic advantages will be those social societies that can effectively accumulate and use productively human capital, as well as innovative development potential, the main carrier of which is the younger generation.

The youth is a social barometer that reacts productively to all external and internal shocks in society, due to its small social experience. Young people productively and quickly change their views and beliefs, fit smoothly into modern IT technologies.

The youth, being the subject of social reproduction, is the effectiveness guarantee of solving economic problems and political transformations, the prosperity and transformation guarantee of the Republic of Kazakhstan. This is a kind of bridge between past and future. And depending on how strong this bridge is in its internal accumulation of social factors, it will withstand all the obstacles from external risk factors [1].

We understand that in the conditions of the fundamental transformations of Kazakhstan society, the country development largely depends on the «youth factor», on the demographic, psychosomatic characteristics of young people, on their education and training, morality and civic maturity, where young people become the driving force of society progressive development, an important factor in innovative transformations in the country.

The state youth policy in the Republic of Kazakhstan is implemented through the activities of a number of political and social institutions. The main subject of youth work is public associations and youth organizations. The interaction of the state and youth organizations in the framework of the implementation of the youth policy measures is carried out in accordance with the priorities of work with youth defined by the Ministry of Education and Science of the Republic of Kazakhstan. For the purpose of rational interaction with public associations, the Ministry of Education and Science of the Republic of Kazakhstan has concluded and implements cooperation agreements with youth organizations in Kazakhstan:

ZHAS OTAN. «Zhas Otan» youth wing shares and supports the ideas of «Nur Otan» National Democratic Party. The stated mission of the organization is to consolidate Kazakhstan youth on the policy platform basis of the country president with the aim of ensuring a modernization breakthrough in the country development, the goal is to create a strong and authoritative political youth organization capable of leading the youth.

«FOR KAZAKHSTAN FUTURE» YOUTH MOVEMENT. «For Kazakhstan future» youth movement was created on the presidential election eve. It was considered to be the right wing of «Otan» party, its «youth branch» and enjoyed the party leaders' support. Today, the movement denies any involvement in it. In the future, the leaders of «For Kazakhstan future» youth movement see themselves in the National Council under the President of the Republic of Kazakhstan on Youth Affairs, where they will «strategically direct» the young people towards a bright future.

KAZAKHSTAN YOUTH CONGRESS. It was established in 2002 with the aim of assisting the state in the implementation of youth policy and the establishment of cross-sectoral cooperation between government institutions and youth non-governmental organizations. KYC is a union of legal entities in the form of an association.

«YOUTH PARLIAMENT OF KAZAKHSTAN» appeared on the initiative of the youth wing of «Otan» – «ZhasOtan» RPP. In fact, this is a duplicate of this country's «adult» parliament. In each region of the republic, youth maslikhats presenting 16 deputies each were created, which, by analogy, were elected by the electorate. All of them represent the younger generation's interests in the law-making body of Kazakhstan, prepare packages of proposals on a particular issue and offer them for Majilis consideration.

«KAZAKHSTAN'S STUDENTS ALLIANCE» STUDENT YOUTH ASSOCIATION. The main purpose of «Kazakhstan's Students Alliance» republican student movement (hereinafter referred to as KSA) is to create public awareness of KSA as an organization that really solves legal, social, economic and domestic problems of students and is actively involved in independent Kazakhstan development.

«ZHULDYZ» UNION. «Zhuldyz» Union of Children's Public Associations is a public non-governmental organization, which unites on a voluntary basis the most diverse children's and youth groups, accepting the charter and program documents of the Union. The union has its own symbols: banner, emblem, motto, ties, flags, ribbons, badges, various marks of distinction and other attributes. The charter and program documents are based on respect for a child's personality, recognition of his right in individuality, uniqueness and importance for the family, society, and the state.

«CONSTELLATION» POLITICALLY NEUTRAL YOUTH PUBLIC ASSOCIATION was created on June 2, 2005. Its goal is analytic and sociological research in the field of youth policy, identifying the main trends in the political culture development of the young generation, and activist values formation among the youth.

«FUTURE WITHOUT DRUGS» CORPORATE FUND

The fund was established by «Kazakhstan Youth Congress» Association by combining legal entities. The main objective of the fund is the primary drug abuse prevention among young people and healthy lifestyle promotion.

«UNION OF KAZAKHSTAN RURAL YOUTH» PUBLIC ASSOCIATION

The Union of Kazakhstan Rural Youth was founded in 2003 by the youth wing of the Agrarian Party on the initiative of Kazakhstan Youth Congress. After the fusion of Agrarian party with NurOtan party, the Union continued its work, and today it is one of the notable public youth movements.

The main goal of the organization is uniting together efforts and energy to solve the problems of young villagers, implement and protect their interests and initiatives.

«Kaisar»Republican youth socio-political movement. The goal is to bring together youth leaders and active young people for the sake of strengthening the power and Kazakhstan dynamic development in the 21st century. The movement makes a point of involving young people in healthy political processes so that it does not become the sport of politicians, as it has happened in the neighboring countries. The leaders of the largest youth organizations in Kazakhstan and many others have already declared themselves members of Kaisar [2].

The process of activating youth associations that has emerged in recent years makes it possible to predict in the near future an increase in the number of young people who have expressed a desire to cooperate with youth organizations. However, events prove that the field of youth work is experiencing a large personnel shortage of specialists professionally trained for this area of social work. Today, the following picture is observed: the number of personnel security for those working with young people includes specialists from a wide range of humanitarian specialties: teachers, university professors; lawyers, physicians, athletes, actors, artists, representatives of Club for the Lightheaded and Quick-witted, musicians and many other absolutely talented people, but, unfortunately, they are not have trained in special social and educational of work with young people.

In order to study and analyze the attitude of young people to various aspects of youth work at the republican and regional levels, identify young respondents' ideas about the specifics of youth work in the context of modernizing public consciousness, as part of the state scientific grant realization of Science Committee of the Ministry of Education and Science of the Republic of Kazakhstan on the project IRN APO5132539: «Yunogogics: theory and practice of youth work in the conditions of modernizing public consciousness» a group of scientists conducted a sociological survey using a questionnaire method. In total, 1654 respondents took part in the survey. During the initial processing the submitted questionnaires, 1,500 respondent questionnaires were allowed to be processed. Participants of the survey: students of higher educational establishments, students of colleges, schools, working youth, including boys accounted for 49.5%, girls 50.5%. The age of respondents was presented from 15 to 29 years old: 15 -17 years old – 4%; 18 – 20 years old – 79%; 21 -25 years old – 14%; 26 – 29 years -3%.

Considering that Kazakhstan is an international country, different ethnic groups of the country's population were represented in the survey: Kazakhs accounted for 46.5%; the Russians – 28%; the Germans – 5.5%; the Ukrainians – 7.5%; the Chechens – 4%; the Tatars – 3.5%; the Belorussians, the Mongols, the Kurds, the Udmurts, the Azerbaijani accounted for 5%.

The survey participants were asked to answer more than 40 questions. The questions processing was carried out by the mathematical statistics method, the average population varied within 97%. The questions were identified in blocks. The main block for research and analysis and which is of interest within the state grant is the attitude of young people to youth policy and its implementation in the regions. To this end, one of the important questions, according to the researchers, was «Do you have friends?» question (See Table 1):

Table 1. **Results analysis of respondents' answers concerning social loneliness**

Yes, many enough	45%
Yes, a few (1-3 persons)	39,5%
No friends, only associates	10,5%
Neither friends nor associates	5%

From the results presented in Table 1, it can be concluded that the majority of respondents (84.5%) have friends, an alarming indicator in this answer is the fact that 15.5% have no friends. The reason for this indicator (15.5%) is modern social loneliness in the youth subculture.

In this context, the family is rather important in determining the environment of social loneliness as it the main social institution for educating the communicative qualities of an individual in society, the search for «self» among peers. Answering the question: «Do you consider your family safe?» the respondents' opinion was distributed according to the following quality assessment criteria (see Table 2):

Table 2. **Results analysis of respondents' answers concerning their family condition**

directions	yes	yes more likely than no	no more likely than yes	no	no answer
1. In regard to finances	21%	46%	24%	6,5%	2,5%
2. In regard to psychology	47,5	31%	12,5	5%	4%

The results of processing the respondents opinions presented in Table 2 show that 68.5% of respondents consider their family successful both psychologically and financially, but it is disturbing that more than 30% of respondents have a risk of social distress, which may further affect the psychological confidence in creating your own family.

One of the important components of harmony and the development of a growing personality is a positive relationship with parents in the family. Answers to the researchers' question: «What is your relationship with your parents?» are presented in Table 3.

Table 3. **Relationship with parents in the respondents' families**

Types	with father	with mother
Absolute mutual understanding	28%	31,5%
Sometimes conflicts happen	61,5%	59%
Total misunderstanding	10,5%	9,5

From the presented results of the survey on this issue, it can be noted that it is an indisputable fact that relationships with mother dominate in families rather than those with father, the head of the family.

Mother in the family, in the opinion of young people, is the main person to solve family problems, her leading position as the «keeper of home and tranquility» remains in 90 % of cases, the respondents either do not participate in conflict with her, or it flows relatively calmly.

Fathers, from the results presented by the respondents, are more vulnerable in conflict with the older generation, as they are less prone to the gentleness and diplomacy of its solving.

Respondents – survey participants rated their environment, the results are reflected in Table 4.

Table 4. **Analysis of the respondents' environment stay**

direction	yes	yes more likely than no	no more likely than yes	no	no answer
Family	57,5%	32,5%	6%	3%	1%
School/university	49%	42,5%	5%	2,5%	1%
Yard/ community	47,5%	41%	6,5%	4%	1%

The presented results objectively demonstrate that young people have a relatively positive communication environment, which is an average of 45%, since more than 55% of respondents do not consider their environment of living and communication in a positive way.

The reason for this situation, according to the research group may be a conflict among peers. The results summary of answering «How often do you have quarrels and conflicts with your peers?» question is presented in Table 5:

Table 5. **The results of the participants survey concerning conflicts**

Constantly	12,5%
From time to time	67,5
Nearly never	20%

The presented results are not encouraging, since the overwhelming majority of respondents – 80% are conflicting, against 20%, who noted that they practically do not participate in conflicts.

The causes of increased conflict in the youth environment are hormones, lack of culture and social behavior in solving controversial problems. Also, researchers believe that egocentrism is characteristic of modern youth and teenage subcultures.

The modern young generation does not have enough communication skills due to the low level of participation in public associations and organizations where there is an opportunity to pass the social school of success. This was vividly confirmed in the respondents answering: «To which group do you refer yourself in your class / company?» question (See Table 6).

The modern young generation does not have enough communication skills due to the low level of participation in public associations and organizations where there is an opportunity to pass the social school of success. This was vividly confirmed in the respondents answering: «To which group do you refer yourself in your class / company?» question (See Table 6).

Table 6. Social role of respondents in the peers circle

social position in the group	%
Leader	29,5%
Performer	24%
Outsider	9%
Outcast	4,5%
Other	33%

Out of the presented results, young people with a low social position (outsiders, outcast, other) – 46.5% – clearly dominate –46.5%, and the performers are also not far from them – 24%. Only 29.5% of respondents identified themselves as leaders, which in aggregate means 53.5% of young people who are mobile and ready to take feasible participation in the society life.

Scientists were interested in the problem of the modern youth pastime and asking «How do you usually spend time with friends?» question (See Table 7), we got the following results:

Table 7. Analysis of spending time by young people

Directions	%
Exchange ideas about the books they read	8%
Watch videofilms	19%
Listen to music	17,5%
Go in for sports	17%
Go dancing\clubbing	13%
Do nothing\ We are just together	17,5%
Other	8%

Also, it was not without interest that the question was raised concerning the knowledge of the survey participant and their involvement in various forms of leisure activities (see Table 8).

Table 8. Forms of youth participation in the proposed forms

Types of youth participation	%
Committees for Matters Concerning Young Persons	20,5%
Public associations	16,5%
Informal groups of interests	14%
Accidental groups (flash mobs, actions, quests, dance battles, etc.)	12,5%
Subculture groups	7%
Other	9%
No answer	20,5%

The submitted forms analysis of youth trends and the social experience of participation in the survey participants is not great. So from table 8 it is clear that more than 49.5% participate in the official ongoing forms of work among young people, but it is disturbing that it is an indisputable fact that 16% participate in youth subcultures and other non-governmental organizations, and more alarmingly that 20.5% of young people could not even position themselves with anyone.

It is not by chance that respondents answering the researchers' question: «Do you know examples of the most effective and popular forms of youth work in your town (village)?», 57.5% answered that they did not know that youth public organizations are still held in the regions and at the place of residence, only 42.5% can somehow be guided in this answer by the questionnaire.

The respondents of the survey were asked to assess the level of organization of work at the place of study (See Table 9-A) and place of residence (see Table 9-B):

Table 9. (A). **Assessment on a scale of quality rating work at the place of the respondents residence**

estimation	%
0	5%
25	14%
50	31%
75	40%
100	10%

Table 9. (B).

estimation	%
0	10%
25	17,5%
50	26%
75	38,5%
100	8%

The presented level of the quality assessment of the services provided fluctuates at the level of assessment slightly above average, which is extremely dangerous due to the low level of work being done.

According to statistics of the Ministry of Internal Affairs of the Republic of Kazakhstan over the past 5 years, the trend of juvenile delinquency and youth is increasing, since according to respondents (72.5%), attention is not paid to the infrastructure of youth leisure and recreation, and only 27.5% think that everything is relatively good.

Researchers wanted to know which specialists should organize work with young people? (See Table 10):

Table 10. **The specialists list according in the respondents' opinion that must organize leisure activities with young people**

List of specialists in the respondents' opinion	%
Social teacher	15%
Social worker	20,5%
Teacher of additional education	19%
Club workers	19,5%
Any interested individual	10%
The youth must organize their work themselves	11,5
Other	4,5

According to the respondents, the analysis of the presented specialties is heterogeneous and widely represents different specialties from the research participants themselves to any interested person.

However, analyzing the staff of some public associations and youth organizations of the Republic of Kazakhstan, the following picture is observed: the number of staff working with young people includes specialists in pedagogical specialties: teachers, university professors; lawyers, physicians, mathematicians, athletes, actors, artists, participants of Club for the Lightheaded and Quick-witted, musicians and many other talented people not only in the creative field, who are more than able to work with young people *on equal terms*.

The conducted sociological analysis of the level of education among specialists of the internal youth policy departments within the state grant (May, 2018) showed the following results.

The survey was attended by civil servants of the district, city departments of domestic policy and youth resource centers in Akmola oblast, the coverage was 98 people. It consisted of 45 girls and 53 young men aged 20 to 28 years. By education, the composition of the participants is represented: 73 people have an academic bachelor's degree, 15 have an academic master's degree and 10 have academic degrees of Master of Science. The specialty ranking showed the following dynamics among the respondents: pedagogical direction: psychological, philological, mathematical, historical education – 21; state and local government – 18; accounting and auditing – 16; political science – 14; cultural and leisure – 11; finance – 10; international relations – 8.

At the same time, we note that none of the above specialists have a diploma in social work with young people, i.e. specialists do not have competences in the field of scientific approaches to the organization of youth social policy. In our opinion, here is one of the key contemporary problems in the implementation of the state program on youth policy.

We are absolutely confident that the youth work organization may consist of the individual work of a specialist with a young person, and may be oriented towards large groups of young people or groups with common characteristics, for example, psychocorrectional, advisory. Work can also be carried out with large groups of young people, for example, educational work organized in an educational organization (school, college, university).

Depending on the direction, the work and the profession specifics of a professional, a young person may be an object or a subject of activity. A young person is an object of professional activity if he is not able to solve his own problems on his own, if he is applied to a paternalistic approach, etc. The subject of professional activity can be a young person, if he/she interacts with a professional, shows his/her activity, is able to bear responsibility for his actions, and is capable of self-education, self-determination, and self-development.

The youth work organization is most often differentiated depending on the areas or the institutions specifics where the work is carried out. For example: educational work, cultural and leisure work, vocational guidance, preventive work, work with young people in the community, work with young people on the shop floor, etc. [3].

Laconic, according to the researchers, was a question for respondents aimed at obtaining a positive result on the implementation of the Law of the Republic of Kazakhstan «On youth policy in the Republic of Kazakhstan» (see Table 11):

Table 11. **Opinion of respondents on the implementation of the Law of the Republic of Kazakhstan «On youth policy»**

Variants of answers	%
Yes	24,5%
Yes more likely than no	25,5%
No more likely than yes	22%
No	21%
No answer	7%

The answers of the respondents were divided equally: 50% were satisfied and 50% of the respondents could not objectively give a positive assessment of this implementation of the country's law.

