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PEDAGOGICAL CONDITIONS FOR FORMATION OF MEDIA COMPETENCE AMONG STUDENTS IN THE PROCESS OF HIGHER PROFESSIONAL EDUCATION

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Abstract: One of the indicators of the country's development and competitiveness is the level of media technology. It becomes increasingly difficult for a person to navigate the world of information in the conditions of complexity and dynamics of social processes, the quantitative increase in mass information, strengthening of mass information flows and technological development of information networks. The media become the main source of information for the population of any state. Communication environment is becoming increasingly as mass, rather than interpersonal. Expansion of media space complicates the possibility of analyzing and orienting the audience in the media environment and increases psychological pressures. In connection with this, an urgent task for the pedagogy of higher education is the problem of finding adequate means that would help prevent such an effect on the youth and reduce the degree of manipulative damage. The article is devoted to the problem of formation of media competencies among students studying in the system of higher professional education of the Republic of Kazakhstan. It provides a terminological analysis of key concepts; the conditions for the formation of media competence of students as a result of systematic pedagogical work aimed at preventing the manipulative influence of the media on individual, which are explained, the characteristics of the special course program aimed at ensuring the effectiveness of this process, which are given, the results of the ascertaining experiment with the fragments of statistics are stated.

Keywords: information society, manipulation, media competence, media education, pedagogical conditions.

1 Introduction

In the conditions of "post-industrial society", "mediatized environment", it is necessary to train new generations of citizens for active life and activity in an informationally saturated society. The universal formation of a single scientific and educational space on the basis of constantly updated means of telecommunications and information technologies that significantly affect the pace, perception, and character of instruction towards its interactivity is connected with the phenomenon of "media competence".

One cannot fail to note the contradiction in studying problems of media education and the formation of media competencies among students. On the one hand, media is a source of knowledge, on the other hand, media often has a negative impact on the educational process. Systematizing the advantages and disadvantages of using new media, it is possible to trace the psychological and pedagogical orientation in creating necessary conditions in the educational environment of the university. (1)

2 Materials and Methods

Modern pedagogy treats "conditions" as a combination of factors, components of the educational process, ensuring its success. Conditions are also considered to be an environment in which certain pedagogical processes take place. The analysis of informative sources on pedagogy has shown that in general terms pedagogical conditions are understood to mean a set of factors, circumstances, components, prerequisites, measures that contribute to a favorable, successful process of education and training (LP Kachalova, IE Piskareva, A. S. Belkin, T.F. Loshakova, S.N. Repin, I.A. Sharshov, N.M. Yakovleva, O.R. Ergard, and others).

The definition and justification of pedagogical conditions for the formation of media competence of students required analysis and refinement of terminological apparatus of study, which includes the following concepts such as "information society", "manipulation", "media manipulation", "media competence", "media education". Let us now turn to an analysis of the above key concepts on the problem under consideration.

In the 1980s, under influence of rapid development of the scientific and technological revolution, the theory of information society was developed. This theory considers production, distribution, and consumption of information as a prevailing sphere of economic activity of society. It exaggerates the role of the informal sector of the economy, the information theory of value is opposed to the labor theory of value. The term "information society" is used to designate a special type of social formation, a new era of development of human civilization. The most prominent representatives of this direction are A. Turen, P. Servan-Schreiber, M. Poniatowski (France); M. Horkheimer, J. Habermas, N. Luman (Germany); M. McLuhan, D. Bell, A. Toffler (USA); D. Masunda (Japan).

As a basic condition for the formation of the information society, high-tech information networks operating on a global scale are considered. Information is a specific commodity, the main social value of society. A new interpretation of communications goes beyond their consideration of both technical means of communication and implementation of information exchange, presenting communications as new means and forms of human contacts and information exchange, the search for forms of active spiritual communication of people in dialogues.

Analyzing various points of view of scientists on the essence of the information society, we can summarize that - this is a society whose development is based not on material production, but on the production of knowledge and information on the basis of advanced information technology, i.e. information. Information is a specific commodity, the main social value of society, as information exchange, forms of human contacts and people's spiritual communication in dialogues are carried out. Despite the fact that the phenomenon of the information society is described in sufficient detail, the task of preparing young people for life in such a society remains extremely urgent.

Manipulation is a kind of psychological device, the purpose of which is to force a person to take certain actions contrary to his desire. At the same time, influence is not explicit, but hidden. The essence of manipulation is that a person who is under pressure must himself want to take certain actions, even if it is not profitable for him.

A considerable number of scientific works of Western and Russian researchers in the field of psychology, sociology, political science, and philosophy of the late 19th and early 20th centuries are devoted to the study of the phenomenon of manipulation. (A. Mole, A.O. Kharash, V.M. Bekhterev, G. Lebon, G. Marcuse, Z. Freud, M. McClouin, M.A. Hevesy, W. Lippman, F. Nietzsche, E. Fromm), representing a categorical basis for understanding the essence of the phenomenon of manipulation of mass consciousness. Among applied psychological studies of the same period, works of A. Bandura, N. Miller, S. Milgram, S. Iyengar and D. Kinder, and others, studied experimentally the psychological mechanisms of suggestion.

Pedagogical aspects of this phenomenon are considered in the works of A.V. Fedorov, I.V. Zhilavskaya, L. Masterman and others.

By media manipulation is understood - a kind of manipulative influence, having a hidden, one-dimensional, purposeful information character, carried out by the mass media (the subject), whose purpose is to imperceptibly change or introduce certain attitudes, opinions, views into the consciousness of audience (object) in relation to certain events, persons, phenomena of reality, through the use of various technologies and techniques of manipulation.

The identification of the problem of media manipulation is also connected with the development of the Internet, which further increases psychological pressures and complicates the possibility of analysis and orientation in the media environment. With the development of Internet technologies and progressive availability of a global network for young people, the media is becoming the main source of information for young people about various phenomena of reality, events occurring in the world. (2-3).

The next key concept of our study is "media competence", which is determined ambiguously, multifaceted. In the definition given by K. Tyner (4), media competence appears as "the ability to find, evaluate and use effectively information in personal and professional activities". The author notes the need for the ability to search and collect necessary data, which is very relevant for the age of information technology with a huge uncontrolled flow of information, which, in turn, requires analysis and adequate evaluation, i.e. critical thinking. In accordance with the proposed study, the personality is seen as an active user, able to work with media and applying his media knowledge and media expertise in all areas of activity, especially in the professional.

According to W. Schludermann, (5) media competence contains a list of abilities and skills related to media, which should include measurements of knowledge, perception and (relatively active) use of (mass) media. Schludermann, like Russian media educators, points to the need to activate media-competent personality in relation to mass media and the availability of media knowledge.

Considerable importance in the course of our research is the position of V. Weber (6), who identifies the structure of media competence, which includes mandatory media-studies, knowledge and analytical skills. One can agree with one of the foreign researchers of this issue of D. Baacke (7), who believe that media competence includes a list of abilities and skills relating to the media, which should include measurements of knowledge, perception and (relatively active) use (mass) of media.

From the point of view of J. Potter (8, p12), "the audience at a higher level of media literacy has a higher level of understanding, management and evaluation of the media world". Media competence can help a person "provide answers in the context of historically limited meanings that are accessible to him and his perception. The literacy of reading and rethinking media texts helps clarify the question, "Who do I become when I see this?" Important are three components of media competence assigned to them such as experience, active application of skills in the field of media, readiness for self-education.

D. Baacke (9) identifies four dimensions of media content such as media criticism (analytical, reflexive, ethical); the science of media (informative, instrumental and qualified); use of media (simple and interactive perception); media design (innovative, creative). In our opinion, at this stage of our research, this approach in the preparation of future pedagogical personnel allows us to solve problems of readiness for professional functioning and positioning in an open educational space.

Valuable for our study is profound terminological analysis carried out by A.V. Fedorov (10-11), who convincingly showed that the term media competence "determines the essence of individual's skills to use, critically analyze, evaluate and change media texts in various forms and genres, analyze complex processes of media functioning in society". The author offers characteristics of high and low levels of development of media competence. All that has been said allows us to conclude that available approaches to the interpretation of media competence of the individual, considering this phenomenon from various positions, have a general characteristic reflecting the essence of the concept of "media competence".

Based on all the presented positions, opinions, opinions, media competence is defined by us as a set of knowledge, skills, qualities that contribute to informed perception, choice, critical analysis, use of media texts that provide psychological resistance to media manipulation.

Media competence is the result of media education, which originates in the first half of the 20th century. The term "media education" was borrowed from foreign pedagogy in 1986 and is a verbatim translation of "Media Education": "Media" in Latin is the way, medium.