At the same time, the respondents noted the main parameters of what the state needs to do in order to make each young citizen of Kazakhstan feel the law security and enforceability (see Table 12):

Table 12. **Recommended destinations for respondents on consolidation of the Law of the Republic of Kazakhstan «On youth policy»**

Directions	%
To create real conditions for the youth self-organization	40%
To help in the creation of the youth leisure infrastructure	12%
To create professional specialists training in the sphere of youth work	31,5%
To create social lifts for all social youth groups	8,5%
Other	1,5%
No answer	6,5%

From the submitted processed data of respondents, it can be noted that 52% of respondents consider the need to create real conditions for self-organization of young people and create leisure infrastructure on free terms (at the expense of the state), 31.5% believe that professionally trained people should work with young people personnel that would ensure the reality and objectivity of the implementation of the social elevators work (8%).

Thus, the survey once again shows that Kazakhstan's society has come to an understanding that traditional institutions of socialization can no longer provide the parameters necessary for self-preservation and reproduction of society.

The modern concept of social and pedagogical support for youth should be based on more effective youth work as combination of means and forms of socialization, designed to integrate the younger generation into social life, guaranteeing the necessary personality and society. Against the background of these changes, there is need to create a system of juvenile services and the formation of specialized socializing activities.

Based on the above analysis, we believe that the modern realities of the time dictate the need for a balanced and reasonable public policy with respect to the younger generation in order to form socially positive properties and qualities in young people. An important step in this direction is the introduction of a conceptually new specialty in the field of organizing work with youth and the youth policy of the Republic of Kazakhstan – «Organizer of youth work».

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CREDIT TECHNOLOGY OF TRAINING: EXPERIENCE AND RESULTS OF IMPLEMENTATION IN THE EDUCATIONAL SYSTEM OF THE REPUBLIC OF KAZAKHSTAN ON THE MAJOR OF HEALTH SAFETY AND ENVIRONMENTAL PROTECTION

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Abstract

The system of professional training in the field of civil defense, labor safety and the environmental protection had been functioning in the USSR, but since 1991 it began to undergo significant changes. Some features of the transformation of various aspects of training in the sphere of health safety that occurred in the Republic of Kazakhstan as a result of the introduction of credit technology of training into the higher education are contained in this article.

Keywords: credit technology training, health safety, labor protection, civil defense, environmental protection, sustainable development.

► Today, more often, opening a new newspaper, switching on a radio or TV, one can get news about the consequences of emergencies, the facts of industrial injuries, violations of the balance of ecosystems and other phenomena and events that threaten the life and health of a large number of people. The world statistics of the results of exposure to harmful and dangerous industrial and environmental factors on humans shows a steady increase in the number of people affected as a result of the natural and man-made disasters, industrial accidents and incidents, which raises many questions, «At the present level of scientific and technological development, is it possible to achieve such state of health safety in which the number of accidents and victims would not increase but decrease?», and «Are there professionals involved in the security issues?» [1]

To answer these questions, first of all, ones need to understand where the phrase «health safety» came from, and then systematize existing threats to man in the technosphere into a single academic and scientific area on the credit technology of training.

Officially, the history of health and safety engineering (HSE) is taken from the period of the First World War, when aviation was used in combat operations, which necessitated the organization of protection against air bombardment and led to the creation of the local air defense systems (LADS), rightly considered the progenitor of the HSE. By the beginning of the Second World War, the number of the USSR LADS formations exceeded 6 million people, whose forces liquidated the consequences of Nazi air raids, fires were localized, accidents were prevented at the facilities of the national economy, bombs, shells and mines were neutralized. In the post-war period the nuclear confrontation between the USSR and the USA and the intensive build-up of the nuclear potential of both powers forced to revise the LADS organization in 1956 in order to protect the population from modern weapons.

By 1961, the formation of the republican, territorial, regional and district services of LADS became mass forces; the creation of self-defense groups was envisaged in all residential areas of cities and towns; the teaching of the population and the objects of the national economy to the methods of protection has received total dissemination. Thus, the LADS was transformed into the Civil Defense

(CD) – a system of the nationwide measures to protect the population and the national economy, improve the sustainability of economic facilities, as well as rescue and other urgent work (ROUW) in emergency situations (ES) of peace and military conditions.

The CD in the USSR was part of a centralized system of defense measures and a nationwide affair: every Soviet citizen took an active part in training and exercises on civil defense; in all educational institutions, industrial facilities and housing and communal services, safety training was conducted in emergency situations, and under the Council of Ministers of the USSR, Soviets of Union Republics, executive committees of the regional, city and Soviets of People's Deputies, the Emergency Situations Commissions (CoES) and CD headquarters were functioning effectively.

In 1991, with the collapse of the USSR, CD as a system of nationwide events ceased existing; in the sovereign states headquarters of CD on the domestic levels were disbanded and has been kept at enterprises only.

The total involvement of the population in the training sessions for security and protection in emergency stopped, but in the general curriculum of schools and academic institutions, according to the order of the Board of the State Education of USSR #473 since 9 July 1990, the discipline «Human Activities' Safety» was introduced, which, in addition to aspects of CD, also included questions on labor protection [2].

However, over time, the problem of systematization of the training of qualified specialists on labor safety, protection in emergency situations and environmental protection, necessary for a young, dynamically developing Republic of Kazakhstan, acquired more precise outlines, and therefore in 1995 the Kazakh State Academy of Architecture and Construction started teaching engineers on «Ergonomics and Labor Protection» and «Engineering Protection of the Environment»; during the next three years, the foundation for the opening of the specialty «Protection in Emergency Situations» was laid, and in 1999 the first students group for the «Technical and Legal Expertise in Emergency Situations» was formed. Subsequently, specialists on labor safety and environmental protection began to be trained at K.I. Satpayev Kazakh National Technical University and Karaganda State Technical University. Kokshetau Technical Institute of the Ministry of Emergency Situations of the Republic of Kazakhstan focused on the professional training of personnel for protection in emergency situations, fire and industrial safety.

In 2004, after Kazakhstan ratified the Bologna Declaration and implemented the credit technology of training and the three-level system of higher education (bachelor's – master's degree – PhD), the specialization «Ergonomics and Labor Protection», «Protection in Emergency Situations» and «Technical and Legal Expertise in Emergency Situations» in the single academic major – «Health Safety and Environmental Protection», which currently provides training for bachelors and masters in a number of Kazakhstani universities [3].

The main goal of Kazakhstan's accession to the «Bologna Process» and the introduction of credit technology of training in the National higher education system is integration into the single European educational space. To create a Kazakhstani model of credit technology of training, the experience of foreign universities of more than 50 countries in Europe, the United States, the Asia-Pacific region and the CIS was thoroughly benchmarked.

By the present time the following stages of introduction of credit technology of training into the system of health safety and environmental protection has been completed:

- transition to the assessment of the cost of training modules and pedagogical load in credit hours, and students' achievement is estimated according to the international alphabetic ten-point system;
- ensuring the uniformity and consistency of knowledge transfer through the establishment of a tight logical connection between the subjects studied (prerequisites and post-requisites) established by the Model Curriculum and the Work Curriculum as well;
- increase in the volume of the university component (the number of educational programs) to 50% and decrease in the number of classrooms (not more than 18 hours per week) and their duration (50 minutes). In-depth and broader subjects learning is devoted to the self-study of students (SSS) and the SSST (self-study of students under the guidance of the teacher: getting consultations, passing semester and protecting course projects), which allowed converting the «teaching» into the «learning» format. Teacher no longer acts as a source of ready knowledge, but becomes an organizer of the cognitive-mental activity of the student, who, in turn, acquires the experience of continuous self-education;

- providing students with an opportunity of accelerated learning at the expense of summer semesters and trimesters, the freedom to choose elective courses in the formation of individual curricula;
- cancellation of credits (and credit books) and the introduction in each semester of two ratings for assessing the academic performance of students (performance indicators are added to the rating lists instead of the credit books);
- establishment of weighting factors for the rating (0.4) and the examination (0.6) in the derivation of the final score for each discipline studied;
- increase students' motivation, on the one hand, by introducing a system of penalties for academic debts, on the other hand by providing the opportunity to receive sponsorship grants for training (Scholarships) from leading manufacturing companies interested in qualified specialists on health safety and environmental protection;
- transition to teachers' video presentations in equipped multimedia classrooms using handouts instead of traditional lectures. In fact, students are provided with visual indications of what exactly deserves attention in the lecture;
- expansion of the range of qualification requirements to specialists on health safety and environmental protection. The modern educational standard, adapted to the credit technology of training, obliges graduates of the specialty «Health safety and environmental protection» to be competent not only in technical issues of providing safe and harmless working conditions, preventing and eliminating the consequences of man-made accidents and natural disasters, but also in the specifics of the systems of the Environmental Management (ISO 14001) and Occupational Health and Safety Management (OHSAS 18001 and OHSAS 18002) [4].

One of the most objective indicators of the effectiveness of credit technology of training on the specialty «Health Safety and Environmental Protection» is a new system of remuneration of instructors' staff. From 2004 to 2014 the annual pedagogical load of teachers on the health safety and environmental protection decreased by 2.5 times, whereas the payment of their labor increased by an average of 30 times.

The fee of the associate professor on health safety and environmental protection in the period from 2004 to 2014 increased from 0.7 to 19.5 US dollars for the academic hour. Senior lecturers and assistant professors in 2014 began to earn \$13.5 per academic hour, which is almost 30 times higher than their rate in 2004.

Thus, the example of the introduction of credit technology of training in the system of health safety and environmental protection in Kazakhstan shows that the reform, bringing the state educational standards closer to the European level, also allows economically optimizing the sphere of higher education in the country and making it attractive for foreign students. Despite the fact that there is no major of «Health Safety and Environmental Protection» in high schools of the most countries participating in the Bologna Process, Kazakhstani universities that teach such specialists are striving to achieve the convertibility of their diplomas in the international educational space and on the world labor market.

The combination of various engineering specialties in «Health Safety and Environmental Protection» is explained not only by the political desire to bring Kazakhstan's education in line with international standards, but also the advisability of applying a systematic approach to scientific research, academic training and professional training of personnel in the field of health safety and the environmental protection, the main purpose of which is to increase the effectiveness of the forecast, prevention and elimination of the possible industrial accidents, natural disasters, man-made disasters, social conflicts, and environmental disruptions [5].

For the system development of standards and regulations for health safety and environmental protection, it is necessary to investigate the risks of various origins as interrelated destabilizing factors, i.e. in a complex, which was officially announced at the Second UN Conference in Rio de Janeiro: «... addressing the problems of the environment and economic development in a complex and coherent way is the only way to provide a safer future for mankind». Emergency incidents of recent years undoubtedly show that the dangers and threats are becoming increasingly cumulative: wars lead to violations in the technogenic, social and environmental spheres; industrial accidents can induce natural disasters, and natural disasters can negatively affect the state of industrial safety.

In the CIS space, an important step towards the integration of industrial safety systems is the development of common Technical Regulations (TR) of the Customs Union (CU), formed by Russia, Belarus, Ka-

zakhstan, Armenia, and Kyrgyzstan. To date, a lot of TR CUs have already been approved, i.e.: on the safety of railway rolling stock, high-speed rail transport, low-voltage equipment, packaging, pyrotechnic products and products intended for children and adolescent, toys, perfume and cosmetic products, on food safety, on the safety of elevators, chemical products, machinery and equipment, fish and fish products, etc.

TR CUs coverage of a wide range of different branches of the economy, industry and agriculture in a single legal field in several countries testifies to the systematic approach to standardization and unification of the requirements of integrated security.

A systematic approach to solving security problems is the only true one that provides protection of a person and territories from all types of hazards, using a full set of forms, methods and means to counteract destabilizing factors within the framework of a unified strategy. The first step in this strategy implementation is the unified training of specialists on health safety and the environmental protection of a broad profile that are not only concerned with labor protection, but also in the environmental affairs, and in protection from emergency situations, and in the industrial safety as well.

One of the main tasks of the Kazakhstani system of the professional training on labor safety and protection is close interaction of educational institutions with industrial enterprises. According to the requirements of the state educational standards of the Republic of Kazakhstan, on the basis of the industrial enterprises, branches are organized where students of the specialty «Health Safety and Environmental Protection» manage industrial practice. The practical component was increased to 5 weeks per year according to the requirements of the credit technology of training.

For example, Chevron is carrying out a number of joint projects to exchange experience between specialists of Kazakhstan's Tengizchevroil (TCO) oil production leader and the Departments of Health Safety of several National Universities: regular presentations, conferences and seminars, but the main efforts are aimed at improving the quality of training specialists in the field of health safety and environmental protection. One of the long-term joint projects of the Departments «Human Activities' Safety» and TCO can be considered the raise of the safety culture level of the country entire population, the introduction of the slogan of «Safety first!» and its priority «Work without accidents» in all spheres of industry, economy and any daily activity. The ultimate goal of joint programs is the awareness by each person of the principles of safety and the need to follow it under any conditions, which in the end should lead to an increase in the overall level of the safety culture, a reduction in risk in production and the direction of public consciousness at the rate of safety and environmental friendliness [6].

Research and development work in the field of health safety and environmental protection is extended to various fields of science and technology, such as psychology, medicine, political science, seismology, glaciology, pedagogy, hydraulics, mechanics, logistics, law, ecology, economics, physics, construction Construction, materials science, speleology, and etc. Indeed, to date, there is no exhaustive list of problems of human security; the instability of the world economy, inter-ethnic enmity, religious intolerance, the health crisis, inadequate access to education, the depletion of non-renewable resources, information security, the emergence of new diseases can be added to the list above.

As a result of intensive industrial-innovative development and technical progress, the subspecies of technogenic risks are dynamically multiplying. Therefore, in spite of the fact that in everyday life only unexpected abnormalities of human activity are attributed to production incidents and emergencies, modern realities indicate that all of them have gradually become the norm of everyday life.

The steady increase in the scale of the impact of various harmful and dangerous factors on human and environment was first predicted in the second half of the 20th century, but people began to formulate recommendations on what to do to control and manage natural, technogenic, social and other risks recently.

First of all, as an integral approach to solving the problems of civilization in the 21st century, the idea of sustainable development is proclaimed. It refers to the process of human transformation of the environment that meets the needs of today, but does not compromise the ability of ecological systems to sustain life in the future. In order to transit sustainable development from idea into reality, mankind has to move to a new mode of life, where only qualitative changes in the natural environment are permissible, and quantitative growth is sharply limited or completely excluded.

Unfortunately, this recommendation is obvious, but extremely difficult: mindful of the perniciousness of anthropogenic impact, emotionally people are irresistibly striving for progress, and it is already impossible to slow down neither the development of technologies that improve the consumer properties of new-

fangled and ultramodern products, but at the same time depress the ecological integrity of the planet, nor the natural increase of consumers themselves.

Разрешению противоречий между уменьшающимися возможностями окружающей среды и умножающимися потребностями общества должно поспособствовать изменение сугубо потребительского отношения человека к природным ресурсам и производственной сфере. Значительное влияние на формирование и развитие культуры безопасности могут оказать квалифицированные специалисты в области безопасности жизнедеятельности и защиты окружающей среды. The resolution of the contradiction between the diminishing capacities of the environment and the multiplying needs of society should be facilitated by a change in the purely consumer attitude of human to the natural resources and the industrial sphere as well. Qualified specialists on health safety and environmental protection would provide a significant influence on the safety culture formation and development.

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II. LIFE SCIENCES

DEVELOPMENT OF SAUSAGE WITH PROTEIN SUPPLEMENTS

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Abstract

In this article is presented the technology of meat production products combined dietary and therapeutic and prophylactic purpose with an optimal calcium and iron.

In modern conditions the development of market economy and the development of a balanced and functional food products is an important social objective, so its decision will affect not only the extension of human life, but also an increase in active, creative period of life, the preservation of health, vitality and capacity for work.

In this regard, it becomes extremely important to develop a new direction for the improvement of meat-based multi-technology product functionality in order to improve the human diet, thus expanding the range of specialized products and more efficient use of the resources of the meat industry.

The purpose of this work is to provide a sausage for people suffering from iron deficiency and calcium with mineral and organic additives.

Keywords: functional food, sausages, food safety, calcium, supplements.

► Research methods. Mass fraction of moisture, protein, lipid was determined by conventional techniques; designing formulations was performed by the method of NN Lipatov; the safety parameters were determined in accordance with SanPiN 2.3.2.1078.01; organoleptic assessment is on a 5 point scale in accordance with GOST 8756.1-70.

In developing the initial evidence is based requirements for the composition and quality of special sausages for people suffering from iron deficiency and calcium, guided by the norms of physiological needs for nutrients and energy, as well as the concept of a balanced and functional foods.

According to the theory of a balanced diet analysis of representations about the specific metabolic processes and physiological characteristics of the individual categories of people allowed to formulate a list of science based requirements for recruitment and the ratio of nutrients:

- correlation protein: fat should be 1: 1-1.2;
- correlation of saturated and polyunsaturated fatty acids in the product should be 3: 1;
- mass protein share should be 12-16%;
- The product must be balanced in mineral and vitamin content.

Designing recipes products was carried out with the use of computer modeling of the balance system and quality evaluation of multicomponent food systems, allowing to develop food products with the required combination of properties, predetermined level of adaptation to the specific metabolism of consumers with a variety of physical and physiological status [1, c.33]).

As a source of protein in developing products using lamb and horse meat monosort first grade, to ensure rational use of the resources provided for the use of meat skimmed milk powder, blood plasma and isolated soybean protein.

Table 1. **Formulation of experimental sausage**

Name of raw materials, spices and materials	Sausages	
	Formulation 1	Formulation 2
Unsalted raw kg to 100 kg		
Lamb monosort	50,0	50,0
Horse meat 1 grade	25,0	27,0
Powdered milk	2,0	10,0
blood plasma	5,0	5,0
Eggs	3,0	3,0
soy isolate	15,0	5,0
Spices and materials, g. per 100 kg		
kitchen salt	2200	2200
sodium nitrite	7,5	7,5
Sugar	120	120
Black pepper	120	120
Allspice	60	60
Cardamom	40	40
calcium chloride solution	500	500

According to microbiological indicators and indicators of food security of the product corresponded to «Hygienic requirements for quality and safety of food raw materials and food products.

«Technological process. Raw after veterinary inspection, stripping and wet toilet undress in rooms where the temperature 10-120C and relative humidity above 70%.

Cutting, deboning and trimming meat produced in accordance with the current technological instruction. Trimmed meat is weighed and exposed to salt [2, c.16-18]).

In our experiments, we used the method of salting meat in particulate form (fineness of 6 mm) with concentrated brine density of 1.201 g / cm³ containing 26% NaCl.

To prepare a concentrated solution of salt per 100 kg of cold water take 35 kg of salt, stir thoroughly, the solution was allowed to stand for settling impurities and the density is checked using a hydrometer.

The solution was filtered prior to use through a layer of cheesecloth and cooled to a temperature not higher than 4C.

100 kg of raw material is added 8.5 kg of concentrated solution of the salt (normal salt is 2.2 kg , water is 6.3 kg).

Stirring of meat with brine in the mixers produce for 2-3 minutes and allowed to uniformly distribute the total absorption of salt and its meat.

During salting and sodium nitrite is added in an amount of 7.5 g per 100 kg of raw beef in a solution concentration of not more than 2.5%. Duration of salting is 8-10 hours. Egg components prepared as follows: fresh washed and split, egg powder is hydrated in a mixer at a ratio of 1: 3 with water. Soy protein and milk powder are hydrated immediately before cooking minced in 1: 2 ratio with cold water [3, c.116]).

Table 2. Chemical composition of the finished product

Component name	Finished products		Control
	Formulation 1	Formulation 2	
Protein in%	16,5	16,7	13,9
Lipids in%	18,5	18,1	21,5
Carbohydrates,%	0,4	0,4	0,2
Water %	64,5	64,6	64,2
Mineral substance in mg per 100 g			
Calcium	180,5	181,7	123,9
Magnesium	26,6	26,8	25,7
potassium	120,2	121,7	119,9
Sodium	79,3	79,7	78,1
phosphorus	185,5	184,7	187,3
Chlorine	20,8	21,4	21,7
Iron	2501,0	2531,1	1645,1
Iodine	165,1	164,3	162,4
Fluorine	15,8	16,3	9,1
Vitamins, in mg per 100 g			
A (Retinol)	0,01	0,01	0,01
B ₁ (Thiamin)	0,30	0,31	0,27
B ₂ (riboflavin)	0,11	0,10	0,12
B ₆ (Pyridoxine)	0,23	0,27	0,21
E (Tocopherol)	0,24	0,23	0,12

For the preparation of minced meat and other raw material ingredients are weighed according to the formulation

Minced meat cooked on the cutter, with the beginning of the process horsemeat and mutton gradually adding other components, and the duration is 10-12 minutes of cutting. Further process is conventional.

Table 3. The content of amino and fatty acid composition of the finished products

Name	Norm FAO / WHO	Finished products		Control
		Formation 1	Formation 2	
Amino acids g / 100 g protein				
Isoleucine	4,0	4,5	4,7	4,4
leucine	7,0	7,7	7,8	7,1
lysine	5,5	7,0	7,2	5,9
Phenylalanine + tyrosine	6,0	8,2	8,7	8,2
Tyrosine	6,0	8,3	8,8	7,1
Methionine + cystine	3,5	3,8	3,5	3,1
Threonine	4,0	4,3	4,2	3,9
Tryptophan	1,0	1,2	1,1	1,1
Valine	5,0	5,3	5,8	5,4

As can be seen from the above tables 2 and 3, developed sausages compared with the control have a higher quality of the chemical composition, as well as in terms of the minimum amino acid close to the ideal product (reference FAO / WHO).

Mathematical modeling of preferred prescription ingredients provided to set the initial requirements of the quality indicators of the finished product.

Our experiments have shown that the protein and mineral supplements allow their use as additives that enrich meat product essential mineral components such as calcium and iron, as essential amino acids and unsaturated fatty acids.

On the body affects not only the quantity but also the ratio of these components (calcium and iron), their optimal ratio is 1: 1 or 1: 1.5, and it creates better conditions for the assimilation of calcium.

Microstructural studies of experimental and control batches of sausages showed that beef is composed primarily of mechanically crushed to a fine grained protein mass of muscle tissue containing large fragments of muscle fibers and connective tissue, which is the average size of 350-400 microns.

Not destroyed particles retained typical morphological characteristics of the feedstock, which can be judged on ingredients stuffing.

The fat released during chopping of disrupted cells, distributed in the stuffing in the form of fat droplets in the vacuoles, and in the fine grain size of the protein mass of from 5 to 60 microns.

Minced mass of relatively compact, permeated by vacuoles and capillaries with clearly defined boundaries, sometimes merging with one another, the average size of 150-170 microns.

The microstructure of the pilot batches of sausages characterized by a relatively compact mass of minced meat, which includes in its membership the large fragments of muscle and connective tissue, spice particles as fat droplets. In this form of fat drops of up to 50 microns uniformly distributed in the mass of fine meat, what appears to affect protein and mineral supplement [4, c.28-29]).

Thus, as a result of the study we demonstrated the possibility of using the protein-mineral supplements when creating specialized sausages intended for the regulation of calcium metabolism of iron deficiency and correction of unsaturated fatty acids.

Optimizing the number of supplements at the same time having a positive impact on the balance of the mineral composition provides a favorable ratio of calcium and iron in the finished product.

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THE USAGE OF HORSE PLACENTA IN MEDICINE AND COSMETOLOGY

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Abstract

Placenta extract is one of the popular beauty ingredients used these days. It has ageing care properties so used in many ageing cosmetics and supplements. Benefits and properties of horse placenta were found according to articles review which demonstrates data about the effectiveness of Placenta Extract is especially for disorders of the nervous system, allergies, and lifestyle illnesses.

Keywords: placenta, equine, health, placenta for health, preventive, treatment, improvement of metabolism, amino acids.

INTRODUCTION

There may be stories that Marie Antoinette (last queen of France), Cleopatra used horse's placenta, making it have a subtle place in the history. However, it is a fact that it has been utilized variously for the therapeutic medicine, private medicine and beauty for a longtime. Henry VIII injured his left leg which lead to ulcerative process in 1527 year – a reign that might have gone differently had he applied horse placenta to his chronic leg ulcers. Several star players, multi-millionaires for running around a lot and occasionally kicking a ball straight, have visited a Serbian therapist or housewife – called Mariana for treatment of joint injuries. Mariana can reduce recovery time from eight weeks to two days, a mind-boggling result that defies laws of tissue injury and healing. She applies or injects a cream or liquid to the injured body part, and that her concoction contains stem cells of horse placenta. Placenta has a lot of nutritional substances why the female animals eat placenta immediately after giving birth, thereby restoring the energy lost during the process of birth. Besides those characteristics mentioned above, it also has anti-inflammatory, cell regeneration effect, supports the body of women during menopause. They improve the general state of human health, accelerating metabolism, increasing the protective functions of the immune system. Often drugs with horse placenta are used as an adjunct in the treatment of the liver, bladder, skin diseases, diseases of the ENT organs and the musculoskeletal system. Also placenta helps to recover faster after diseases, competitions and trainings for professional athletes, for hair growth by increase of growth factor.

The healing properties of the placenta

Now there are many different cosmetic and pharmaceutical products based on the placenta, both in the form of topical & consumption i.e. creams and dietary supplements respectively[1,2]. Production of capsules with placenta is a rather complex and time-consuming process. The placenta has a delicate structure, so to preserve all its properties, it is necessary to observe many conditions such as temperature, acidity of the medium, processing time. Placenta capsules are created by

enzymatic separation extraction (Laenne method). This technique creates most of the existing placental drugs that retain all the nutrients[3]. The capsules which are packaged in the placenta are created from special hypoallergenic raw materials. The placenta of animals and people has a specific smell, so the additional task of the manufacturer was to preserve all the useful properties of the placenta and at the same time try to minimize the smell. That is why the placenta is packed in solid and sealed capsules [4].

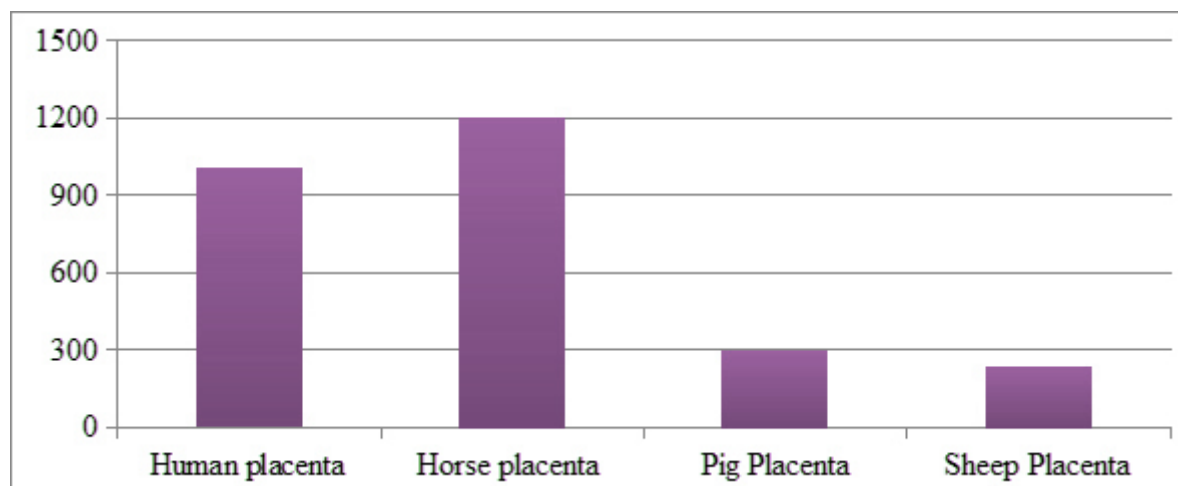


Figure 1. Effectiveness of horse placenta in comparison with placenta from another mammals

Effects of placental cosmetics:

In placenta, growth factors such as EGF (epidermal growth factor) works on epidermis and FGF (fibroblast growth factor) on dermis (figure 2)[5,6].

These are essential ingredients that people originally have and even if they use placenta in cosmetics, they do not reach the inner or the dermis than the stratum corneum of the epidermis[7]. However placental cosmetics can penetrate deep into skin with use of iontophoretic device. So there is possibility that epidermal cells and fibroblasts can be activated by using an iontophoretic device[8].

Placenta has a function to prevent spots by inhibiting the enzyme tyrosinase, which plays a main role in process of making melanin pigment. So this is used in skin-whitening cosmetics[9].

Antioxidant action:

Placenta has antioxidant action to eliminate active oxygen and delay the aging of skin. Activated oxygen, essential which has a role to repel bacteria and others invading the body. Placenta contains antioxidant enzyme SOD (superoxide dismutase), vitamin C, E so antioxidant effect can be expected [10]. In placenta we have vitamins B12, B6, A, E, K, C minerals Mg, phosphate ions, K, Zn also transferrin – iron-binding blood plasma glycoproteins that control the level of free iron (Fe) in biological fluids[11].

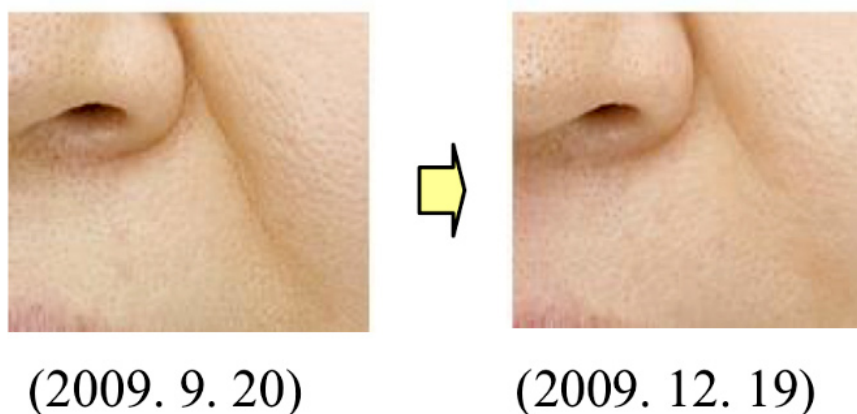


Figure 2. Rejuvenating effect of horse placenta on skin.

Effects Placenta extract on the body

The main action of capsules with horse placenta is their ability to accelerate cell division. Due to this, the effect of rejuvenation occurs[12]. Cell growth factors decrease after 30, and by the age of 50 they become almost 2 times less. Using the placenta, you will get more growth factors and will look much younger[13].

High traceability

Traceability is the high possibility of tracking the process from identification of animals that extracted placenta extract to rearing, processing, manufacturing, and distribution. Especially, in the case of domestic Thoroughbred, as the name of «Blood Sports», management of bloodline is thorough. Also, compared with pigs, the number of producers is small, training and health management are thorough, so there is high traceability[27]. There are the Kyrgyz Republic, Argentina, New Zealand, etc. as raw material procurement sites of overseas horse placenta, but traceability is high because horses in these countries are also at high level of production control[28].

Applicable to JHFA (food only)

Among supplements including placenta extract, placenta foods are set for the JHFA mark subject to review and certification by the Japan Health and Nutrition Food Association (Japan Health and Nutrition Food Association). The JHFA mark refers to the setting of standards for health foods and the accreditation system related to the standards, which is a mark of confidence and security when consumers choose health supplements. For now, the placenta extract to which this JHFA mark is applicable is derived from horses. Placenta cosmetics are not subject to JHFA[29].

The disadvantage of horse placenta is high price

Although it is a horse placenta with a great merit in terms of safety and ingredients, the disadvantage is that the price is higher compared to the placenta extract of pigs and sheep. In the first place, the number of domestically produced thoroughbreds is limited, horse can only give birth once a year, because it can not give birth, mass production can not be done, etc.[30]. The higher the concentration of cosmetics containing horse placenta, the higher the price will go up.

CONCLUSION

They improve the general state of human health, accelerating metabolism, increasing the protective functions of the immune system. Also, the horse placenta stabilizes the pressure, improves the psycho-emotional state of a person, contributes to the normalization of the internal organs. Often drugs with horse placenta are used as an adjunct in the treatment of the liver, bladder, skin diseases, diseases of the ENT organs, diseases of the musculoskeletal system. Also placenta helps to recover faster after diseases, and professional athletes — after competitions and trainings. One capsule of Kirei de Placenta contains 220 mg of placenta. This drug uses the placenta of horses that live on the ecologically clean island of Hokkaido. This breed of horses has a good pedigree, it does not have any diseases. The preparation Kirei de Placenta is made according to GMP standard, which not only guarantees the quality of placenta extraction, but also excludes the use of any additives by horses. Besides in capsules Kirei de Placenta contains large amounts of horse placenta than its competitors. At the moment, only two species of animals are allowed to use placenta in Japan: horses and pigs. Why should you choose a horse placenta after all? There are several reasons for this: the horse placenta is safer, due to the fact that the body temperature of horses is higher than that of pigs, so most parasites die in the body of horses; secondly, the quality of the horse placenta is higher, since the amount of nutrients is concentrated on one foal.

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EFFECTIVENESS OF THE USAGE OF MARE'S MILK IN VARIOUS DISEASES

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Abstract

Recent interest in mare's milk is associated with the fact that it is an ancient relic of Turkish people and contains a wide variety of nutrients with health-promoting properties. Among milks of many mammal species, it is the mare's milk that is highly appreciated for similarity to human milk in terms of chemical composition allowing its use as a substitute for mother's milk in infant feeding. It can also be used in feeding people with various health conditions, particularly the patients in group of risk or suffering from Tuberculosis, Hepatitis C, psoriasis, atherosclerosis and etc. This article sums up the usage of equine milk in different fields of medicine and its controllable effect in many diseases.