The analysis of informative sources devoted to problems of media education ((1-8), etc.), demonstrates the absence of a generally accepted concept of "media education". Among all available definitions, the first generally recognized definition is the definition formulated in UNESCO documents in 1973, "... teaching theory and practical skills for mastering modern mass media, considered as part of a specific and autonomous field of knowledge in pedagogical theory and practice; it should be distinguished from the use of QMS as auxiliary tools in the teaching of other areas of knowledge, such as mathematics, physics or geography". (12) Advantages of this definition are the allocation of media education as an "autonomous field of knowledge in pedagogical science" and an attempt to dilute the notion of "using QMS as auxiliary tools" and "studying QMS".

The psychological and pedagogical dictionary defines media education as "a direction in pedagogy, which advocates the study of laws of mass communication by schoolchildren. The main task of media education is to prepare a new generation for life in modern information conditions, to perceive various information, to teach a person to understand it, to realize the consequences of its impact on the psyche, to master communication methods on the basis of non-verbal forms of communication through technical means and modern information technologies". (3, p241).

One of the most authoritative media educators and media theoreticians L. Masterman (substantiated the following seven reasons for priority and relevance of media education in the modern world:

- high level of media consumption and saturation of modern societies with mass media;
- the ideological importance of the media, and their influence, as an industry, on the consciousness of the audience;
- rapid growth in the amount of media information, strengthening of its management and dissemination mechanisms;
- the intensity of media penetration into the main democratic processes;
- increasing the importance of visual communication and information in all areas;
- the need to train students/students with a focus on meeting future requirements;
- the growing national and international processes of privatization of information. (1)

N.V. Zmanovskaya's (13-14) goal of media education sees media education as "the aggregate of systematized media knowledge, skills, value attitude to media education in general, as well as the level of skill that is defined by them in implementing the media education of schoolchildren in the pedagogical process".

N.B. Kirillova (3) defines the final goal of media education is the formation of a person's media culture, that is, Ability to active, meaningful media content, based on knowledge about the essence, specificity and goals of mass communications".

R. Kubey uses the terms “media competence/media literacy” (ability to use, analyze, evaluate and transmit messages in various forms. (15, p2)

In our opinion, the listed concepts are similar in importance to each other, since they determine the development and competence of an individual in the field of media education, are considered as the goal of media education, but, at the same time, are not absolutely identical, they are conceptual or ideographic synonyms. (16-17)

When creating a set of pedagogical conditions conducive to improving the level of media competence of university students in the process of professional training, we considered the social order of society for higher professional school; specificity of the educational process in the university and the possibility of its use for the formation of the researched skills; leading ideas of competence approach. Proceeding from the above, we have identified the following set of pedagogical conditions for the formation of media competence of students:

1) the creation of motivation to achieve in students’ learning through familiarity with various media genres, works of media creativity (motivational)
2) the development and implementation in the educational process of the higher school of a course for students’ choice “Fundamentals of Modern Media Studies” (meaningful)
3) the development of a critical attitude towards the products of the mass media; the ability to analyze, evaluate and interpret media information; training in anti-manipulation skills in interaction with various media (procedural). (18-20)

The first pedagogical condition for the development of media competence of university students is the creation of motivation for students to gain access to study through familiarity with various media genres, meditation works. We believe, that working with media materials in the classroom at the university gives many options for pedagogical creativity, make classes fascinating. Thanks to various forms and methods of working with media works (overview, thematic and problem discussions, annotations, debates, round tables, problem situations, creative projects, etc.), students develop skills and understanding skills and analysis of media materials. (21) Such classes encourage them to communicate, express their own opinions, comments, as they relate to the most relevant and interesting topics for students. The realization of the first pedagogical condition is conditioned by the need for students to develop a positive motive for learning, an interest in the successful formation of media competence. (22-23)

The modern educational process of the university requires a more thorough program-targeted and technological structuring of formation of the media competence of the students' personality. In this regard, the second condition for the development of required competence is associated with the acquisition of certain theoretical knowledge among students about the media. For this, it was decided to develop a program of the corresponding special course “Fundamentals of Modern Media Studies”, the program of which includes a number of organizational (input and output diagnostics); methodological (reliance on the philosophical concept of M. Bakhtin-V. Bibler on the dialogue of cultures, on a meaningful and historical approach, through the consideration of concrete historical genesis and the development of media education); (selection of the content of education, choice of methods, forms of media education classes, organization of students' independent activity) of grounds, totality of which ensures the formation of necessary general and special knowledge of media, manipulative influence of the media, and contributes to planned development of key elements of media competence of individual. (24-26)

The volume of the curriculum is 40 hours. The program of special course provides for studying the role of media and media education in the modern world, the main terms, theories, directions of media education, historical stages in the development of media education abroad and in Kazakhstan, problems of media perception, and forms of organizing media education sessions. (27-28) The process of mastering the program is based on a combination of classroom classes, which are based on interactive forms of learning content, application of problematic, heuristic, gaming techniques, and practical creative pursuits. The program provides for a transition to the formation in students of a full-fledged perception and development of abilities for meaningful critical analysis of media texts. We believe that including media literacy classes in the university curriculum, we will equip young people with skills that will help them to independently regulate the influence of media on their lives. (29)

The mass media and the Internet, having taken priority positions in the formation of a picture of the world among young people, began to pose a special threat to their psyche. Increasing the influence of youth of uncontrolled information about the world, man, society, nature, actualizes the problem of information education, the formation of media competence, critical thinking and critical attitude to information. As the proponent of the introduction of technology for developing critical thinking in the educational process, Ali Nihat Eken (Turkey) needs to remember is best protected from the unhealthy impact of the media, one who is able to perceive media critically, who can independently analyze and evaluate the information that has come to him. (30) In this regard, we believe that the implementation of the third pedagogical condition is aimed at evaluating self-knowledge obtained from various sources, forming a reflective position when working with this kind of information, since it provides for the acquisition by students of experience of a critical attitude to the information received, comparing it with information obtained from other sources and available life experience. (31-32)

It seems that such conditions will contribute to improving the quality, systematic, theoretical and methodological elaboration of pedagogical activity for the development of media competence among students, and as a result, to solve the problem of preventing manipulative influence on the basis of the pedagogy of higher education. (33-35)

3 Results and Discussion

In our study, experimental work was organized on the basis of the Kazakh National Pedagogical University named after Abai and the Taraz Pedagogical Institute. For the experiment, two groups were organized - experimental and control, with a total of 188 students studying in specialties “Pedagogy and Psychology” and “Pedagogy and Methods of Primary Education”. At the stage of the experiment, media competency criteria were defined that included a body of knowledge of the media, skills, and habits of their practical application, personality qualities that characterize a person, such as cognitive activity, critical thinking, creative thinking, communicative, reflexive. At this stage of research work, we organized diagnostics of levels of formation criteria of media competence. For this purpose, the following methods were chosen such as questioning, testing, and conversation in form of a “round table”, discussions on a given topic, as well as public debate and a survey.

In accordance with the main provisions of the criterial-level approach, the existence and quality of knowledge, skills, qualities that make up media competence were considered in an experiment on three levels such as high, medium and low.

The high level of the formation of media competence means the availability of knowledge about the media; the phenomenon of manipulation in media and the danger; activity in the search and retrieval of information, selectivity with respect to consumed information; possession of developed critical thinking, the ability to compare, comprehend, reasonably evaluate, analyze media texts. (36)

The medium level of the formation of media competence means the presence of disparate knowledge about the media; about components of media competence; the phenomenon of manipulation in the media; awareness of danger; demonstration of activity, but lack of selectivity in search and retrieval of information. (37-39)

A low level of media competence means poor knowledge of media; the phenomenon of manipulation in the media; about technologies and techniques of manipulation; lack of activity in the search for information; critical thinking and critical autonomy are not worked out; motivation for addressing the media is related to the needs for entertainment, relaxation; emotional reaction to the material is inadequate to its content. (40-42)

Based on the results of the analysis of the first stage experiment, the following main conclusion was drawn: students do not have a sufficient level of knowledge, skills, qualities that make up media competence. Representations of students about the phenomenon of manipulation in the media are extremely fragmented, the perception of media information is superficial, the ability to critically compare, interpret, evaluate, analyze, interpret the texts of news media is weakly expressed. Most students in an address to network media prefer motives of entertainment, relaxation, distraction, fashion, habit, students often demonstrate emotional instability in the perception of media texts. The described results are shown in Figure 1.