Keywords: saumal, mare's milk, psoriasis, atherosclerosis, cosmetology, digestion, viral diseases, chemotherapy.

INTRODUCTION

Horse milk is one of the most important basic food stuffs for the human populations in those areas of central Asia, where a lactic alcoholic beverages called kumis and saumal are traditionally produced through fermentation [1]. These products are used in Russia and Mongolia for the management of digestive and cardiovascular diseases in Italy, equine milk is recommended as a substitute for bovine milk for allergic children [4].

Role of mare's milk was proven in different medical fields, for example: in skin disorders, chemotherapy, metabolic disorders, cosmetology and etc.

In skin disorders:

Analysis of recent literatures shows that, usage of mare's milk is most definitely recommended for skin problems such as atopic dermatitis, eczema and psoriasis [3]. This knowledge even dates back to ancient Egypt, when Queen Cleopatra bathed in mare's milk every day as part of her beauty ritual [4]. Skin diseases, such as psoriasis and eczema are best treated from the inside out, from the place of action, removing the cause, not the symptoms [5]. In atopic dermatitis concentration of EFA (essential fatty acids) decreases, even though it was recently established that there is no deficiency of linoleic acid in this eczema [21]. In addition, the concentration of linoleic acid tends to rise, to lift into the blood, into the milk and into the fat tissues of patients with atopic eczema [20]. This indicates a low conversion of linoleic acid to alpha linolenic acid (ALA). The administration into the human diet of alpha linolenic acid is considered to make improvements in skin roughness and also in the catecholamine blood concentration [19]. All these indicate that mare's milk is more similar to human milk than cow's milk [11] and more suitable for allergic children's diet as a substitute in treating dermatitis [14].

In atherosclerosis:

Recent researches prove that raw horse milk and fermented derivatives are considered useful in the prevention of atherosclerosis [4]. They support a justified cholesterol level. Fat regime is the most important factor that influences the human condition, especially in cardiovascular diseases. Health quality would be better if we decreased fat in our diet, and if we changed the unsaturated fatty acids ratio [7]. The high value of unsaturated and many saturated fat acids has an adjusting effect on a destroyed fat metabolism [13]. Used regularly, it can decrease the cholesterol level of the blood. Upon comparing the cardiovascular status of ovo-lactovegetarians and vegans, it has been proven that while both are healthier than meat-eaters, vegans have better cardiovascular status than vegetarians who consume dairy cow products [15]. Mare's milk apparently contains L-linolenic (ALA) and linoleic (LA) acid amounts, which are called EFA (essential fatty acids) and traces of ω -3 and ω -6, higher than in cow's milk [5], although many polyunsaturated fatty acid (LCPUFA) contents are limited [8]. From L-linolenic and eicosapentaenoic acid derive prostaglandins, like PGI₁, with vasodilatory effects, thromboxanes, like TXA₂, with vasoconstrictive effects, and docosahexaenoic acid (DHA). From linoleic acid derive many other prostaglandins (PGI₂) and thromboxanes with different influences on the circulatory system [10]. Fat from cow's milk contains relatively high concentrations of saturated fats which have been implicated in heart diseases [18]. Cow's milk fat has been identified as a cholesterol elevating fat, because it contains cholesterol and is primarily saturated [9].

In chemotherapy:

Horse milk is having a great impact in stimulation of all detoxification mechanisms of the body like in liver, kidneys, sweat glands etc., which shows a great effect on healthy blood texture, as of cancer therapy through its anti-cancer activity [28]. Along with surgical treatment cancer disorders are treated with irradiation therapy and chemotherapy which are ineluctable [23]. This type of therapies are attacking the sick cells along with healthy cells especially the cells of hair roots, blood forming organs, immune system, guts, and the skin [27]. This is what leading to loss of hair, intestinal problems and making the patient most vulnerable to infections [19]. The defence mechanism against the metastasis, appearance of other tumours and banal infections barely helps [17]. In addition condition of the body gets worsened by the metabolic toxins and non-functional detoxification mechanism. To trigger the detoxification mechanism through liver, skin, kidneys and to strengthen the patient now a days mare's milk is highly recommended because of its enormous nutritional value [15]. Mare's milk is also proven to treat tuberculosis (Gilmudtinova et al., 2011), intestinal infections and anaemia. Dietary supplements and pharmaceutical extracts have also been reported to accelerate post-surgical recovery (7 Bulletin UASVM Animal Science and Biotechnologies 73(1) / 2016) [23]. Horse milk is not a magic cure by which you can cure incurable ailments, but it has been reported to have a very good influence on health and to provide support in the battle against a diversity of different disorders.

In cosmetology:

Equine milk is used in cosmetology with very good results. Horse milk fat is considered an important ingredient in Mongolian cosmetics because of its high polyunsaturated fatty acid content like alpha-linolenic acid (ALA) (Temuujin et al., 2006). mare's milk contains more albumins (finely dispersed), therefore it doesn't develop allergy. The large amount of whey protein and exogenous amino acids in mare's milk make it a more beneficial source of nutrients for people than cow's milk. Milk proteins are active in skin hydration and skin ageing prevention (Cotte, 1991).

In digestion:

The similarity of mare's milk to breast milk makes it an interesting substrate [3]. As mentioned the uses of mare's milk in wide variety of medicine, the digestive disorders are of a great example which shows the impact of mare's milk in pathologies. Immunoreactivity of the digested mare's milk products is carried out by the lactic acid fermentation by *Lactobacillus casei* LCY, *Streptococcus thermophilus* MK10U and *Bifidobacterium animalis* [22]. Immunoreactivity of the milk proteins was assessed by competitive ELISA and the separation of proteins was studied using a tricine SDS-PAGE method [29]. Immunoreactivity of β -lactoglobulin, β -casein, κ -casein decreases significantly with the lactic acid fermentation and it is connected to the type of bacterial strain [27]. Decreased and decline of immunoreactivity was caused by simu-

lated digestion processes are obtained in the experiments as follows: lactoferrin: 95%, β -lactoglobulin: 94%, β -casein: 93%, α -lactalbumin: 82%, α -casein: 82%, bovine serum albumin: 76% and κ -casein: 37% [7]. The results of the study indicated that microbial fermentation with tested strains is a valuable method for reducing the immunoreactivity of mare's milk proteins [25]. However, further studies with other bacterial strains are needed for reduction or complete elimination of mare's milk immunoreactivity to possibly introduce fermented mare's milk into the diet of patients with immune-mediated digestive problems [8].

In viral diseases:

Several constituents in mare's milk may have a potentially protective effect. Not only proteins of the non-specific immune system (lysozyme, lactoperoxidase, LF), but also specific immunoglobulins (IgM, IgG and secretory IgA), lipid components, cytokines or prostaglandins help in the protection [24,25]. Later studies have shown that at least part of the antiviral properties of mare's milk can be attributed to a direct antiviral activity of Lactoferrin (LF). LF comprises antiviral activity against a wide range of human and animal viruses, both RNA- and DNA-viruses. The antiviral activity of lactoferrin makes mare milk special because of its antiviral activity and it was shown below through an example on HCV.

Hepatitis C virus (HCV) is a member of the flaviviridae family. HCV is an enveloped virus that contains a positive, single strand RNA genome. A unique feature of HCV is its ability to cause a persistent infection [20]. Therefore, HCV is associated with the cause of chronic hepatitis, liver cirrhosis and hepatocellular carcinoma [26]. At least 6 major HCV genotypes have been identified, which are subdivided into more than 50 subtypes [23]. This genetic diversity of HCV plays a role in the immune evasion of HCV and has held back the development of an adequate vaccine [27]. Treatment of HCV infections has not been very successful. Interferons have been used, however only with a low success rate of up to maximally 30%. More success was obtained when a combination therapy of interferons and ribavirin was applied [22]. Little was known about infection and maturation processes of HCV due to the lack of an in vitro culture system [9]. Recently however, Mituzani et al and Ikeda et al employed two different human derived cell lines for the replication of HCV. Using these culture systems, an antiviral effect of LF on HCV replication was observed [25]. The antiviral effect of lactoferrin was lost after heat treatment, indicating that the natural conformation of this protein is needed to exert its antiviral effect. Lactoferricin (LFcin), a tryptic digest obtained from the N-terminal region of the N-lobe, which is strongly bactericidal and fungicidal, proved to be ineffective against HCV [16]. This further illustrates the need for the natural conformation of LF for its antiviral activity. Time of addition assays indicated that LF probably interferes with adsorption of HCV to the target cells: it is most effective if administered before or simultaneous with the viral inoculum. Decrease of incubation times of LF with HCV enhanced viral infection [5]. LF can prevent adsorption to target cells by the fact that it binds to the envelope proteins of HCV E1 and E2 [8]. In addition, it was shown that LF interfered with binding of HCV E2 in vivo, since anti-human LF antibodies, in the presence of LF, were able to co-precipitate secreted and intracellular forms of E2, which were transiently expressed in HepG2 cells. In concordance with others, LFcin did not bind to these envelope proteins E1 or E2 [5]. In future there may be more experiments done on mares milk antiviral property to treat many viral diseases as it shows it already proves its effect on inhibiting the virus adhering to cell wall with lactoferrin [20].

In mercury toxicity:

Mare's milk is usually not consumed raw, because it tends to have a strong laxative effect, although this effect is sometimes used medically. Instead, mare's milk is almost always fermented into kumis [1]. Mare's milk contains significantly more lactose than cow's milk. Fermented mare's milk is prepared by lactic acid fermentation [19]. The general population is primarily exposed to mercury via food, fish being a major source of methyl mercury exposure [18]. Mercury is incorporated into the food chain as methyl mercury, primarily through the action of bacteria and other microbes transforming elemental or inorganic forms. Humans are also exposed to mercury via thimerosal (a preservative added to vaccines and many other pharmaceuticals), and «amalgam» or mercury-based dental fillings [20]. Mercury vapor released from mercury dental fillings is absorbed very rapidly and thoroughly by the body, mainly through inhalation and swallowing [5]. Mercury from amalgams is readily methylated by bacteria in the mouth [21]. The high fiber fermented mare's milk containing probiotics was found to be acceptable by all test panels and volunteers.

Mercury ingestion was found to cause biochemical and histopathological alterations in rat serum and tissues. The mercury-treated rats showed a decrease in body weight and an increase in kidney weight. Sera of the mercury treated rats showed alterations in biochemical parameters, and histopathological changes in brain and kidney [6]. However, the rats fed high fiber fermented mare's milk along with mercury ingestion showed improved histopathology of kidney and brain, and there was restoration of the biochemical parameters in serum to almost normal values [4].

CONCLUSION

There is no doubt that mare's milk is fully loaded with required nutrients for human. It has long been a popular gourmet food with an exceptionally delicious flavour and subtle nuances found in no ordinary dairy product in Central Asia. On the basis of literature data analysis and review findings, it was found that mare's milk is not only food product and thirst quenching but also provides valuable nutrients for human body and has got treatment features due to its antibacterial, immunological, antiviral properties. However, discovering another features and its effectiveness in other diseases is in future perspective

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ON THE ISSUE OF SAFETY AS DETERMINANT OF HUMAN BEING

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Abstract

The article examines the phenomenon of human safety. The concept of safety is analyzed through the prism of the influence of certain methodological experience on it. The problem of the influence of technology on the picture of the world of man and society is investigated.

Keywords: philosophy, science, safety, concept, method, nature, man, quality.

► The axiom of many studies in the field of philosophy of science is quite a fair statement that a fundamental sense of safety was a fundamental factor in both human development and understanding of being. At the same time, historically it has not always been expressed in the categories of a certain «free quality».

An attempt to trace the first ever concept of human safety inevitably encounters certain difficulties, which is explained by the modern understanding of safety that is largely based on the instinctive nature of human. This concept was fixed «at the dawn» of the history of mankind – at the time of the developed mythological way of thinking. At the same time, it is obvious that from the standpoint of philosophy as a worldview, holistically exploring a person in his «immersion» in being, the philosophical concept of safety is different from the noumenal, while the nature of the philosophical definition of safety is historically very inaccurate.

Thus, the concepts of safety, which must be considered in the chronodiscreteness of their historical development, can be explored both in the superficial quality of some existential materiality, and in the essential quality of human transcendence as well. At the same time, absolutely not any consideration of safety can be adequately correlated with the existentiality of a person and his transcendence, since the main factor in the understanding of being is the understanding of human safety.

It's known, that in the course of the historical evolution of human consciousness, the mythological form of realizing the reality has been gradually replacing the philosophical one, under whose influence the «social aspect» of safety is strengthened over time, which is largely natural to humans. The further «philosophical evolution» in relation to the conceptualization of safety continues in the framework of theocentrism. Later, the «new sound» of safety issues has acquired in the works of T. Hobbes, G. Grotius, J. Locke, J.-J. Rousseau, and B. Spinoza.

The concept of «chronic discretion» as applied to the concept of safety very accurately reflects the process of the historical formation of society and philosophical understanding of its life, and in its direct connection with the development of technology and the concept of human safety in the technical field, this term indicates a philosophical «secret» not only of man and technology in synthetic mediation of reality, but it also translates into consciousness a special, conceptual understanding of the «technical», perceived by an individual through the prism of the worldview and existential that means, first of all, the existential nature of historicity and scientific ideas, which sometimes cannot be derived rationally, through speculation. However, in the methodology of science in the 20th century, falsificationism

occupied a prominent place, which led to an ambiguity in the understanding of the chronic discretion of social transformations in the highlight of the determinants of human development.

From the point of view of methodology, a different understanding of the concept of safety in its «existential materiality», and in fact, in the modern version of Stoic Platonism, are «by definition» counterfeit constructs regarding the process of forming ideas about human being, as well as ontological participation in being. The formation of the concept of safety in the chronic discretion of historical development as a determining factor of being transcendental, i.e. metaphysical side, is already a different ethical-philosophical methodological paradigm of research, the use of which involves new qualitative layers of understanding of human culture.

The above theses have essential methodological significance, since in this article the existential nature of matter and human experiences is considered primarily in the context of scientific research, and the metaphysical and transcendental nature of human experiences is determined by the quality of philosophical knowledge of the world.

At the same time, philosophical, as well as personal development is possible, including through an understanding of history from the standpoint of moral, as well as ontological and essential consideration of phenomena in whose circle the person himself is directly involved. Among others, S.L. Frank tells about it¹. His ideas are of paramount importance, especially with regard to understanding history and the influence of historical factors on the understanding of being within the scientific and philosophical forms of the methodology applied to the concept of safety, while social dynamics along with the expansion of scientific knowledge and above all the improvement of scientific and technical base, it is possible in the event that this development has attributes of the truth of the process of human cognition and their value understanding of the safety of their own being.

However, the very philosophical understanding of the subject matter at the same time implies an ambiguous philosophical understanding of the qualitative characteristics of the historical process, especially if historical development is being overviewed primarily both from ontological and ethical positions. Social transformations and, in particular, technology are capable of very significantly transforming not only the vital activity of a modern person, but also a person's understanding of his being as an entity, which undoubtedly leads to an ambiguous understanding of the concept of safety as a whole compared to past historical experience. From the point of view of the essential paradigm, such a position does influence the formation of new ways of developing both philosophical and scientific methodology of safety concepts.

The vector of philosophical knowledge also affects the phenomena related to safety, which means not only the existential protection of human life on the material and spiritual levels, but also contributes to «tuning» human culture to achieve a new quality of social relationships. And in this regard, it is rather interesting that the concept of safety is not only the concept of «saving lives» today, but also affects various moral correlations in the aspect of individual development on the path of personal development within the framework of psychological ecology of thinking, as well as «conditional» psychological hygiene behavioral culture. The researchers of this problematic² raise not only the ontological, but also the ethical question of understanding human being in the categories of its safety³.

In turn, the chronodiscrete nature of the process of safe development was seen in its own way by various philosophers, while actualizing both the process of man's cognition of the world as an ambiguous interpretation and its heterogeneity, which, from the standpoint of scientific and philosophical methodologies, is without any doubt a criterion of truth analytical assessment of social transformations. It should be borne in mind that the fixation of social activity, and its transformation that occurs through the inclusion of the integral being of a person in the technical sphere, can be considered from the standpoint of unambiguous interpretation. It is a holistic fixation in the attributes of uniqueness in relation to the need to provide a comprehensive consideration of the ideological characteristics in the determination of human activity.

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 - 2 P.3. Mozdakov A.Y. Socio-philosophical aspects of the problem of safety: dissertation of the candidate in philos. sciences. – Veliky Novgorod, 2008. – 21 p.
 - 3 Ibid

That is why the question concerning the determination of human activity and holistic human existence should have, with its key characteristics, truth, ethics, «morality» and morality, which reveal the nature of objectivity with respect to both capabilities and abilities of a person, and safety of a specific person involved in a particular activity. The interest in safety issues, manifested by researchers in various subject areas⁴ is quite remarkable in this regard.