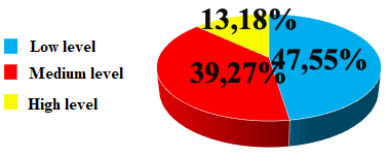

Figure 1. Indicators of the Experimenting Level of Media Competence of Students

At the formative stage of the experiment, we will test a special course that contains some aspects of theoretical and practical approaches to the development of media competence among students in a pedagogical university.

4 Conclusion

In conclusion, it should be noted that media competence is not a fixed amount of knowledge. To increase them, increasing the degree of media competence can be throughout the whole human life, through perception, interpretation, and analysis of cognitive, emotional, aesthetic and ethical media information. In conditions of the dynamic information environment and constant transformation of media technologies and modification of ways of consciousness manipulation, it is necessary to systematically monitor the current changes taking place in this sphere with the purpose of adequate pedagogical response to them and maintaining the relevance of counter manipulative pedagogical technologies used on the basis of higher education

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NEGATIVE CONSEQUENCES OF THE COUNTRY'S COLONIZATION OF KAZAKHSTAN

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Abstract: In the article, on the basis of an objective investigation and usage, for the first time, archival documents introduced into scientific circulation and materials of the pre-revolutionary press, the essence of a colonial policy of the imperial government in Western Kazakhstan is analyzed. For a long time, the country's colonization was estimated unambiguously as the progressive phenomenon, tragic consequences of this policy in the social, economic and spiritual life of the Kazakh people were not shown.

Keywords: Country's colonization, Strengthening of a socio-political bearing part of the imperial government, Large-scale colonization, Russification and Christianization, Economic and political independence, Economic relations.

1 Introduction

The word "colonization" is translated from the Latin language as "settlement on foreign land". If we look at this word in a broad sense, then "colonization" means the creation of the alien territory of settlements of the inhabitants of any other country. An example is the colonial settlements of the ancient Greeks, Phoenicians, and Romans in the Mediterranean and the Black Sea region. In the Middle Ages, colonization took place in the East. For example, the Arabs colonized East Africa, the Chinese - South-East Asia. In the narrow sense, colonization is the forcible seizure of foreign countries and territories for the creation of dependent estates there and their subsequent exploitation.

This meaning of this term appears already in the 15th century with the emergence of capitalism and with the beginning of new geographical discoveries. The main reason for colonization is the search for new lands rich in precious metals, since the depths of Europe had only a small amount of their reserves.

Therefore, the victims of the colonialists are the "new" continents: Africa, America, and Australia. Summarizing the above, it is possible to define the term "colonization" as a process of settling and economic development of the country's deserted outlying lands, as well as the process of establishing settlements beyond its borders, which is most often accompanied by the conquest, displacement or extermination of the local population. (1)

Hence, one can identify the main goal of colonization, which is to establish control over the colony, over the resources of this colony, for example, control over mineral deposits, fertile lands, labor resources or the colonization goal can be the advantageous geographical location of the colony (country).

At the same time, the metropolitan country tries to distribute these resources to its own advantage, while the local population is not provided with basic civil rights. The power in the country belongs to the representatives of the metropolis, and the indigenous people are in every way subjected to oppression by the metropolis. (2)

The process of settling a foreign territory occurs by depriving the local population of economic and political independence, rights and freedoms, the liquidation of local government and the establishment of new laws, based on the personal interests of the metropolitan country.

A special regime is established, through which the indigenous population is completely dependent on the foreign state. This territory was also subjected to the territory of modern Kazakhstan. From history, it is known that the accession of Kazakhstan to Russia is closely connected with the name of the Abulkhair Khan of the Younger Zhuz. As has been said, colonization is usually accompanied by the forcible seizure of foreign territory.

But in this case, Abulkhair Khan himself wanted to obtain Russian citizenship, based not only on his personal interests but also to provide protection from enemies, mainly from the Dzungars. Therefore, Kazakhstan's accession to Russia can be considered voluntary, although it was based on a unilateral policy. The Khan's first appeal to Russia remained unanswered.

However, when, in 1730, influential biys instructed Abulkhair to negotiate with the Russian government on the conclusion of a military alliance, the khan accepts Russian citizenship. (3) This played an important role in the future situation of the entire people of Kazakhstan, and in 1865, the entire country became part of Russia.

Let's highlight the main reasons for the adoption of Russian citizenship - the lack of unity between the Kazakh rulers and the threat of the Dzungars. The internal and external political crisis in the Kazakh Khanate compelled all the Khanate to accept the citizenship of the Russian Empire. The long process of colonization can be divided into several stages, judging by the methods of colonization.

First, free spontaneous colonization of the region occurs at the expense of the settlement of runaway people and free Cossacks. The second stage is characterized by the construction of fortresses, fortifications, and the organization of various expeditions to explore the territory of Kazakhstan. Colonization is a military-administrative method with use of diplomatic means. In the third stage, the Russian government takes up resettlement policies. This policy for the government played an important role in further colonization.

After all, this enables the displacement of different peoples and this is the way to the Russification policy of tsarism. In addition, in the face of resettling peasants, a new place is being created. The fourth stage is spiritual colonization, which is characterized by the Russification of the local population through baptism into Orthodoxy and the change of the traditional alphabet into Cyrillic.

The traditional management system was destroyed and all power (administrative, military, economic and spiritual) was transferred to the hands of Russian officials. Thus, we see that the peaceful process of colonization has gradually grown into a violent seizure and for two hundred years the people of Kazakhstan have suffered oppression from the side of Tsarism.

Colonization has resulted in many negative consequences. For example, the way of life of Kazakh tribes changed: people who had been nomadic since ancient times had to move to a settled way of life since numerous restrictions were introduced in this regard.

The land issue worsened, as the land where the nomadic population grazed cattle was seized, for the construction of fortresses. The emergence of forbidden territories occurred, as well as the peasants-settlers were allocated land, which caused a land squeeze. All this became the cause of discontent among the population and served as a pretext for a mass of anti-colonial speeches. There were revolts and internecine conflicts of dissent with the decision to join Russia.

The Kazakh Khanate was weakened due to political disunity, the desire of individual khans and sultans to strengthen the independence of a Zhuz, the lack of an internal market and the strengthening of contradictions in the Khanate. In the end, the khanate power in the Kazakh Khanate was liquidated. Districts were formed.

However, the consequences of the colonization of Kazakhstan by Russia were not only negative but also positive. Through the Kazakh steppe, trade routes took place, which was of great international importance, since they linked the countries of Eastern and Western Europe with Central Asia. Through this step, the Russian Empire also established trade and diplomatic exchanges with the countries of Central Asia. Diplomatic relations between Russia and Kazakhstan are being established. Kazakhs who were raided by neighboring states saw Russia as a strong ally, and the Russian government, in turn, was interested in the political situation of the Khanate and in its relations with neighboring countries. Finished goods and capital were also imported to Kazakhstan. There were cities that later became administrative and economic centers.

Factories, plants, and roads were built, banks were opened. Trade and economic relations between the two states began to develop. The Russian Empire took measures to ensure the security of the annexed territory, primarily for protection from China. Despite the fact that the resettlement policy has led to land squeeze, it also has its advantages. For example, the resettlement of peasants to the Kazakh steppes led to the establishment of close friendly ties between these peoples, they complemented each other's way of life and culture.

The Russian empire became a defense and a strong ally of the Kazakh Khanate because at that time there was a great risk of losing statehood. Therefore, Kazakhstan's accession to Russia was the only way out of the current difficult situation and made it possible to defend its state independence.

2 Materials and Methods

Raising the question of cultural and community connections of the Kazakh people and immigrants, it is possible to note that, in historical science, only positive aspects of these communications had been described, and negative sides of these communications were not considered. The concept of the imperial authorities on the superiority of immigrants over local population negatively affected different spheres of the public life of the Kazakh people undermined foundations of national traditions and spiritual heritage of the Kazakhs transferred from generation to generation, led to the deterioration of an economic situation and crisis of the spiritual origin.

The construction of immigrants' settlement together with the Kazakh auls or in close to them led to changes, both in the economic sphere and in the cultural and everyday life of the Kazakh people.

Resettlement of the Russian peasants to Kazakhstan solved not only the main objective – to slacken agrarian crisis in the central regions of the empire, but also pursued the aim – to Russify the Kazakh people and to strengthen influence on the spiritual life of Kazakhs.

At the first stage of resettlement, the most part of the Russian peasants rented lands from Kazakhs and, having constructed hunters lodge, was settled among the local population. Some part of immigrants in searching the earnings constantly lived in the Kazakh auls. The colonial authorities, in connection with a small number of people and weakness of the Russian immigrants in comparison with "foreigners", undertook various measures for preserving the Russian consciousness of immigrants. It was provided, by a small number of immigrants in the Kazakh steppe, and that only separate families of the Russian peasants lived in some Kazakh auls.

The colonial authorities were afraid that "peasants would get under influence of Kazakhs and would lose the Russian shape.

For example, the member of the Turgay regional statistical committee of V. Katarinsky expressed fear that the Russian settlements failed the mission assigned to them by tsarist government, i.e. "Russification of Kazakhs".

Moving of the Russian peasants whenever possible in auls, or in the neighborhood with the Kazakh auls, according to imperial administration, created opportunities for "expanding Christian religion among the Kyrgyz, the familiarizing of the steppe with the Russian state both the Russian culture and uniting with the Russian people". Representatives of local administration at all did not hide the colonial intention on this matter.

So, it was proved that resettlement of the Russians was the only way in russification of "foreigners" of the Russian empire.

In this regard, on April 5 and 26 1912, the Synod sent the letter to the Head department of land economy and land management in which it was specified that "during reallocation of the land, Kyrgyz-Muslims and Kyrgyz-Christians should be settled with Russian peasants" the corresponding instructions were given.

Along with colonization of the Kazakh lands, the tsarism started extending civil laws and rules of the Christian religion in the Kazakh steppe. Imperial officials thereby tried to approve only Christianity as the official religion.

Proceeding from it, the colonial authorities and religious institutions from the middle of the XIX century started undertaking measures for promoting Christian religion in the Kazakh steppe and to the broad attraction of local population to this religion, and, at the same time, strengthened the activities for preservation by arriving immigrants of the Russian-orthodox shape.

Diocesan Committees for the purpose of promotion and preservation of traditions and ceremonies of orthodox religion and strengthening of immigrants' belief regularly sent orthodox priests to the steppe. During construction of houses and economic constructions in settlements, the priority put construction of churches for immigrants. For example, during the founding of Kustanaicity with the purpose to rise motherland's prestige dignity of Christians the cathedral temple was constructed.

In 1914 for the satisfaction of religious needs of the Russian immigrants who have passed the Ural River, the imperial government allocated1.5 million rubles gratuitously.

On the eve of 1916 in Ural Turgay resettlement area 63 churches, 195 meetinghouses and 113 church and communal schools functioned. Among them in settlements in the Ural area 40 churches and prayer halls were open.

Resettlement of the Russian peasants to the Kazakh steppe created great opportunities for implementing the policy of the russification of "foreigners". The colonial authorities using the developed convenient situation started extending Christian religion among Kazakhs. For the purpose of realizing this direction Aleksandrovsky, Makaryevsky (1894) and Aktyubinsk (1898) camps were organized. Missionary schools were open on these camps, in its turn, boarding schools, in which since 1898 the Kazakh children started being trained, were created and at the first stage, 20 Kazakh children studied there. (4) And in the territory of the Ural area, the missionary camp started functioning in 1900 in the Russian-Kazakh settlement Shilik.

Meanwhile, the colonial authorities were not limited to the organization of only missionary camps. By the beginning of XX century, during strengthening of the country's colonization, within Christianization and russification policy of tsarism concerning Kazakhs, the opening of other missionary establishments was planned and the authorities provided money investment in the organization of such establishments. For example, in 1899, 2000 rubles for the organization of missionary establishment in Aktobe were allocated.

In addition, for receiving more significant results in missionary activity, the special attention was paid to the knowledge of the Kazakh language by priests. In particular, in all churches of the Turgay area, the priests knowing the Kazakh language were appointed. All of them were under the leadership of the main

missionary F.Sokolova. These priests, carrying out Christian sermons in the Kazakh language, started attaching local population to Christianity actively.

The imperial government used different methods to make Kazakhs accept Christian belief: gave money, promised to allocate the land plots, agricultural stock, and even to build houses for Kazakhs.

Thus, colonization of the Kazakh steppes was not limited only by taking the Kazakh lands, but also by means of "carrot and stick" mentioned the spiritual life of Kazakhs, pursuing Christianization policy.

Authorities' actions in this direction shortly started yielding the results. By the end of the XIX century, the number of christened Kazakhs increased. Originally christened Kazakhs were settled among the Russian peasants in the settlement Mikhailovka; special houses were built for them. Later for christened Kazakhs of Turgay area, the settlement Makaryev was constructed. In 1900 the number of christened Kazakhs of this settlement was120 people. The same year the number of the christened in a missionary camp Shilik of Ural area reached 66 people.

Missionary society of Orenburg diocesan committee sent the application to regional management about the need of newly christened Kazakhs of Aktyubinsk district close with settlements of Russian peasants. On its basis, in 1903, about 200 Kazakhs who have accepted Christianity were settled in the settlement Prigorodny near Aktyubinsk.

In this regard, we consider necessary to note the fact that the acceptance by Kazakhs of the Christian religion was compelled and is caused by a difficult situation and aspiration to receive any financial support from the government. Actually, as the scientist-historian Professor S. Zhakypbek (5) noted, "… accounting for archival materials, it is possible to track that on acceptance of Christianity, Kazakhs were motivated by a very difficult, difficult situation. Certainly, rich wealthy Kazakhs never did such things. The most part of the christened was made by the grown poor, become impoverished Kazakhs who did not have relatives and sympathizing persons in an aul, for survival such Kazakhs were compelled to step into this way." (5) So, owing to the country's colonization, the Kazakhs who have lost the lands which economy came to ruin, were compelled to worship to a cross.

The colonial administration for the purpose of the involvement of Kazakhs to the Christian religion and for stimulation rendered the monetary help to the christened. For example, in 1895 for improvement of life of the newly christened in Kustanai, it was gratuitously allocated 2000 rubles for 10 years. However, despite the "help" to the christened Kazakhs from the authorities, the missionary organizations and church, the position of such Kazakhs, in comparison with other orthodox was worse. Here so, in the course of the large-scale country's colonization of the Kazakh steppe and its tragic consequences the grown poor, become impoverished representatives of the indigenous people who lost the lands and has appeared in a stalemate, "threw" the language and religion and "turned" into Russians.

Certainly, measures directed on the baptism of the Kazakhs went in parallel with prosecutions of Moslem doctrine. Earlier, to the middle of the XIX century, the imperial authorities sought to use Islam in the colonial policy.

The policy "… supports by the Russian authorities the Moslem doctrine, introduced 150 years ago", now strongly disturbed the same power, missionaries, and church figures. About it Chernavsky (4) wrote the following: "The Kyrgyz (Kazakhs A.D.) in Orenburg area have been under the influence of the Russians not for long. Despite it, the Kyrgyz remained nomads, neighboring with Russians gave some results". Meanwhile, under the influence of the Tatar mullahs and the Central Asian religious figures, Islam was widely adopted in the steppe. The researcher Shternberg (6), according to one Muslim, noted: "Till there were no missionaries in the Kyrgyz steppe, the Kyrgyz did not know Moslem and did not teach the children except for the few rich men who employed Tatar teachers.

When missionaries began to scold Islam, Kyrgyz thought that the government wanted them to convert to Christianity, everyone, even poor, considered to train children Muslim, employing Tatar madrasah pupils for summer. Then the police began to forbid Tatar mullahs and pupils to go to the Kyrgyz (Kazakhs A.D.).

However, they began to go there under the guise of dealers, and the Kyrgyz became even more diligent. Muslim missionaries during 50 years couldn't make the same it was made by the Russian missionaries during 15 - 20 years." (6) Such orientation of Moslem doctrine came to a sectional view with a colonial policy of tsarism.

In such a situation, the imperial government started carrying out the measures directed on the restriction of the influence of Islam on the public life of the nomadic population. The Orenburg boundary commission started imposing a ban on the stay of Tatars in the Kazakh steppe, the performance of religious functions by them, and also the Kazakhs' trips to Turkestan, Bukhara and hajj commission to Mecca. (7)

Such policy of the imperial government led to control strengthening over madrasah, the intellectuals, censorship introduction on printing editions and persecutions on dissidents of religious figures and the national intellectuals, declared as propagandists of Pan-Islamism and Pan-Turkism.

For example, in 1916, the pride of the Kazakh people, national intellectuals A. Baytursynov, A. Bukeykhanov, and M. Dulatov were accused and inflicted punishment for the articles "Political Situation" published in No. 213 in the newspaper "Kazakh".