Determination of human being and behavior can be carried out both through the natural-ethical field of perception, i.e. through concepts in ecology of thinking, and through the sphere of technical, i.e. by understanding the features of social transformations that are not of an ethical impact, but have only a physiological and psychological effect.

The first type of impact is primarily «informational», which should be interpreted, undoubtedly, in the broadest sense due to the fact that it becomes primary in relation to man and secondary in relation to existing and to all objects of the material world that are points of view may be involved in the development of the «philosophical technosphere»⁵. The concept of information safety is viewed within this discursive field in a strictly ontological manner and is understood not as a set of «closed» technical data of a character, but becomes the filling of being itself, being viewed both through the individual being of a person and through his social roles⁶.

At the same time, one should not forget about the well-known objective methodology of understanding the concept of safety, which would not only reflect the peculiarities of behavior, but also bear a pronounced ethical status, along with the status of the axiological orientation of knowledge⁷.

Indeed, with the help of a philosophical understanding of the possibilities of objective cognition of reality, a value and essential definition of a true safety concept can arise, since the essential conceptual flaws of the scientific methodology being used today to understand worldview questions, distorts concepts and phenomena in a certain social development target. At the same time, philosophical reflection is free from numerous concepts that are actualized in everyday and scientific cultures, as a result of which the «existential» explication of essential safety concepts should be considered not through the individual being of the subject, but taking into account the key characteristics of social existence⁸.

One of the main accents in the study is made that the determination of human existence is inevitably forced to be determined by the framework of either a naturally objective human perception of real phenomena⁹, in other words, being, or in the «hard» framework of an artificially created understanding of reality that is not identical to being. That is why, in philosophy and psychology, the true determination of being is determined by the moral or safe behavior of a person in relation to eternity.

However, moral and safe in science and in philosophy are inevitably and seriously distinguished by the fact that the scientific form of thinking a priori denies metaphysics as a method, while the philosophical form of thinking, on the contrary, accepts it. Contradictions between psychological science and philosophy are analogous to the scholastic contradiction in its «classical», deterministic form, by the struggle of scientific schools, but most often – by the very essence of the synthesis of science and philosophy, which determines the understanding of objects and phenomena. It is also worth noting that modern science is interpreted through metaphysics, and vice versa – metaphysics is interpreted through philosophy.

Concerning the phenomenon of historical development and the vicissitudes of the formation of scientific knowledge, it is possible to interpret it from the standpoint of actualizing the qualities of various methodologies and forms of worldview, while the safe quality of being undoubtedly depends on the position of the researcher himself. Among other things, this means that the actualization of philosophical

4 P. 3. Kuzmin M.D. «Safety» and «Economic Safety» as a category of social cognition: dissertation of the candidate in philos. sciences. – Tyumen, 2014. – 22 p.

5 P. 4. Manzhueva O.M. Information safety phenomenon: essence and features: dissertation of the Dr. in philos. sciences. – Ulan-Ude, 2015. – 383 p.

6 P. 4. Ibid.

7 P. 5. Ibid.

8 P. 5. Ibid.

9 Shershenev L.I. Safety: state and public foundations // Safety. – 1994. – Vol. 4 (20). – P. 12 – 13.

interpretations of being within the framework of science and modern popular culture is a phenomenon that is often defined as a kind of «destruction».

Thus, chronic discretion of social transformations can be expressed both from the standpoint of scientific and technical changes in the economic sphere, and from the standpoint of a certain «moral predestination», that is, from the standpoint of changing ethical paradigms, which, for their part, are based on an understanding of the safe existence of society. The two named phenomena themselves are in the rigid framework of scientific differentiation and, in the language of science and philosophy, find their expression in the inherent antagonism of personal and social.

A person is a political being that cannot but influence the concept of safety, which is directly dependent on the civilian qualities of the person. Individual and social safety is achieved by the subject as a result of the inclusion of his individual being in social communication. At the same time, even the refusal of the subject from any individual manifestations of the personal in the social environment is often considered as a personal quality, which contributes not only to personal socialization, but also to the social protection of society as a human aggregate.

One must agree that «a return to the problem of the safety of the individual is connected with the era of globalization»¹⁰. So, O.M. Manzhueva emphasizes the dissonance between technology and ethics¹¹, which should be taken into account when constructing various safety concepts, since it is precisely the correctly compiled methodologies for the formation of genuine thinking and a sense of safety in it that allow us to adequately consider various phenomena, processes and objects in a person's reality.

The vision of safety in a qualitatively different semantic field does not cancel the interpretation of its concept, rather peculiar to the modern scientific tradition, by various researchers¹², reflecting an incorrect understanding of the essence of safety both in the scientific and philosophical communities, and at the level of social regulation mechanisms.

The concept of safety is of particular scientific significance also because it cannot be viewed in isolation from being and from the process of development of the individual and society as a whole. This shows solidarity with O.M. Manzhueva¹³, however, another important problem occurs. The established stable determinants of the «technical», which are fixed in the social development of the individual, almost always in a certain way transform the personal and individual understanding of being a person, which affects, first of all, the nature of a person's understanding of the world, and secondly, an understanding of existential threat.

The very concepts of safety that are formed in the closed framework of the scientific and philosophical communities often play the role of a paradigm that cannot only protect the material and spiritual human existence, but also to a certain extent become a coordinate system fixed in culture through the generally accepted understanding of the problematics of being in its philosophical interpretation. That is why the analysis of safety concepts cannot be abstracted from «operating» with concepts not abstract and speculative, but of essential methodologies that take into account not only the ontological characteristics, but also the epistemological and hermeneutical features of alternative contextual areas of knowledge.

Obviously, the determinative «correlation factor» in the development of everyday and labor culture of a person has historically been social transformations. As for the technical sphere, modern methodologists of science cannot but capture significant essential changes in the picture of the human world in historical technical perfection reaches the apogee of its development, possible at this «turn» of evolution, and forms a sense of safety and safety in the individual. This feeling becomes inherent in all members of society, because both technical development and, to a lesser extent, social being, transforming, create new contextual fields for a person's understanding of the world essence, destroys the prevailing understanding of the concept of safety in the social mind.

10 P. 3. Kuzmin M.D. «Safety» and «Economic Safety» as a category of social cognition: dissertation of the candidate in philos. sciences. – Tyumen, 2014. – 22 p.

11 P. 4, P. 307. Manzhueva O.M. Philosophical paradigm of information safety: dissertation of the Dr. In philos. sciences. – Moscow, 2016. – 452 p.

12 P. 4. Manzhueva O.M. The philosophical paradigm of information safety: dissertation of the Dr. in phios. Sciences. – Moscow, 2016. – 452 p.

13 C.3. Ibid.

Talking about the determining factors of human existence, one cannot touch upon another important problem. It is known that any social transformations often become possible within the framework of development processes, which, however, are sometimes understood ambiguously, since their adequate perception requires, as a rule, a certain «starting point» for reflection, capable of constituting thought based on the experience of past and present generations. and sometimes taking into account the forecasts of futurologists. But in any case, philosophers need to pay close attention to the processes of development of society, and to the starting point of this development, given that the person in his integrity is a product of a long historical development¹⁴.

In connection with the foregoing, it is appropriate to recall the words of GF-V. Hegel, who asserted that the transformation that is carried out even on a cosmic scale at the level of some «universal processes» that take place within the framework of the universe, can be understood as the activity of a certain «World Spirit»¹⁵. However, the philosopher's statement is quite possible to apply to the nature of those social transformations that are not excluded in the framework of the «collective creativity» of civilization and through the activation of the thinking of its individual members. In other words, any social transformation is not at all an isolated and local phenomenon – on the contrary, it is capable of fixing an integral picture of social transformations, and in the process of this fixation, the understanding of safety as a phenomenon of being acquires particular value.

Broadly thinking, it is necessary to state the fact that the peculiarities of the construction of the scientific methodology of safety concepts have historically been distinguished by their extrapolation on non-existent things. However, even in this kind of research one can see the absolutization and axiologization of methodological premises of an irrational nature. Safety often means not the quality of being, but a characteristic of sustainable development, understood within the framework of ethno-political discourse, which without exaggeration is fundamental both in a certain «ethical field» of personal determinants, in relation to answering challenges of existential questions, and on an ethical level.

At the same time, despite the rather diverse views on the subject of historical development as a whole and on the degree of individual human inclusion in it, it seems obvious that both social transformations and the construction of a safety concept within various social groups are aimed at ontological transformation of thinking and human behavior according to a given understanding of the meaning of life. As for critical judgments regarding the resistance of science and technology to the true understanding of being, they are actualized mainly through the mythological understanding of the latter, while neither science nor technology are constructs of thought and constructs of material culture that would essentially influence the understanding of ontology or anthropology, but influence only through its embodied synthesis with the mythological form of thinking.

Thus, the concept of safety is now becoming not only a determinant of human existence, but also being transformed into an extremely complete and centered structure of his thinking and behavior, which contain the most «refined» information sequences of logical theses and conclusions, that are of deeply scientific and philosophical value in their isolation.

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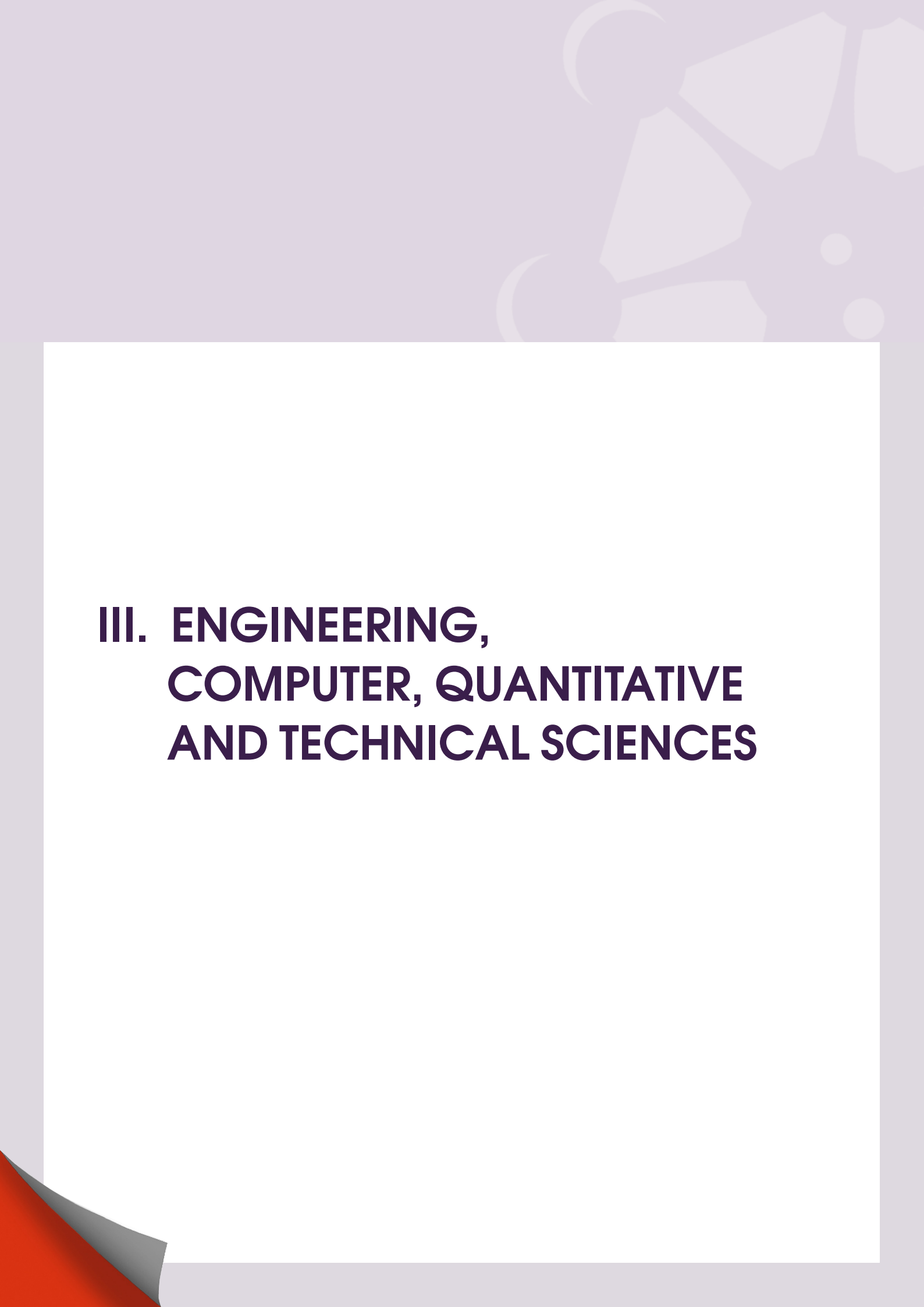
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III. ENGINEERING, COMPUTER, QUANTITATIVE AND TECHNICAL SCIENCES

THE TASKS OF ENSURING AVIATION SECURITY OF THE REPUBLIC OF KAZAKHSTAN

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Abstract

The proposed work relates to the field of air transport security and includes research aimed at improving the systems and objectives of aviation security of airports and airlines of Kazakhstan in order to ensure an acceptable level of security.

Keywords: aviation security, national security, transport security, security systems, security objectives, acceptable level, act of unlawful interference.

► This century is an innovation information technologies century. Civil aviation continues to grow at an unprecedented pace. It is a strategic priority for the geopolitical, social and economic development of any state. It is also an essential component of the industrial and social infrastructure, and its sustainable and effective functioning is a prerequisite for ensuring national security, sustainable economic growth and raising the standard of living of the population. The modern system of airports in terms of aviation security is an important prerequisite for the economic development of the country and its integration into the world economy. The problem of ensuring the protection of civil aviation against unauthorized interference with its activities in recent years has become one of the most important. Of particular importance are terrorist acts, which every year become more sophisticated. Terrorist organizations and individual criminals are well funded, use modern technical means of attack, are well trained and constantly update methods for implementing acts of unlawful interference. Under these conditions, an adequate response of the relevant defense bodies is required, anticipating negative manifestations. At the same time, new methods, means, and most importantly the task of ensuring the protection of civil aviation and, in particular, airports from acts of unlawful interference are needed.[1]

Aviation security is defined as the state of aviation security from acts of unlawful interference with aviation activities. Aviation security is carried out within the framework of state regulation of this activity through the implementation of a set of legislative and organizational measures aimed at preventing and suppressing illegal acts against civil aviation.

The aggravation of political and socio-economic problems, the emergence of vast zones of conflict situations, terrorism, the taking of hostages, the criminalization of society – all this has not bypassed more than one state of the world. Air transport, which accumulates huge monetary and material resources and plays a special role in maintaining the normal life of any state, turned out to be the direct object of negative impact. Any incident in air transport causes a huge resonance in society. Attempts to seize and seize aircraft, threats and explosions at airports, other acts of unlawful interference seriously complicate the situation on air transport, undermine people's confidence in the safety of using its services, entail heavy moral, economic and even political consequences, and damage national interests.[1]

Preventing acts of unlawful interference with the activities of the CA is a major problem in the field of air traffic, especially if we take into account the evidence of international

terrorism in recent years and the numerous attempts to bring dangerous objects and substances on board the aircraft. Due to the increasing manifestations of aviation terrorism, the issues of strengthening contacts in order to increase the efficiency of joint work are of particular importance.