Introduction since 1807 of the obligatory teaching of Russian in Muslim schools, madrasah and the introduction of the Russian graphics in the Kazakh writing from the second half of the 70th years of the XIX century was one more measure in the policy of Russification of inhabitants. In this regard, the researcher of the Kazakh area Yadrintsev (8) wrote: "The introduction of the Russian graphics resulted in mass illiteracy of foreigners."

Summing up, it is possible to note that the country's colonization, on the one hand, was directed on the strengthening of a socio-political bearing part of the imperial government, on the other hand, was a basis for pumping out of the richness of the Kazakh steppe. The imperial government opened a way to the Russian peasants for large-scale colonization, thus, deprived the Kazakh population of fertile, suitable lands and water sources.

During the country's colonization the historically developed economy of Kazakhs fell into decay, the cattle breeding economy entered a crisis strip, and it, in turn, led to the deterioration of life of the Kazakh people, its impoverishment. Kazakhs lost not only suitable lands for cattle breeding, but, together with it, their wintering collapsed, mosques appeared in the center of the Russian settlements, graves of their ancestors were destroyed. The Kazakhs lost lives also being considered as a source - the rivers and lakes, wells, swills for cattle, the wood, etc.

The imperial government with the purpose of the russification and Christianization of the Kazakh people, and also deprivation of the national features, language and religion, settled the Kazakh population together with the Russian immigrants. So, the country's colonization infringed on national, social, economic and spiritual interests of the Kazakh people. Decreasing patrimonial migration generated land disputes among Kazakhs, and the aggravation of the land question split the Kazakh society even more. Thus, the Kazakh society turned into the victim of a colonial policy of tsarism.

3 Results and Discussion

The completion of the accession of Kazakhstan to Russia brought essential changes in empire policy concerning the Kazakh edge. Military and colonial actions having attached Zhetysu and Southern Kazakhstan, the tsarism came to the Central Asian base, having forced out English influence in the region. Having used a favorable international situation, the Russian Empire, being guided by the far-reaching political interests, established in Kazakhstan a colonial model. Roughly developing, the industry of the mother country more and more needed raw materials sources and labor. Rich with natural resources, livestock and raw materials the Kazakh edge drew the attention of the Russian businessmen.

However, the development of the huge region with different natural and geographical conditions demanded from ruling circles carrying out administrative-territorial, judicial and other innovations. Charters about the Siberian and Orenburg Kazakhs of 1822 — 1824, in essence, liquidated the khanate in Kazakhstan (except for Bukey, or Internal Horde), opened a scope for governmental and private Cossack colonization, but couldn't destroy the remained forms of government.

The tribal structure of the Kazakh society generally continued to keep former value through the creation of district system; replacement of nomads with centuries of familiar spots began to undermine a basis of the political system and economic way of the autonomous population. Carrying out a management system was favored also by a position of the empire, which have expanded in the borders. After serfdom cancellation, the government of Russia carried out a number of the reforms, which radically have changed a current socio-political life: territorial, judicial, urban, etc. Development of capitalism went "to depth" and in breadth. In these conditions, Russia put forward a problem of radical withdrawal of a former control system of Kazakhstan.

For the preparation of the draft of the Provision on the management of the Kazakh steppe, the government in 1865 formed the so-called Steppe commission. By reform preparation, the mood of broad masses was not taken into account. Carrying out radical reforms, which would promote the increase of material well-being of the Kazakhs was supported by C. Valikhanov. He suggested entering the system of administrative board in Kazakhstan on the basis of national self-government. In "A note about judicial reform" he considered social and economic innovations as the major for the Kazakh people.

On July 11, 1867, Tsar Alexander II signed the draft of the Provision on the management of Zhetysu and Syr Darya areas; On October 21, 1868 — the draft of the Provision on the management of Turgay, Ural, Akmola, and Semipalatinsk areas. Thus, "The temporary provision" on the management of Kazakhstan was prepared by tsarism on the basis of the reasons of government officials with the active participation of sultans of Seydalin, ChingizValikhanov, Musa Chormanov, etc. The management of the Semipalatinsk and Akmola areas was opened in 1854, Zhetysu underwent changes in 1866. The reform captured for the first time all Kazakh edge, though the Bukey (Internal) Horde, where the khan’s power stopped the existence in 1845, according to the draft of the Temporary provision departed in a structure of the Astrakhan province. In turn, areas were divided into districts, districts — into volosts.

Except the military and civil power, conducting diplomatic relations was imputed a duty of the Turkestani governor general with neighboring states — China, Iran, etc. The new control system loosened patriarchal and feudal way of life of nomads, limited the power of sultans, biys, and foremen. Implementation of reforms of 1867 — 1868 led to a weakening of the influence of the patrimonial aristocracy that was reflected in their legal, economic and political status.

Administrative management had pronounced military character. At the head of areas, there were military governor generals (they are commanders of military districts), concentrated in their hands the completeness of the military and civil power. The indivisibility of the military and civil authorities was the principle of the administrative device of the Kazakh steppe according to the new reform.

Under the Temporary provision on management in steppe areas of 1868 and to the Provision on management in the Turkestan region of 1867,a volost manager focused the police and administrative power in the hands. He watched the preservation of "tranquillity and order", payment of taxes and any duties from the population. Aulforemenfulfilled the same duties as volost managers.

Reform of 1867 — 1868 founded the military and judicial commissions and the district courts operating on the basis of all-imperial laws. The crimes committed out in steppe areas, criminal and civil cases of Kazakh cattle-farmers were understood by district judges on the basis of the Russian laws. Provisions of 1867 entered in 1868 temporarily in the form of experience for two years. However, this "experience" because of the possible negative reaction of the local population lasted more than for twenty years. Only at the end of 80 — the beginning of the 90th of the XIX century the imperial authorities started completion of introduction of administrative and judicial reform.

4 Conclusion

The accession of Kazakhstan started in the 1930sof the XVIII century, was completed only at the end of the middle of the XIX century and was a complex, contradictory process. The accession of Kazakh Zhuzes took place in various foreign policy and internal conditions. Tsarist administrative and political reforms eliminated the traditional system of government, opened wide opportunities for settling the Kazakh territory by Russian settlers, displacing nomads to poor lands. (9)

Having gained uncontrolled power over the majority of the population, Russia expanded its colonial policy in almost all spheres. At the same time, the accession of Kazakhstan to Russia created conditions for economic exchange and interaction between nomads and the newcomers. The abolition of serfdom did not resolve the agrarian question. Peasant unrest continued.

Under these conditions, the government took a number of measures to distract the peasants from the revolutionaries; one of them was the activation of the resettlement policy by colonization of Siberia, northern, western, central and the southeastern districts of Kazakhstan. The tsarist government intended to move the peasants from Central Russia as personal support in a new place. In the beginning, tsarism limited itself to the Military-Cossack colonization of the region.

The resettlement of peasants began in Russia. The tsarist government expected that the well-to-do peasants would pursue a Russification policy in the province and serve as a source of replenishment for the colonial troops. Having determined the goals of their agrarian policy in Kazakhstan, the tsarist government began to implement them.

On the ground, a number of measures were taken to colonize the Kazakh steppe and settle it by peasants from the central provinces of Russia. The initiative was taken over by the military governor of the Semirechye region, General Kolpakovsky, under whose leadership in 1868, the "Provisional rules on peasant resettlements in the Semirechye" were developed, in effect until 1883. According to the "Provisional Rules", a number of benefits were determined for the settlers: empowerment, liberation from taxes and so on.

In 1883, in connection with the transition of the Semirechye region in the Steppe General of the Governorate, the local administration developed a "Rules on the landed arrangement of the settled population of the region." The new document was approved on May 1, 1885. (10) Compared with the previous ones, the new "Rules" somewhat reduced the privileges of the settlers.

Conditions for the resettlement of peasants in the Turkestan Territory, including the Syr Darya region, were provided for by the "Regulations on the Governance of the Turkestan Governor General", developed in 1886. The tsarist government drafted and approved on July 13, 1889, a special provision "On the voluntary resettlement of rural townsfolk and bourgeoisie to state lands." It allowed resettlement only with the prior permission of the Ministers of Internal Affairs and the agrarian policy of state property.

The "Regulations" specifically defined the areas of resettlement in the Tobolsk and Tomsk provinces, as well as in the Semirechye, Akmola and Semipalatinsk regions. Thus, the provision "On voluntary resettlement" in 1889 partially opened the resettlement movement from the central provinces of Russia in Kazakhstan and was one of the important aspects of the general agrarian policy of the autocracy. One of the guides to the life of the agrarian policy of the autocracy was the Committee of the Siberian Railway. The question of the construction of the Trans-Siberian Railway was born in the 50s of the XIX century.

Finally, in 1891, the tsar's decree on the estate was issued for the land lots of the Tobolsk, Tomsk provinces and the Akmola region. The task was to make a withdrawal of up to 11 million acres of land within the next 3-4 years in a 200-mile lane along the line of the Trans-Siberian Railway.

According to the "Provisional Rules for the Formation of Resettlement and Spare Sites in the Area of the Siberian Railway" approved on June 13, 1893, "Provisional Commissions" were established on the ground. They solved the issues of seizing land for resettlement and spare parts. Starting from the beginning of 90s of the XIX century intensive peasant resettlement began in Siberia and Kazakhstan. The land seized by the Akmola land-surveying party was not allowed to farm here.

Therefore, already in 1894-1895 the Committee of the Siberian Railway urged the need for a comprehensive survey of the territory of the steppe region (Turgay, Akmola, Semipalatinsk) in terms of identifying surplus land and enrolling it in the "resettlement fund." The work of the Shcherbina expedition began in 1896 and lasted until 1902. The natural-historical and economic-statistical factors of all 12 districts of the 3rd region were studied.

So autocracy in the second half of the nineteenth century, aimed at colonizing the territory of Kazakhstan and reflecting the interests of developing Russian capitalism. In general, the agrarian policy of the tsarist autocracy in the second half of the XIX century was aimed at resolving the agrarian crisis in European Russia.

Laws developed by the tsarist government reflected the interests of capitalism but by no means the interests of the Russian, and even more so of the Kazakh peasantry. The last third of the XIX century is important and in many ways a turning point in the history of Kazakhstan. This is the time of complete loss of independence and the final colonization of the country by Russia. In the mid-60s of the XIX century the entire modern territory of Kazakhstan was fully incorporated into the Russian Empire. This process coincided with the bourgeois reforms in Russia in the 1870s and 1880s. The XIX century contributed to the development of capitalism as a whole.

In 1865, the tsarist government set up a commission to study the economic characteristics of various regions of Kazakhstan, the existing system of government, customary law and the drafting of a reform. The commission included not only officials of various institutions but also scientists. As is known, Valikhanov and the well-known researcher Levshin took an active part in the work of the commission. As a result of the work of the commission, a draft of the reform of the management of the steppe regions was drawn up. To finalize the draft reform of administrative management in March 1867, a committee was established, headed by the Minister of War, D. Milutin.

On July 11, 1867, was published "Provisional Regulations on governance in the Semirechye and Syr Darya regions". On October 21, 1868, "Provisional Regulations on the management of the steppe areas of the Orenburg and West Siberian Governor General" were approved.

The main task of the reform was the unification of Russia's sub-imperious nationalities under one government, the removal of local aristocracy from power, the weakening of tribal principles, "to achieve a gradual merger of the Kyrgyz (Kazakh) steppes with other parts of Russia." Reforms were caused by the desire of tsarism to provide Russian capital with the most favorable conditions for the exploitation of the indigenous population of the Kazakh steppes and the natural resources of the region. On the basis of the reform, the entire territory of Kazakhstan was divided into three general-governorships, which consisted of six regions.

The introduction of a new management system allowed the tribal nobility to seize all the lower level of the administrative apparatus. For the post of parish governor and patrimonial sergeant-major, not always authoritative people, who were rooting for the interests of the people, were elected.

Elections were usually accompanied by bribery, forgery, the struggle of various groups for power. The municipality governor concentrated in his hands the administrative and police authority. And in turn, the aul chiefs had the same rights within the aul. In the settled areas of the south of the Crimea, each settlement chose an aksakal at the gathering of electors for a period of three years. He was also approved by the governor.

Large villages and cities with indigenous population were divided into quarters, headed by an aksakal. Quarter aksakals were equated with the rights of volost governors. In towns and villages, "public economic administrations" were also set up at electoral assemblies, the purpose of which is to lay out taxes, all charges and manage the cities and settlements by the public economy. The administration consisted of three to five people, with the chairman at the head. The elected chairman was approved by the governor.

An aksakal usually did not intervene in the internal affairs of the administration, whose activities were controlled by the county governor. Aksakals and administrations were thus the apparatus of oppression of the indigenous population. So, along with the organization of a strong military apparatus, the tsarist government widely used local by-laws.

The main issue in the reforms of 1867-1868 was a land issue. According to these documents (clause 199 of the Regulations), all land in Kazakhstan has declared the property of the state and was only transferred to the use of Kazakh aul communities. Only those land plots that were granted to the khan's descendants by the tsar were recognized as personal property.

In the late XIX and early XX centuries during the mass resettlement of the peasants of the Central Governorates in Kazakhstan, paragraph 199 of the Regulations was the legal basis for the colonial seizure of Kazakh lands. Own lands of Kazakhs were transferred to them for a fee. Fertile lands on the banks of steppe rivers and lakes were fixed for Cossack troops. For the nomads on these lands, Kazakhs had to pay rent. Peasant resettlers received a number of benefits. In county centers, they had the right to receive free land for arable land and a homestead, a forest for construction, farming, trade, and craft. Such privileges were also presented to the Kazakhs who accepted Christianity.

So, land legislation in Kazakhstan was carried out in the interests of the reactionary agrarian policy of tsarism. The provisions of 1867-1868 were introduced temporarily in the form of experience for two years.

However, this "experience" because of the possible negative reaction of the local population has dragged on for more than twenty years. Only in the late 80 - early 90 of the XIX century

the tsarist authorities began to complete the implementation of the administrative and judicial reform.

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THE ASPECTS OF THE RELATIONSHIP BETWEEN POLITICAL STABILITY AND POLITICAL CULTURE IN A MODERNIZED SOCIETY

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Abstract: In the article the author considers that political stability is essential and important for all the countries of the world. Nowadays it is one of the actual problems as well. The author points out that there is no state strategic development without internal political stability. That is why to save its internal political stability and unitarity any state should be grouped around the common ideology. In this article, the category of political stability, which has been mentioned in the research of some world thinkers, is comparatively analyzed and classified. The main factors that affect political stability are determined and the classification of political stability was made. Moreover, the importance of political stability in the sustainable development of the political system and regime of the country is also studied. And, some key aspects of the relationship between political stability and political culture are resolved.

Keywords: Consensus, Political culture, Political stability, Political values, Modernized society.

1 Introduction

As we know, stability doesn't play a significant role only in enhancing effective control over social processes or either political regime; it also has a big influence on providing social order. The main condition for the successful development of any society is the existence of political stability. Especially, the essence of integrity and stability of the society will significantly increase during the transition period. The current social and economic crisis is expanding parameters for a country's sustainable development and making them more actual. Accordingly, the research into the essence and meaning of the category 'stability' and 'political stability', and their role in the political system is one of the vital issues of the society.

2 The category of political stability in Political Sciences

The category of 'stability' is primarily characterized as a stable, established, unchangeable equilibrium. As time passed, according to some paradigmatic changes within the methodological framework and social system, the essence and meaning of 'stability' has also expanded. The etymological meaning of the word 'stability' (derived from Latin) is the state or quality of being stable, especially resistance to changes, deterioration, or displacement or steady processes. In contemporary scientific literature, this word is defined as a dynamic and high-level regulation of stability and change, but not the condition of strict stability.

The term 'stability' relates to the political system maintaining its own structure and it is defined as a fixed condition that provides effective functioning and developing in external and internal changes. In conformity with the theory of the stable political system, it demonstrates high level 'support' of the vast majority of the society and administration of political institutions.

Scholars of political science have argued that, if political institutions are able to unite a country's citizens around a single idea, there is a big chance for stability in the society. (1)

There is a list of features that are typical of a stable country a) sense of patriotism; b) Continuous Governance; c) gradual elite change; d) having a system of checks and balances to keep state power in balance; e) having a multi-party system for an effective activity of the opposition; f) dominance of the middle class. (2)

It, therefore, means that political stability can be defined 'as a stable condition of a society that enables the system to work effectively and develop while being able to control its structure and social trends under external and internal circumstances. (3)

If we refer to the history of Social and Political Sciences related to public stability, we can find Aristotle's work 'Politics' that has regularized social structures of different views and demonstrated right and wrong forms of a state. According to the right (stable) form, the public interest is more important, especially, in appointing state officials. (4) As Aristotle assumed, the public interest is the core in establishing political justice, public consensus and enhancing public stability in the country.