Since the Republic of Kazakhstan is in the European / North Atlantic (EUR / NAT) ICAO Regional Office, it needs to strictly adhere to the tasks assigned to comply with the safety audit programs, which include regular, mandatory, systematic and coordinated safety checks of all Contracting Parties. States.[3]

Since 2009, an audit of ICAO has been conducted in Kazakhstan, according to the results of which the effective implementation of ICAO standards was 47%, in particular, 82 comments were revealed, of which 2 were significant. Based on the results of the 2009 audit, the European Commission decided to include all airlines in the so-called «black list» with the exception of Air Astana, which was imposed restrictions on the expansion of flight geography and aircraft fleet. This audit revealed the system problems of the industry as a whole. In the course of eliminating the revealed comments, Kazakhstan began to actively cooperate both with the headquarters of ICAO and with the Regional Office in Paris. Then, in 2012, the Civil Aviation Committee of the Ministry of Investment and Development of the Republic of Kazakhstan signed a memorandum of understanding with ICAO on the implementation of the Continuous Safety Monitoring Mechanism in Kazakhstan. In addition, Kazakhstan began to actively participate in events and initiatives held under the auspices of ICAO. Thus, Kazakhstan has repeatedly acted as a platform for holding ICAO regional meetings.[4]

In 2014, the Secretary General of ICAO, Raymond Benjamin, visited Kazakhstan. He noted the fact that Kazakhstan has achieved success in the development of civil aviation in a short time. In addition, he expressed interest in further partnership with Kazakhstan, «as the republic is an example for the region.» In the same year, on the basis of the comprehensive work carried out to eliminate the ICAO comments, the first validation mission of ICAO was conducted. As a result of this validation mission, one significant observation was eliminated, and the level of effective implementation of ICAO standards rose from 47% to 64%. At that time, this indicator corresponded to the level of such countries as Slovenia, 63%, Montenegro, 63%, Estonia, 63%.[2]

In 2016, a validation mission of ICAO in Kazakhstan was conducted, according to the results of which the level of effective implementation increased by 10% to 74%. This result corresponds to the level of the following European countries: Slovakia 75%, Portugal 71%, Luxembourg 70%, Lithuania 70%, Moldova 72%. At the same time, it should be noted that the current average world level is 63%, and the average European level is 76%. In accordance with the data of the Continuous Monitoring Mechanism posted on the ICAO portal, Kazakhstan ranks 66th among the 191 ICAO member states. The result of the implemented and implemented comprehensive measures to improve the level of aviation security and safety in the country was the decision of the European Commission on December 8, 2016 to lift restrictions on domestic flights to the European Union. This decision was made following the meeting of the European Commission's Flight Safety Committee, which took place on November 23, 2016 in Brussels.[2]

Since the main task of the civil aviation security system is to protect and ensure the safety of passengers, crew members, ground personnel and all other people, aircraft and facilities at the airport serving civil aviation, from acts of unlawful interference that can be performed on the ground or in flight. Therefore, the main task of the states should be to ensure the safety of passengers, crew members, ground personnel and the public in general in all cases related to the protection of civil aviation from acts of unlawful interference (see clause 2.1.1. Of Appendix 17) [5].

The basic principles and concept of aviation security are as follows:

- Civil aviation should operate in conditions that ensure its safety and protection against unlawful interference;
- States develop and implement such legislation and procedures that are necessary to create such security conditions;
- Measures taken by the state to protect civil aviation from acts of unlawful interference must, as established by ICAO, comply with the Standards and Recommended Practices contained in Appendix 17 to the Convention on International Civil Aviation;
- States prosecute any person who attempted to commit or committed an act of unlawful interference, and / or extradite such person to states that are willing to prosecute in court the order of such criminals.

The main problem in this area is to equip airports with modern technical means that allow the detection of explosives in cargo and baggage. A serious problem that can affect the level of aviation security is the insufficient equipment of most airports with modern technical means of inspection.

As a result of purposeful work to improve preventive security measures, the number of aircraft seizures decreased. The aviation security services annually stop thousands of attempts to carry dangerous objects on board the aircraft, a large number of all types of weapons, ammunition, other dangerous objects and substances prohibited for transportation in the passenger cabin of the aircraft are being seized.

The given purpose, objectives of this study and the problem of providing Aviation security is proposed to be analyzed at the level of airport activities throughout the country as a whole. Aviation security should be considered from both sides. First of all, it is some activity aimed at preventing the factors of unlawful interference in the activities of civil aviation. With regard to the airport, this activity is aimed at preventing a possible disruption of its normal functioning as a result of the impact of criminal or other threats. The above mentioned activities are carried out by airport officials, its personnel, the aviation security service, state law enforcement agencies and other structures. Secondly, the provision of AS can be considered as the result of the specified activity. It should be noted that the absolute result is impossible, one can only strive to achieve some acceptable state of aviation security. In this case, the concept of level of aviation security arises, i.e. quantitative display of the security status of the object.

It is clear that this value is dynamically changing under the influence of external and internal threats and the measures taken to protect the airport infrastructure. Among the most important goals of aviation security at an airport are the following: prevention of threats, protection of life and health of personnel and passengers, ensuring the sustainable operation of the airport, etc. It is appropriate to quote from the Accident Prevention Manual, ICAO document (DOS 9482-AN / 923): «If, in your opinion, safety is too expensive, then you do not know what an accident is.»[5]

In conclusion, the main tasks of ensuring aviation security are: predicting, identifying and eliminating threats to aviation security, promptly responding to them, effectively applying appropriate methods and means of ensuring aviation security of the airport and airlines. The functional elements of the airport, personnel and passengers form the objects of protection.

Today, it should be noted that due to the coordinated work and compliance with the tasks set to ensure aviation security, restrictions were lifted from Kazakhstan, as a country as a whole, allow Kazakh airlines to fly to Europe. Kazakhstan will continue to work to bring the aviation administration and the industry as a whole in line with the indicators of world leaders.

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BASIC CONCEPTS AND PRINCIPLES OF BIM-TECHNOLOGY IN DESIGNING BUILDINGS AND FACILITIES

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Abstract

This paper considers BIM-technologies as a modern challenge to traditional construction processes. Building information modeling technology is a new phenomenon in design and construction all over the world, it is constantly developing and changing the forms of application. In such situation, the implementation of BIM-technologies in full process is even more complicated and there are considered problems on this issue.

Keywords: new technologies, innovative construction, BIM-technologies, three-dimensional modeling, joint project development.

► At the turn of the 20th century and the beginning of the 21st century, thanks to the development of information technologies, a new method of architectural and construction design appeared. Computer diagnostics and computer modeling of something, has become an integral part of the life of modern man in many of its manifestations. Science has become more informative and with a greater flow of information processes more in-depth and flexible, there has appeared a scientific language, new theories and radically changed practice.

In the architectural and construction process, a large amount of paper documentation for projects is being used, and now for examination. In accordance with this, work on construction sites becomes more difficult with all the information that is so voluminous. New technologies make it easier and faster to work.

Taking into account all the activities of corporations, as well as their problems, a new approach to design and construction was revealed – information modeling of BIM, allowing to reduce costs, monitor and control terms and reduce risks (Fig.1).

Architectural and construction corporations working on this path have in their practice several significant problems with the realization of volumes: these are budgets, and terms and risks. This affects not only the construction of public buildings or structures, but also the construction of roads, urban infrastructure, etc.

Figure 1.
The concept of BIM



Information modeling technology (BIM) is a mass of software products that work in the same environment. This is a process of modeling a digital object that carries all the information on any issues. The leading supplier of creation, processing and realization is Autodesk, which produce a large number of products for the construction design (Fig. 2).

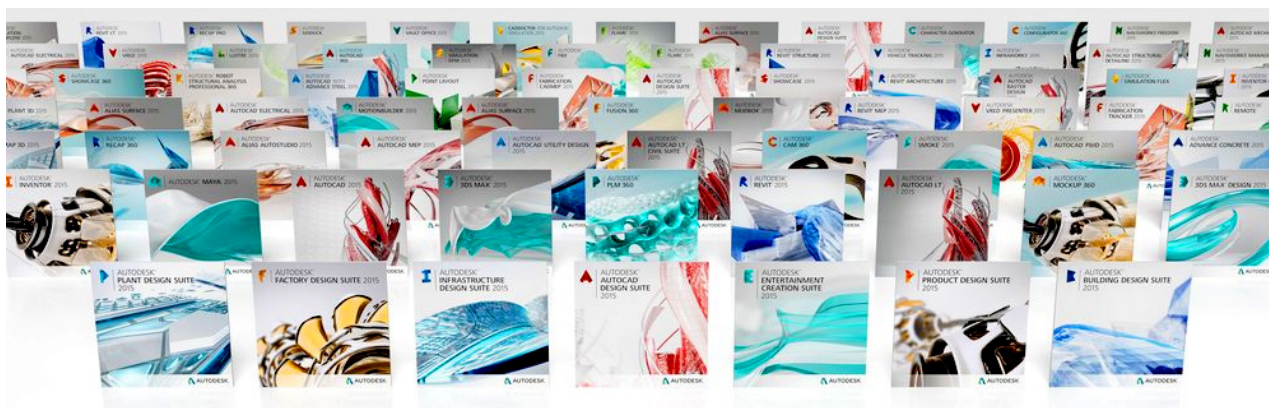


Figure 2. Autodesk Products

BIM is defined as Building Information Modeling:

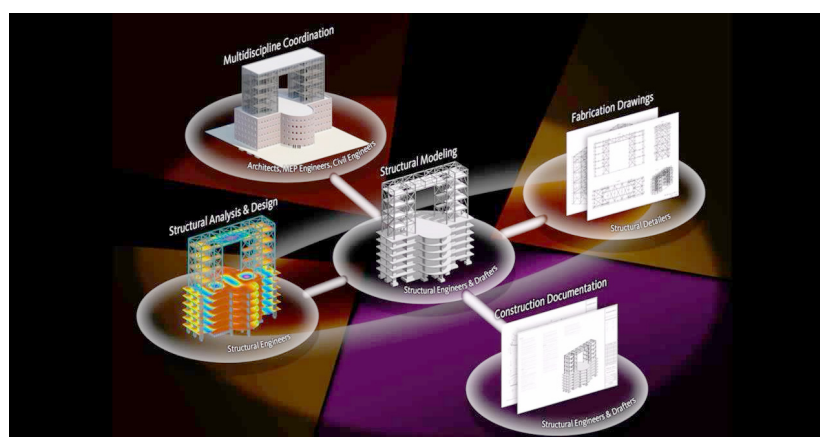
- 1) Building – a building, an object, in a software equivalent, a three-dimensional model;
- 2) Information – information, provision of information on the model in the form of drawings and complete specifications;
- 3) Modeling, a digital virtual object model that can be examined at any stage of the design and evaluated. This process includes architectural and volumetric solutions, technical and economic indicators (TIC), and calculations.

A whole complex of software helps to create drawings of any brand and accordingly each of the programs is responsible for its section (Fig. 3). BIM technology includes:

1. Designing;
2. 3D-visualization;
3. Complete analysis of the object;
4. Simulation and any engineering calculations;
5. Demonstration of the project;
6. Exploitation of the object.

All information and all these stages are included in one model of the object, which can be read, processed, transferred to other media. The information model of a building can be kept by designers, customers. In the operation section, it is possible to predict all sorts of cataclysms, to plan capital repairs, to control the terms.

Figure 3.
Programming
of various sections



Information technology is used by a large number of countries at the state level. Speaking about the state level, we mean the creation of architectural and construction objects for this technology. On the example of Great Britain, which introduced the system as a single fundamental, the construction cost was reduced by 33%, which in money terms shows 2 million pounds sterling.

Software, which offers Autodesk, are responsible for different sections of the design and, accordingly, can be modified and processed in different programs compatible in format (Fig. 4).

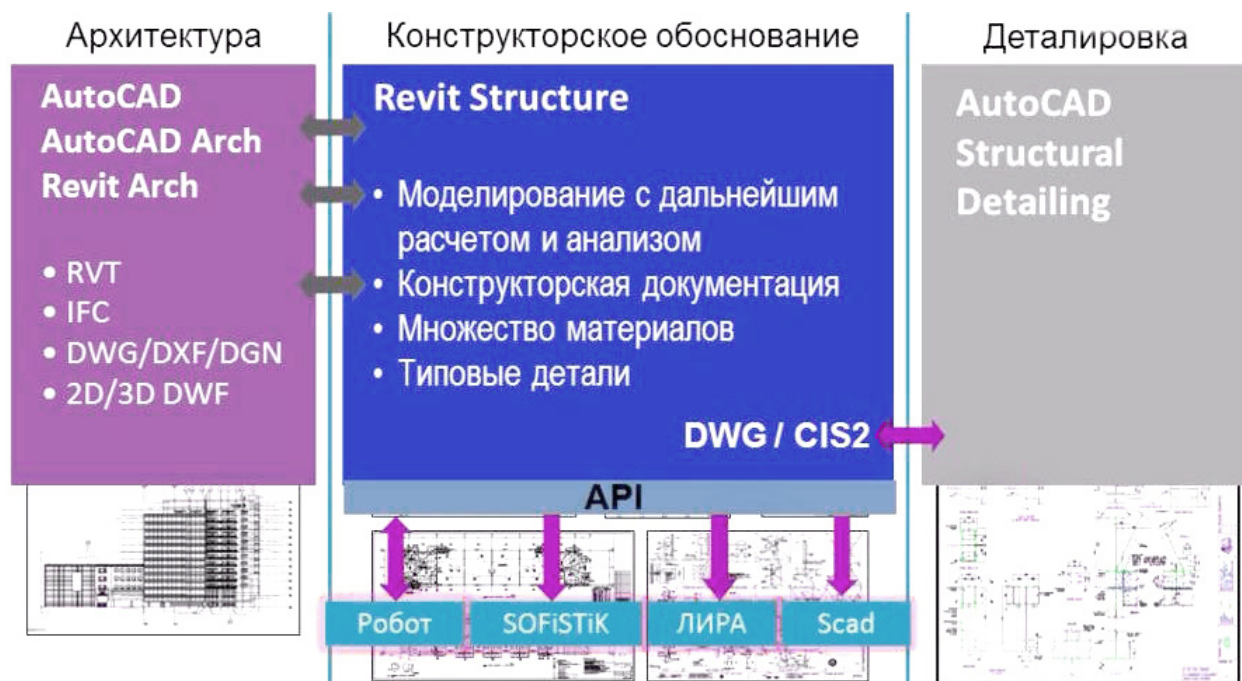


Figure 4. **Software**

Creating an informative model is done in several stages.

The initial stage includes the development of individual families (blocks), primary design elements (windows, doors, slabs, etc.), equipment elements (heating and lighting devices, etc.). The second stage includes directly those elements that are created on the construction site: foundations, walls, roofs, etc. In this case, there is a great opportunity to use pre-created elements: fastening or framing parts, etc.

This approach is convenient for both designers and builders directly on the construction site, and operators.

The main feature of the method is the change of any elements with subsequent changes in all sections of the project, allowing to minimize the number of errors in the project, as it was previously processed manually. Consequently, the stage has a rather conventional character, the approach to which is identified conditionally in the designer's experience.

The created model further becomes the basis and allows active use in the creation of working documentation of any brands and types, the development of architectural and structural details, components of the facility, installation, ordering, technical equipment, any calculations, as well as operational issues.

The created model of a building or structure can also be downloaded and printed on a 3D printer, which makes it possible to make its working layout both architectural and constructive. The printed model can be transferred to the customer. When working with the customer, the design and construction of the object becomes sufficiently transparent, increasing the image of the designer to a more professional and presentable level, which is an integral part of the work.

Based on 3D printers, the resulting model of the building directly into the printer, it is possible to create not only mock-ups. Chinese companies offer their latest technology in printing buildings or structures (Fig. 5). Innovative approaches in construction, using the example of 3D printers, are possible when creating a model in BIM technology, more economical, accurate in technology and reliable.



Figure 5. 3D printer

The introduction of BIM design in practice will create uniform rules and standards for design and construction in a single information field. The quality of the documentation will be improved with a minimized amount of the error committed, and the reliability of the information will fail to improve the quality of expertise and cost savings.

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ORGANIZATION OF COMPUTER LAB WORK «CALCULATION AND VISUALIZATION OF FORCED OSCILLATIONS IN THE PRESENCE OF AN EXTERNAL FORCE» WITH THE USE OF THE SOFTWARE PACKAGE MATLAB

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Abstract

The organization of computer lab work «Calculation and visualization of forced oscillations in the presence of an external force» is proposed with the use of the Matlab software package: a) external force – constant; b) external force – $F = F(t)$; c) external force – $F = F(t) e \cos \beta t$; d) $F = 0$ for $t < 0$; $F = F(t) t / T$ for $0 < t < T$; $F = F(t)$ for $t > T$. For each of these cases, solutions, calculation programs and visualizations are presented. The results are presented in the form of graphs of the dependence of the acting external force on time and the displacement of the particle from the equilibrium position from time. All examples contain program code with comments, the model diagram and the results obtained in the solution in the form of numerical or in graphic data with necessary explanations. Student can use them to solve their homework, minimally adjusting the text. The student is also invited to experiment with changing parameter of model.

Keywords: external force, damped oscillation, calculation, visualization, graph.

► The capabilities of the Matlab system are huge, and in terms of the speed of tasks, it is ahead of many other similar systems. All these features make the MATLAB system very attractive for use in the educational process in higher education institutions [1].

One of the difficult tasks of introducing the results of the use of information technologies in educational institutions is the insufficient practical ability of teachers to use computer models of physical phenomena to organize computer lab work.

Revitalization, motivation and, ultimately, the effectiveness of training largely depend on the organization of computer laboratory works. We have previously written about the creation and use of models of the organization for the performance of computer laboratory work on the study of various physical phenomena in the educational process [2-20].

This article gives an example of the use of the Matlab system in organizing the computer lab work «Calculation and visualization of forced oscillations in the presence of an external force» for the performance by the students.