T.Hobbes was one of the first English scientists who mainly focused on the problem of public consensus. Describing the state of nature in his major work 'Leviathan', he concluded that 'every man is enemy to every man'. According to him, the natural condition of society is the tendency where the process of instability and self-destruction exist. To avoid such a mass tendency, people should always reach consensus. Public consensus is considered as the value which leads to mutual understanding and stability. (5) The quite new integral conception of stability - T. Parson's functional theory of change brought a new wave into the science. T. Parson's theory of change made a deep analysis of the meaning of the term 'public stability'. Characterizing the social system as a whole structure, he used the notion 'stability'. According to T. Parson's idea, 'stability' is an exchange of subsystems in mutual harmony and process of mutual equilibrium; on the other hand, it is an equilibrium of the system and environment. (6)

However, T. Parson's theory of functionality has been criticized by his follower, R. Merton. Making the research into the social system of the society, the latter placed much focus on the asymmetrical proportion of society. He put forward the fact that the social system would never remain stable; on the contrary, a social structure could cause social confrontations. (7)

As for Russian scholar A.A. Galkin, stability is a mutual unstable balance between processes and elements of the society.

There are two ways of gaining general public stability as identified by scholars: through coercion or dictatorship and promoting democratic principles. The first method is realized through the use of force legally or illegally. However, the stability established by this method will not be long-lasting and sustainable; it will depend on definite political power or ideology and will be unable to protect the whole public interest. This type of stability is definitely established by the 'top' without the participation of the citizens and opposition. Secondly; political stability can be provided by the principle of consensus and wide social basis, and mechanisms of democracy that rely on the tradition of pluralism. It intends to refer to the harmony of interests of social and political forces. (8)

In Political Science, there are a number of political expressions that are frequently used and related to 'stability'. They are political stability, the stability of the political system, sustained social and political development, a stable regime and permanent power. In general, 'political stability' is stability or stable condition of any political process, which is realized under the influence of definite measures directed at certain public factors and aims.

In the 20th century, the problem of political stability was considerably highlighted by political scientists. Well, let us sort out some definitions related to 'political stability' as applied in

Western Political Science. First of all, 'stability' is characterized by a country's ability to prevent a crisis, and the absence of a real threat and legitimate coercion. Making this notion more concrete, Scottish scholar F. Bealey (9) considers political stability as a political body which is immune to any threat posed to the existence of the society and its 'identity.'

English political scientists K. Dowding and R. Kimber (10) describe a permanent political system as an ability to prevent any coercion. Mentioning the fact that this notion can't be of different level, they consider stability either exists or not.

This is definitely a very controversial conclusion because the political system is under threat can use various methods of self-protection.

Stability and instability may coexist in different stages of their development. Many political scientists associate the classification of stability with its attempts to success.

J. Jaworsky introduced the limit between 'minimal' and 'democratic' stability. The first is an absence of a civil war or armed clashes within the country. This kind of stability may be achieved by an authoritarian method. According to many Western political scientists, 'democratic' stability is an ability to accept democratic values and adaptation to the changeable public situation. As this idea shows, stability is a function of democracy. It makes citizens to get involved in running the state. (11)

Stability is explained as ruling and functioning of definite authorities for a long time. Accordingly, this is characterized by its ability to successfully adjust to the changes in society. German political scientist Y. Zimmerman (12) assumes that stability of power is directly connected with the effective and long-term administration of political leaders. He points out some principles of reaching such stability.

In democratic societies, stability is determined by the presence of Constitutional regulation. S. Huntington determines the term 'stability' by the formula of 'regulation plus continuity'. He considers that prosperity of the state power, which persistently develops for a long time, is a guarantee of achieving this aim. (13)

As we suppose, stability mentioned here is like a consequence of power legitimacy. This type is the strict determinant stability of legitimacy.

Nowadays, many political scientists are not only interested in legal activities of the political system; they also express concern over the problem of encouraging the people in the political system and promoting their fundamental values. Analyzing this issue, American scholar D. Searing (14) pointed out some principles of it. Particularly, the higher political presence of the citizens the higher support the society gets from political 'rule of game.'

Sometimes stability is explained by the absence of changes in the political structure or ability to administer it. In addition, it is also determined as an equilibrium of power between the various political forces.

Basic factors of political stability are greatly highlighted while considering the theoretical concept of political stability. Analyzing political stability and instability, American political scientists E. Duff and J. McCamant (15) suggested that we should apply the following issues. First, people's position to a political process, second, internal reserves of the political system. They can be seen in the following criteria of stability: the excess of social assistance over social mobilization; the highest level of economic development; equal share of income; having political reserve opportunities; the spread of multimember institutionalized political party attracting people to a political life.

In many cases, stability doesn't directly depend on the level of the economic development of the state. Firstly, public behavior counted on close relations of the economics and state may not be repressively and absolutely obvious. Secondly, for those, who live during the modernization period of the country, the economic growth frequently seems to be a destabilizing factor.

As American political scientist J. Elster thinks (16), the main elements of ensuring political stability are: altruism, social norms, and personal interests and 'code of faith.'

But, Jewish social scientist Sh. Eisenstadt (17) finds the mechanism of labor division to be the main factor of political stability.

French social scientists M. Crosier and E. Friedberg (18) considers stability, particularly political instability as inevitable defects in bureaucratic organization and workplace. As they think, the activity and development of self-confident bureaucratic organizations will lead to instability and chaos within itself, and as well as in the society.

In Western Political Science, the term 'stability' is studied in several ways. First of all, political stability is a complex and systematic study characterized by the permanence of the ruling system, civil behavior, and legitimacy and trust in the administration. Besides, stability can be considered only in comparative form, comparative meaning, and qualitative comparative measures.

Political stability is explained by the absence or possibility of legitimate threat; in such situation, the state will have a chance and methods to settle the crisis.

In general, political stability is an opportunity of the political system to effectively carry out its ruling, protecting, promoting and other functions. Thus, political stability is a whole system of relations of political subjects that are able to realize their functions. Political Science presents the following types of stability: internal, regional and international political stability.

3 Stability of the political system in society

Being the core of the political system, political stability meant to maintain integrity, qualitative characteristics and effective functioning opportunities. The political system is described by some key features: fulfilling its functions and having a low level of social and political turmoil, the absence of serious disagreements, free personal development, social stability of social groups and improvement of tense atmosphere affected by internal and external factors.

Factors that have an impact on stability can be divided into three types:

- The legitimacy of the authorities and its realization methods, the level of public trust and their support for the authorities' actions;
- Internal opportunities of the political system;
- A country's international prestige;

American political scientists E. Duff and J. McCamant (15) demonstrate the following features of political stability:

- Excess of social aid over social mobilization;
- Growth rate of economic development;
- Equal distribution of the income based on the political opportunity of the state power;
- Vast spread of multimember institutionalized political party that attracts people to political life.

According to the typology of the public internal system, attributes of stability can be as follows:

- Economic: economic growth rate, inflation 'growth', employment level, unemployment rate etc.;
- Social: the growth rate of social ills, the spread of social deviation, criminality level, political activity level, the number of social performances;

- Political: type of election system, level of renewal of the executive body, mutual relations between the branches of power, frequency of change of the government etc;
- Spiritual: level and spread of confessionalism, prevailing religion, 'mutual relationship' and level of relationship between the religion and state. (19)

In order to establish political stability, it is necessary to stabilize the country's economic financial situation. (20)

Considering political stability, it is advisable to point out three levels such as government's stability (first level), the stability of political regime (second) and people's stability. (21)

There are three levels of legitimacy in Political Science, they are: ideological, structural and personal.

In accordance with public position and understanding, ideological level of legitimacy is based on the regime of the authorities. The meaning of the ideological legitimacy is interpreted by justified actions of the government that explains common ideology, which is based on national interests of the authority and people. Ideological legitimacy is mainly introduced by social media campaigns of the state power, which justifies itself. The ideology is based on the common interests of the people and power.

Trust and confidence of the people in the government's legitimacy and its functions is regarded as legitimacy. Structural legitimacy is typical to permanent public system which is created in conformity with approved traditions and established rules of the state power.

The personal level of legitimacy is directly connected with the personal features of the representatives of the authority. This type of legitimacy is based on the people's full support of their leader who is considered the leader of the nation as an ideal one.

In the modern world, efficient legitimacy is an important factor in building trust in the government and supporting it.

Ingmar Schumacher (22) pointed out that citizens' trust in power will lead to the eradication of corruption, which results in providing political stability in society.

However, as T. Zweifel and P. Navia (23) assume, in democratic countries though they are not politically stable, the level of corruption will be lower than in politically sustained dictatorship.

High level of political culture is one of the preconditions for creating a civil society and constitutional state, and the development of political culture is a democracy and humanization of the society and state.