Theme of laboratory work No. 1: Calculation and visualization of forced oscillations in the presence of an external force: Determine the forced oscillations of the system under the influence of the external force $F(t)$, if at the initial instant $t = 0$ the system is at rest in the equilibrium position ($x = 0, \dot{x} = 0$) For the following cases:

$F = \text{const} = F(t)$. The system oscillates according to the law

$$x = \frac{a}{m\omega^2} (\omega t - \sin \omega t) \quad (1)$$

Calculation and visualization program

```
>> w=1;
>> a=2;
>> m=0.1;
>> t=0:0.1:30;
>> x=a./(m*w.^2).*(w.*t-sin(w.*t));
>> plot(t,x,'k-')
>> grid on
```

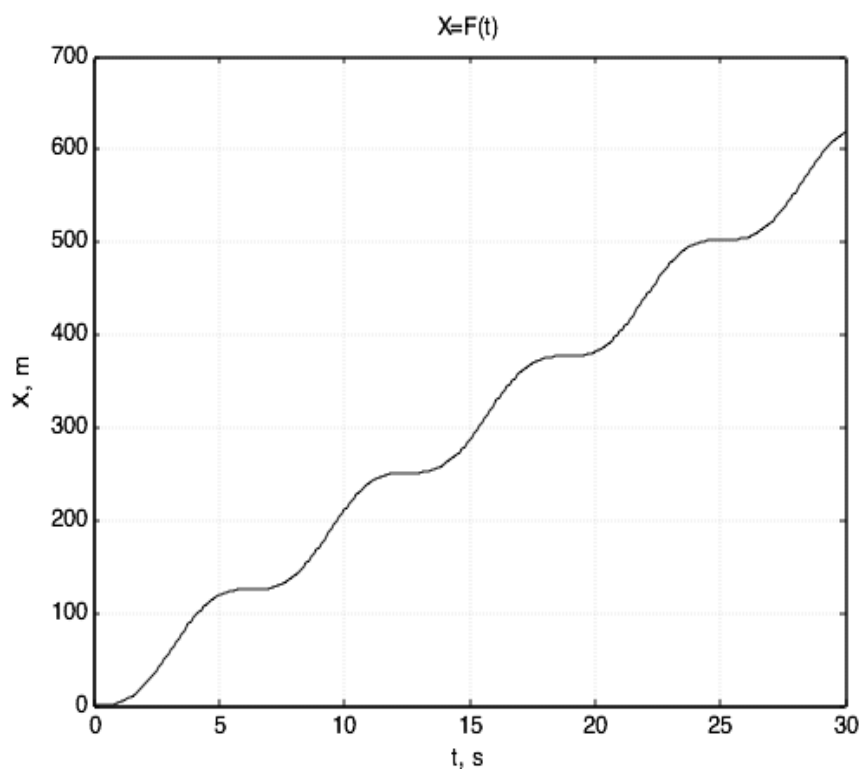


Figure 1. The oscillation of the system under the influence of a constant force

The action of a constant force leads to a shift in the equilibrium position around which oscillations occur.

b) $F = F_0 e^{-at}$.

The system oscillates according to the law

$$x = \frac{F_0}{m(\omega^2 + a^2)} \left(e^{-at} - \cos \omega t + \frac{a}{\omega} \sin \omega t \right) \quad (2)$$

Calculation and visualization program

```
>> f0=2; w0=1;
>> m=0.1;
>> f0=2; w0=1;
>> m=0.1;
>> t=0:0.1:4;
```

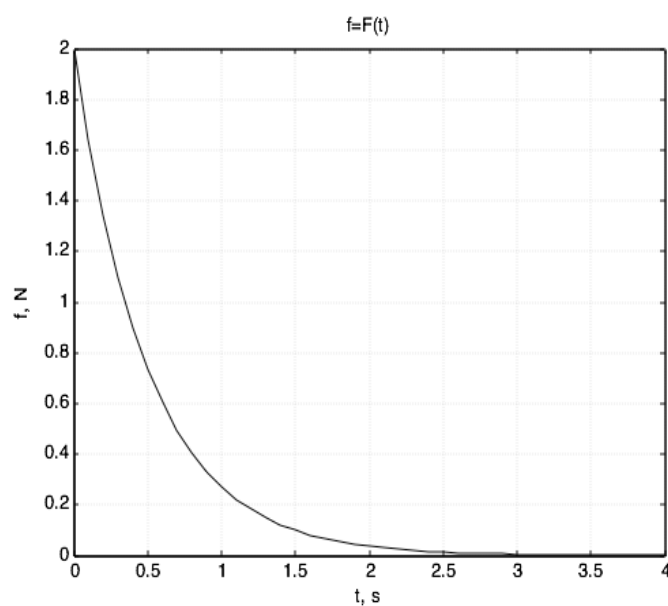
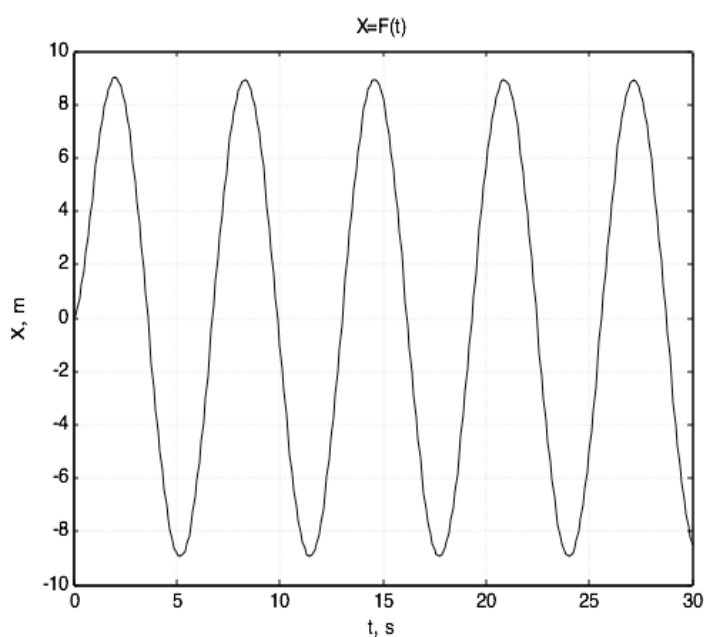


Figure 2. The force acting on the system

```
>> t=0:0.1:30;
>> a=2;
>> x=(f0./(m*(w0.^2+a.^2))).*(exp(-a.*t)-cos(w.*t)+a.*sin(w.*t)./w);
>> plot(t,x,'k-')
>> grid on
>> xlabel('t, s')
>> ylabel('X, m')
>> title('X=F(t)')
```

Figure 3. Oscillation of the system under the influence of the force $F = F_0 e^{-at}$.

c) $F = F_0 e^{-at} \cos \beta t$. The oscillation of the system under the action of such a force occurs according to the law

$$x = \frac{F_0}{m[(\omega^2 + \alpha^2 - \beta^2)^2 + 4\alpha\beta^2]} \left\{ (\omega^2 + \alpha^2 - \beta^2) \cos \omega t + \right. \\ \left. + \frac{\alpha}{\omega} (\omega^2 + \alpha^2 + \beta^2) \sin \omega t + e^{-at} [(\omega^2 + \alpha^2 - \beta^2) \cos \beta t - 2\alpha\beta \sin \beta t] \right\} \quad (3)$$

Calculation and visualization program

```
>> f0=2; w0=1;
>> m=0.1;
>> t=0:0.1:4;
>> a=2;
>> b=0.1;
>> f=f0.*exp(-a.*t).*cos(b.*t);
>> plot(t,f,'k-')
>> grid
```

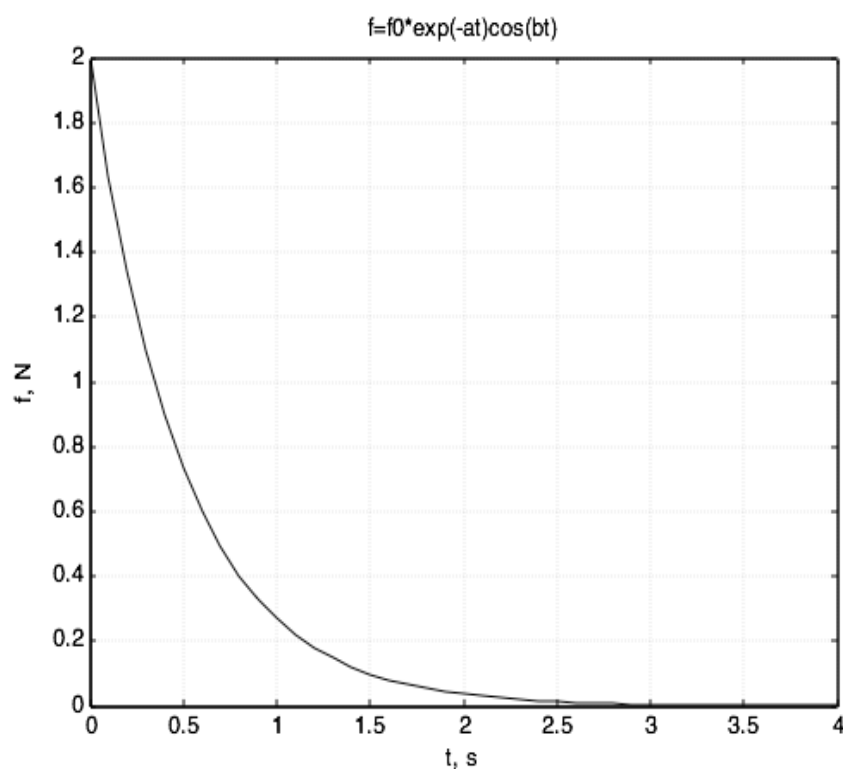


Figure 4. The force acting on the system is $F = F_0 e^{-at} \cos \beta t$.

```

>> t=0:0.1:30;
>> a=2;
>> b=0.1;
>> A=f0./(m.*(w.^2+a.^2-b.^2).^2+4.*a.*b));
>> B=(w.^2+a.^2-b.^2).^2;
>> C=a.*(w.^2+a.^2-b.^2).^2;
>> x=A.*(-B).*cos(w.*t)+C./w.*(sin(w.*t)+exp(-a.*t)).*(B.*cos(w.*t)-2.*b.*a.*sin(w.*t));
>> plot(t,x,'k-')
>> grid on

```

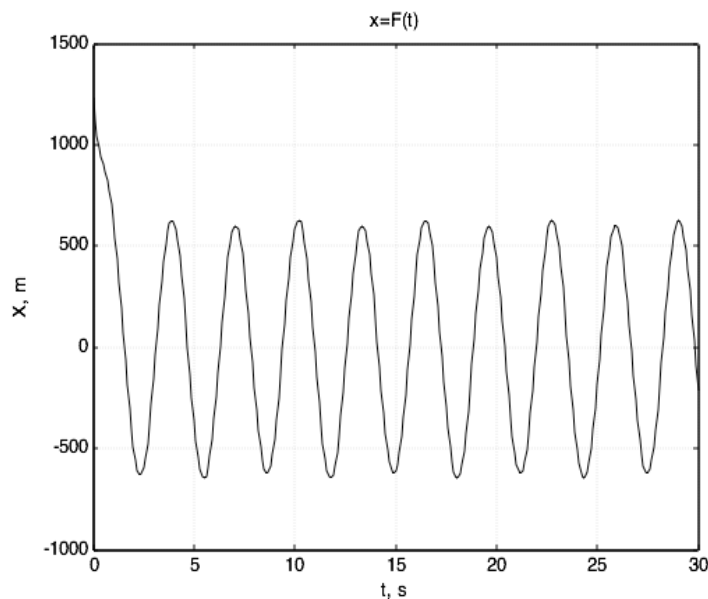


Figure 5. The oscillation of the system under the influence of force $F = F_0 e \cos t$.

d) Determine the oscillation of the system after the action of an external force varying according to the law $F = 0$ for $t < 0$, $F = F_0 t / T$ for $0 < t < T$, $F = F_0$ for $t > T$ (Fig. 6); Up to the instant $t = 0$ the system is at rest in the equilibrium position.

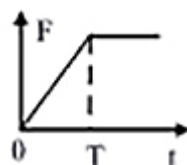


Figure 6. The force acting on the system

Solution: for $0 < t < T$

$$x = \frac{F_0}{mT\omega^3} (\omega t - \sin \omega t)$$

For $t < T$, we seek the solution in the form

$$x = c_1 \cos \omega(t - T) + c_2 \sin \omega(t - T) + \frac{F_0}{m\omega^2} \quad (4)$$

For $t = T$, from the continuity of x and $\dot{x}$ we find:

$$c_1 = -\frac{F_0}{mT\omega^3} \sin \omega T, c_2 = \frac{F_0}{mT\omega^3} (1 - \cos \omega T)$$

The amplitude of the oscillations

$$a = \sqrt{c_1^2 + c_2^2} = \frac{2F_0}{mT\omega^3} \sin \frac{\omega T}{2}. \quad (5)$$

Note that the smaller the slower the «power» F_0 is turned on (ie, the larger T).

Calculation and visualization program

```
>> w=1;
>> T=10;
>> t=0:0.1:30;
>> f0=2; m=0.1;
>> x1=f0./(m.*T.*w.^3);
>> x=x1.*(w.*t-sin(w.*t));
>> plot(t,x,'k-')
>> grid on
```

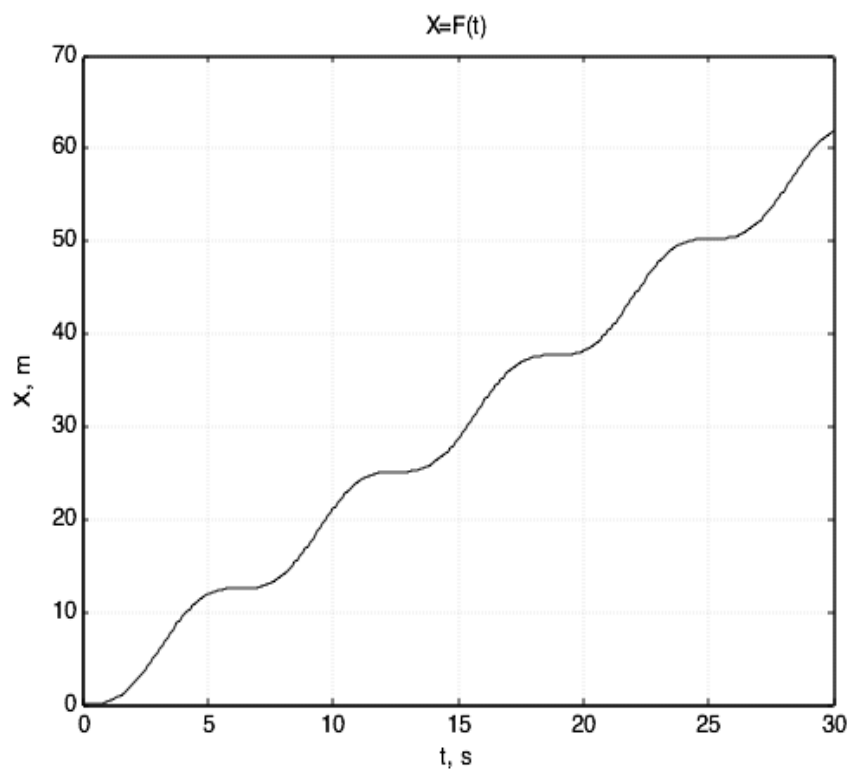


Figure 7. The oscillation of the system under the influence of force at $t > T$, $F = F_0$

```

> w=1;
>> T=10;
>> t=0:0.1:30;
>> f0=2; m=0.1;
>> x1=f0./(m.*T.*w.^3);
>> x=x1.*(w.*t-sin(w.*t));
>> plot(t,x,'k-')
>> grid on
>> c1=-x1.*sin(w.*T);
>> c2=x1.*(1-cos(w.*t));
>> X=c1.*cos(w.*(t-T))+c2.*sin(w.*(t-T))+f0./(m.*w.^2);
>> plot(t,X,'k-')
>> grid on

```

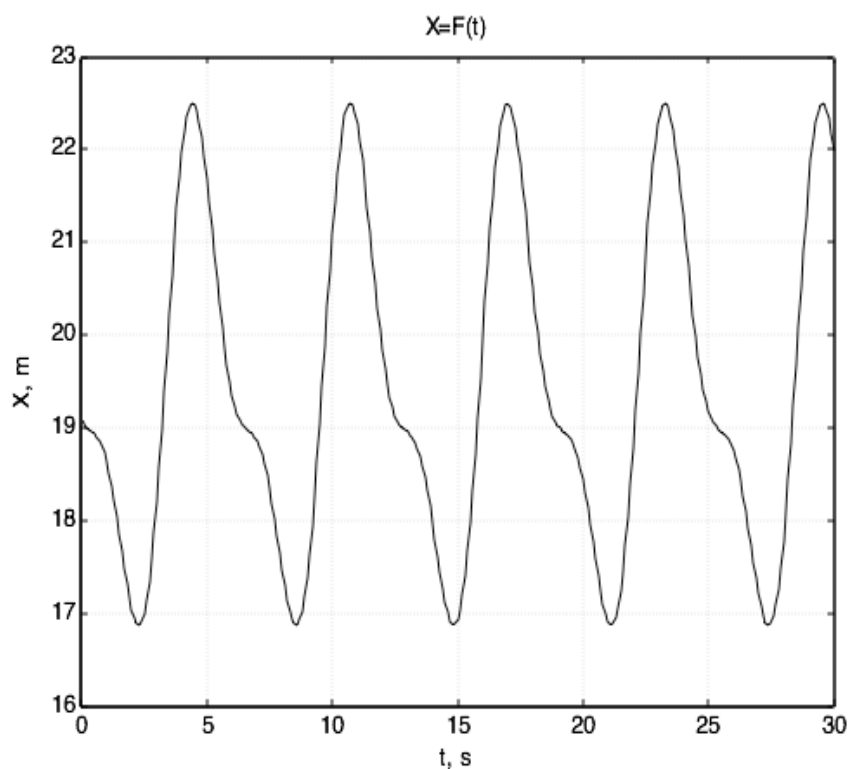


Figure 8. The oscillation of the system under the influence of force at $0 < t < T$

e) Find the trajectory of the motion of the particle in the central field
 $U = kr^2/2$, the so-called spatial oscillator.

The calculated formulas $w = \sqrt{k/m}$ is the eigenvector frequency,
 $x = a \cos(wt + \alpha)$, $y = b \cos(wt + \beta)$ – where a is the amplitude of the oscillation.

Calculation and visualization program

```

>> a=1; b=2; w=1;
>> t=0:0.1:30;
>> alfa=pi./3; beta=pi./6;

```

```

>> fi=w.*t-alfa; delta=beta-alfa;
>> x=a.*cos(fi);
>> y=b.*cos(delta).*cos(fi)-b.*sin(delta).*sin(fi);
>> plot(x,y,'k-')
>> grid on
>> xlabel('X')
>> ylabel('Y')
>> title('Y=F(X)')

```

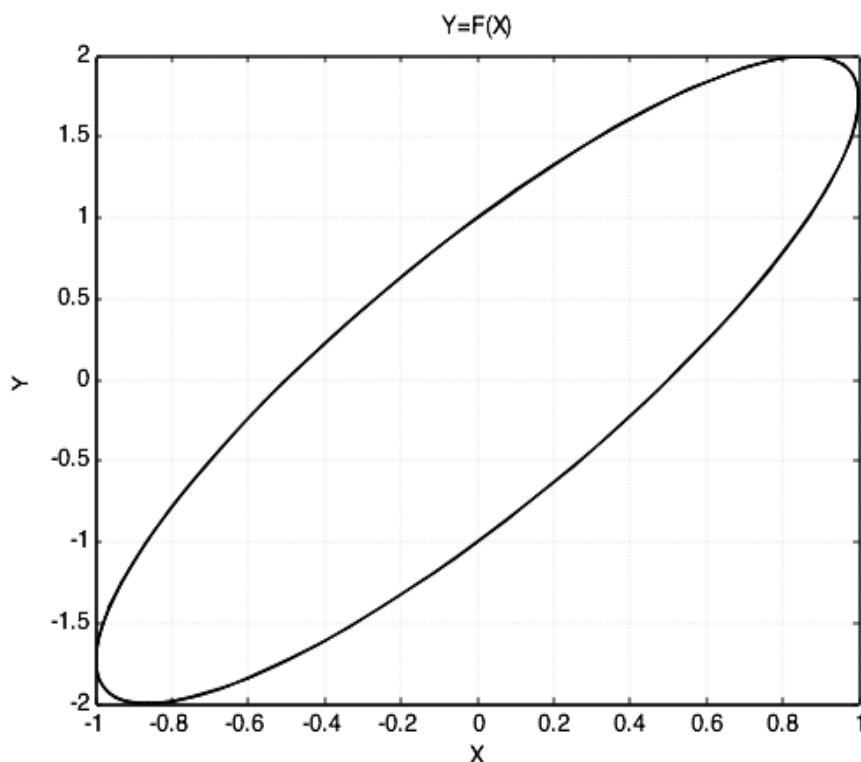


Figure 9. **Trajectory of the motion of a particle.**

Presented laboratory works were performed by third-year students of our university, who are studying in the specialty «scientific physics», while conducting laboratory classes on the discipline «Computer simulation of physical phenomena.» Especially I want to note that visualization of calculations in the form of graphs allows you to better understand the essence of physical processes and students with great desire perform this part of the task.

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IV. LAW, HISTORY AND CULTURE



PHENOMENON OF LEGAL CULTURE

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Abstract

This article is devoted to the analysis of the legal culture of civil society. The purpose of the article is to highlight the value orientations of the legal culture of the Republic of Kazakhstan in the process of developing a democratic state. The essence and structure of legal culture and its features are considered in the article. The author pays special attention to the study of the value aspects of the legal culture of the Republic of Kazakhstan in the development of a democratic state and the formation of a civil society.

Keywords: law, culture, identity, legal culture, a democratic state and its values, civil society, legal education, legal upbringing.

► The question of the formation of the legal culture of modern society is considered in direct connection with the development of universal human culture. The general level of culture of any society is determined by the material and spiritual successes and achievements of people, the results of which together determine the level of progress in the development of the state. In this dynamics of the development of the general level of culture, the important is the legal culture, which shows how developed the state and legal organization of life of each individual and society as a whole. A high indicator of legal culture is one of the main features of the rule of law and developed civil society. In our country active work is carried out in the field of raising the level of the legal culture of the population, eradicating legal nihilism and fighting corruption manifestations.

In the Address of the President of the Republic of Kazakhstan N.A. Nazarbayev clearly emphasizes the idea that «when moving to the number of 30 developed countries of the world we need an atmosphere of fair competition, justice, the rule of law and high legal culture» [1].

In the Concept of Legal Policy for the period from 2010 to 2020. «... an integral part of the legal policy is the legal regulation of scientific and educational activities that are an important condition for ensuring the country's industrial and innovative development, increasing its intellectual potential» [2].

Legal culture now covers all spheres of society. It records the level of legal knowledge of people, the criteria for assessing acts in terms of their illegality, includes a system of legal values, beliefs, norms, traditions, as well as law-making and law enforcement activities. The product of legal culture is, first of all, legal documents that fix the established norms of law; organizations that develop and control the implementation of legal norms, as well as institutions that carry out punitive functions [3, p.69].

Legal culture is an integral part of the culture of society as a whole, and its significance goes beyond the study of law and legal practice. In the legal culture, which represents a certain level of development of the regulatory qualities of law and legal values, legal progress and spiritual values, the legal consciousness of society and the individual is realized. The main interrelated

and interacting elements of legal culture are the state of legality, legislation, practical work in the field of law and, above all, the state of legal consciousness in society.

Being a systemic education in the legal system of society, the legal culture at various stages of its history also changes, which allows to determine (measure) its value. In the broadest sense, the level of legal culture can be measured both in historical retrospect, and in relation to the existing state of legal life, in accordance with the existing legal system of society. Narrowly, the level of the legal culture of society can be measured as the level of positive and negative manifestations of legal life achieved.

In the studies of many scientists, the difficulties stemmed from attempts to strictly isolate the legal culture from the system of universal human culture, which is represented in the results of people's activities. The level of general culture determines the possibilities for the realization of law, and its own development depends on the existing legal norms. On the one hand, the development of law, hence the legal culture is conditioned by the economic structure, social structure, political system of society and its ideology, and on the other – the level, nature, traditions and tendencies of its culture.

The component of the legal culture – the right is called to ensure the functioning of society as a whole against the backdrop of the struggle and compromises of various forces that are ultimately interested in working out a certain program for carrying out common affairs. Thus, the degree of development of legal culture in a society with diverse interests in all spheres demonstrates not only the effectiveness of protecting the interests of the state and its citizens, but also demonstrates the ability of people to be resistant to destabilizing influences.

Legal culture is unthinkable without mastering the law. It allows to distinguish such typological features of the quality of a person and a citizen as knowledge and understanding of the essence and principles of law, its value properties, the degree of perception and respect for the law, the degree of conviction in the fairness of law and justice, the habits of observance of legal regulations, the ability to ensure the realization of law.

At present, there are a lot of problems in the process of forming a legal culture. This is, first of all, the legal illiteracy of the population, a complex process of law-making, a frequent contradiction of normative and legal acts of reality, as well as the not developed ideology of a strong rule of law and, as a consequence, legal nihilism, the denial of moral principles [4, p.243].

It is worth saying that in the modern understanding of legal culture there are many poorly studied moments and unsolved problems, the solution of which requires a certain methodological approach, which is based on the peculiarities of the law itself. These features include:

- 1) there is a clear allocation of a social object, in relation to which the very concept of «legal culture» is formulated;
- 2) there is a definition of the structural content of legal culture, i.e. presence of the composition of its main components;
- 3) the availability of an understanding of the features of the quality of legal culture and its differences from the state of «outside the legal culture»;
- 4) determining the place and role of legal culture in the system of categories of theory of law.

The study of legal culture directly depends on the available scientific research of this concept. To date, there are many definitions and approaches of domestic and foreign scientists, the essence of which is reduced to an attempt to reveal the nature and nature of this phenomenon.

For example, according to the well-known domestic scholar-lawyer Ibraeva A.S. «... legal culture is a combination of positive phenomena in the legal life of society, as well as the extent to which the society assimilates legal values. The future of civil society depends on the level of the legal culture of society. Forming legal culture is a complex process. In the Republic of Kazakhstan, civil society passed the initial stage of formation» [5, p.7].

We agree with the scientist's opinion that work with the population to raise the level of legal culture must begin, first of all, at the level of local executive authorities. It will be really practical. Existing state programs and concepts are mainly developed at the national level, which indicates the need to create a revitalization of this work at the local level.

Legal culture is a socio-psychological phenomenon that is valuable only in a socially heterogeneous, contradictory society, where a legal culture can act as legal regulators of life support for this

society. Legal culture has its specific content, which distinguishes it from such social phenomena as law, legal relations, etc. In essence, it reflects the level of development of legal values both of society as a whole and of individuals, their level of ability to create and effectively apply legal means to achieve their goals [6, p.258].

Legal culture has a complex internal structure and at the same time has many socio-political connections in its content. This is not surprising, because Being a part of the general culture of a society, legal culture shows all the changes and deformities to which the general human culture of a society is exposed in general. It should be noted that legal culture not only boils down to knowledge of laws and the norms of law by every person, but shows how successfully an individual can realize himself in the legal field, how much civil responsibility and civil debt to the state are developed in him.

In the opinion of N.A. Klevtsova, the main prerequisite for the study of legal culture is the awareness of the need for an in-depth development of the set of theoretical and applied problems of the formation of a system of human rights and duties that are directly dependence on the changing economic, political, social conditions of society [7, p.134].

The position of Boschno S.V. is interesting, which considers that the legal culture is a component of the general culture of society (person), i.e. it obeys the general laws of the formation of culture. To form a legal culture, it is necessary:

- 1) the existence of a large social group that will be the bearer and custodian of culture and its values;
- 2) the existence of small social groups that will act as direct conductors (translators) of culture for individuals;
- 3) a strong dominant legal culture is necessary, in this case countercultures are not dangerous for it [8, p.7].

According to A. Bondarev, legal culture does not represent a certain number of legal values or their characteristics. Legal culture is a specific property of subjects of law, i.e. it shows the level of their development in the legal field, the success of their abilities at a qualitative and effective level to use all the necessary legal means to achieve their legitimate goals [9, p.13].

For example, the domestic scientist Absattarov G.R. believes that «... firstly, the legal culture of the Kazakh people is the initial defining ideas, demands, attitudes that make up the moral and social basis of the maturity of the Kazakh society; secondly, the main requirement for the legal culture of the Republic of Kazakhstan is the improvement of the quality and level of the social and legal life of society and the individual [10, p.189].

Formation of legal culture directly depends on the level of legal education in the country. The quality of higher legal education is an indicator of the development of the entire legal system and the readiness of the society to realize itself in the legal field, to participate in all processes occurring in the country.

Based on the above approaches to understanding legal culture, we can conclude that in the legal science there are various theoretical and methodological approaches to the legal culture, which gives us the opportunity to identify certain reasons for its structuring. These grounds differ in:

- 1) subjects, i.e. holders of legal culture, on its objective and subjective components;
- 2) in terms of the ratio of public and individual interests;
- 3) by the presence of ideological and socio-psychological values;
- 4) on behavioral and value components;
- 5) on the level and degree of legal knowledge obtained;
- 6) on the degree of consolidation of legal knowledge in the mind, implementation in practice.

For a more complete analysis of the structural elements of the content of legal culture, it is very important to take into account the general meaning of the term «culture», which means a certain level of development of social relations, as well as a synthetic characteristic of the person himself, the level and measures of his personal development. Today, unfortunately, there is a certain devaluation of traditional values of legal culture, and in turn the formation of modern values that would correspond to a developed rule of law, face a certain degree of immaturity of socio-economic and political conditions.

Favorable social conditions are the determining factor in the development of a common culture, which, as a rule, is reflected in its content. The main role in shaping the development of the legal culture of the society is played by the awareness and realization of existing public interests and needs. Legal culture is formed only where there is a systematic reproduction of its conditions, ensuring the unity of the system of legal knowledge and values. The normative level of legal culture permeates almost all levels of basic public interests, i.e. sphere of legal consciousness, legal ideology, value orientations, etc.

To implement socially useful behavior of a person, certain mechanisms of its regulation are necessary, i.e. actions that organize, organize and direct the legitimate activity of a person in society and in various social groups. Regulators of such lawful behavior can be represented as «external», i.e. social and «internal», i.e. psychological.

Legal culture has a close connection with other types of general culture (economic, moral, professional, etc.). We can distinguish three main components of legal culture:

- 1) the cognitive component, i.e. knowledge of the law, legal and illegal conduct and their consequences. The cognitive component contains judgments (opinions) of an evaluation nature. On the basis of these judgments, the attributes are attributed to the qualities of «utility-harmfulness», «desirability-undesirability», «acceptability-unacceptability», etc.;
- 2) the affective component is the emotional attitude to the law. The emotional component contains certain feelings about the social object, i.e. «Pleasure-displeasure», «sympathy-antipathy», «love-hate» etc.
- 3) the conative component (behavioral). The co-operative component signals readiness for a particular action and contains tendencies of readiness for behavior relative to social objects.

Having studied a small part of the existing approaches to determining the nature and essence of the legal culture, it becomes obvious that the formation of a legal culture and its development is possible only when solving the following problems:

1. It is necessary to provide the necessary orientation in the fundamental principles and principles of the legal system of the state. This means the division of the principles of the legal system into: sectoral, interdisciplinary, constitutional. Knowledge of these principles allows an individual to understand the essence and content of law, to form his own legal knowledge and beliefs.
2. To expand the volume and increase the level of legal behavior of the addressees of the law, it is necessary to create a certain base. This should be done to create a social maturity of citizens and legal literacy, which will characterize their legal behavior. And this in turn will be a prerequisite for the normal functioning of the state with a high level of legal culture.
3. It is important to train highly qualified legal cadres, they are the «face» of the legal system, their activities are directly related to the implementation of state legal policy;
4. Higher professional education should meet international standards. Educational programs of legal specialties should include training courses, the study of which will form the professional competence of graduates of legal specialties;
5. Scientific research should not be limited to theoretical results. Their practical implementation is important. Existing scientific achievements in the field of studying and analyzing legal culture should be used in the development of state programs, concepts, etc.;
6. It is necessary to provide direct bearers of rights and obligations, conditions of struggle for their legitimate interests. This means creating conditions for excluding legal passivity, instilling a sense of justice and justice for every citizen.
7. It is necessary to carry out a permanent work to prevent offenses. It is important to fight against legal nihilism, poor public awareness of existing laws, and to constantly work on improving legislation.
8. It is necessary to pursue a policy of legal activation of the population. Stability of law and order in society directly depends on the activity and effectiveness of each individual with violations of the rule of law.

The solution of the set tasks in the field of raising the legal culture is based on the development of the main directions for enhancing the legal culture. We offer the following directions:

- 1) analysis and study of such concepts as «law» and «legality»;
- 2) constant improvement of the legal framework in the field of legal policy;
- 3) development of the level of legal activity;
- 4) development and assimilation of scientific research achievements in a given field;
- 5) analysis, processing and systematization of the results obtained, definition of new goals and objectives.

Thus, it can be argued that it is impossible to raise the level of legal culture without complex measures on the part of the state, without creating conditions under which society can realize its rights and freedoms. Each individual and society as a whole should be aware of the need to participate in the socio-economic and political life of the state, to contribute to the development of the state.

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