Political culture is an important element of the state's security because public culture develops information processes that influence individuals who make up the society, and by providing social ideals, it plays the role of intellectual values. Cultural stereotypes will provide civil equilibrium that influences the formation of the society and social groups within it.

Stabilizing factors may include president, parliament, and government institutions as well as legislative, executive and judicial branches. The combination of the above-mentioned factors will guarantee sustainable and constant development of the society.

For a country with a polyethnic structure, the role of consent between different ethnic groups is extremely important in maintaining political stability.

At the level of state institutions as well as public institutions, stability should be considered as a dynamic situation that deals with systematic changes. Between the state and society, there must be a permanent relationship which promotes and provides mutual links.

In developed political structures, the stability of a relationship is based on the activities of government power, middle-aged people, social-political movements, and civil public institutions and social channels mediating between the state and society. In the majority of young independent countries, including Kazakhstan, life reserves of political stability is based on the closeness of the political system that artificially protects from different factors.

Accordingly, democratic development needs the presence of political culture. (24) The most significant point in political stability is to provide behavior placed in the legitimacy, transparency, and efficiency of the functions of the authorities, and the constancy of the norms and values of political culture, habitual type of characters, and constancy of political relations.

The criteria of internal political stability are considered as a consent level of the interests of various institutions, social groups, the state, and citizens. It is measured by quantitative and qualitative parameters and determined by the structure and fluctuations of the limitations of main indicators.

In its turn, political stability can be divided into three levels. The first level is the stability of political administration. The second level is the stability of the political regime. The third level is the stability of the society and population, according to which, issues of maintaining territorial integrity, promoting lawful behavior and security of the citizens and regulating their rights and freedom are under deliberation.

Harming the country's stability (instability) will pose any kind of threat to the permanence and activities of the political system.

In order to make full research into 'political stability', it is necessary to classify it according to its volume, type, entities, methods, and tools.

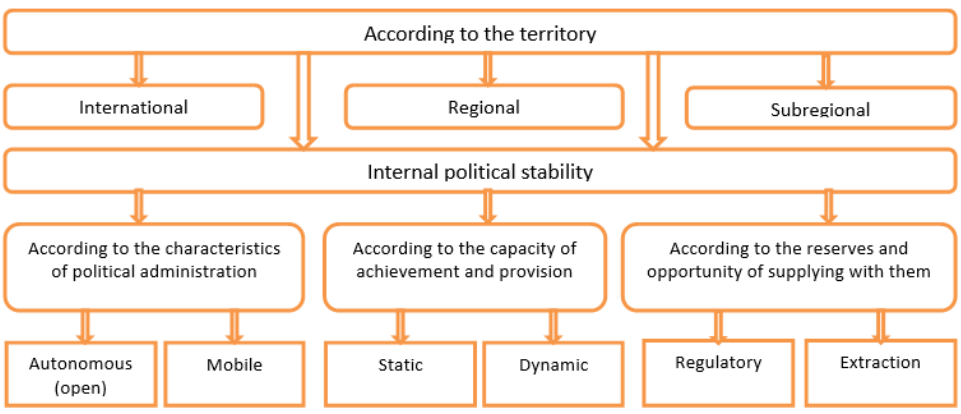

Figure 1. Types of political stability

Taking into account all the above-mentioned divisions and peculiarities of political stability, it is necessary to point out some typical specific features of stability of the political system. First, the change of the interests of the public entities is based on all the changes in this system. The balance in interests will result in stability and harmony of the society, or vice versa. Secondly, it will foster the improvement of social-economic forces and promotion of their relations. Political system changes and constantly develops. Thirdly, changes in this system are greatly affected by subjective factors. Political freedom directed to such aims will lead to political changes. Fourth, the change of society depends on periodic changes; the political system adjusts to the environment and international relations. In conformity with this situation, the political system will get stabilized.

The political stability of the society is the systematization and permanent development of the established norms and values of it. The stability of the political system by itself is based on the management of social processes, social-political regulation, and appreciation. (25)

The stability of power is said to be comparatively connected with either different political system or previous political regime. There are three types of regimes in Political Science such as permanent, average permanent and non-permanent. Each of them has its own management opportunities, regulations of public order and ability of self-maintenance and development.

The stability of the political regime covers a range of serious issues such as maintaining administration system, confirming civil discipline, providing legitimacy and ensuring confidence. Therefore, it is generally characterized by adaptation to changes, balance, and similarity of political forces. From this point of view, the main criteria of stability are the duration of power, its influence on the political parties and a multiparty system.

Stability in political regime is a complex phenomenon, it ensures maintaining administration system, approving civil discipline, efficiency, and legitimacy of administration. According to these criteria, the category of stability covers these issues: duration of power, role of political parties in legislative bodies, multiparty system, fragmentation of forces in parliament, and others. The methods applied in achieving stability are deliberated on a large scale: to increase and promote citizens' free political activity until they use force.

Stability has nothing to do with the changes and reforms; however, it anticipates the procedure of their realization. Particularly, it prevents society from using force illegally and controls the rule of social forces. The stability of the society's self-protection is related to maintaining the organizations that fit the social system of power and provide people's concentration on the social and economic process. (26)

Factors of stability are as follows: existence of support for the constitutional order in power and legitimacy regime; efficient activity of power; appropriate use of coercion; absence of real structural changes in the branches of power; carrying out wise and efficient governmental strategy; tolerance support and attitude of power to the opposition; tolerance of people to non-standard ideas; execution of primary functions of the government.

Contrary to stability, instability provokes mostly qualitative reforms and principled changes in the society as well in power. Factors of instability are: cultural and political fragmentations, negligence of people's interests; severe stand-off /conflict of political parties with different ideological views; antisocial ideas and positions promoted by different organizations.

As a rule, each nation has its own ideas, views, and principles related to the political system and its separate elements and mutual relations, as well as its role in the political system. Political institutions provide the formation of a concrete stereotype of political consciousness and behavior and pass it on to the succeeding generation. In other words, the political system fits the development and level of political culture, or it is carried out within the political culture.

As a result of a real historical process, a nation's views, principles, and ideas related to a definite political system have gone through some changes. And it was seen in their actions (distrust in concrete political institutions and their leaders, a serious influence of the opposition, growth of political activity). Therefore, the change of political consciousness and behavior needs some change in the political system. In brief, first political culture changes, then – political system.

Usually, if changes in the political system are made by the political leaders, they are to expect public anxiety. Changing the political system leads to the transformation of the political system. Thus, it may cause big reforms to happen. If these reforms influence economic development, the social base of the political system will increase and get stabilized. In democratic societies, apart from the state officials' influence, the opposition does influence the change of the political culture. Under such circumstances, the two parties come to a decision and make some changes in the political system.

The political system maintains stability through its resources. Political stability in the first place is called – regulatory, and the second is called extraction.

Regulatory is the influence of the political system in creating civil society through its control and regulation of individuals' and groups' behavior. It influences through direct obligations, i.e. laws, orders, and decrees, and with the help of indirect obligations, it has an influence on price rate, credit regulation, and public opinion.

Extraction political stability is the process when the state extracts natural and human resources from civil society. Under this system, government elections are held; state and military officials and party members are appointed by the expert-analytical service. Budget mechanism of the political system is operated by taxation and sponsoring institutions. Kazakhstan hasn't completely developed extraction political stability. According to this system, the authorities are elected, and state and military officials are appointed by the expert-analytical service.

Undermining of political stability (destabilization) can be extensive and qualitative. In the first case, it can be situational, and the political system will not lose its quality. But in the second situation, destabilization may lead to crisis and subsequently, it may change the political system or administration technology.

We consider political stability as an organized, agreed and constant functioning of the political structure. It is necessary to point out three types of political stability. The first is the stability of political authorities (long-serving power, constant staff). The second is the stability of the political system (absence of crisis at present time). The third is political stability of the society and people; here, the main priorities are to preserve a state's territory, integrity, public order and people's safety, freedom and rights.

Researching the third level of political stability is a real challenge. The stability of this very level corresponds with the multilevel, dynamic system stability. Preserving the first and second level political stability directly depends on the instability and collapse of the society. If only this third level political stability is established i.e. when living conditions have been improved, it is possible to create the system of internal political stability and national security.

The stability of society is impossible without its consolidation. In conformity with the public stability and its situation, the consolidation promotes the common interests and aims and the realization, preservation, and protection of mutual activity, and critical reconsideration of social values. Authentic consolidation is only based on national unity. It includes not only the

authorities, but it must contain a majority part of the population or common people.

The stability of society is the derivation of many political and social obligations. They are social order, single legal area, confidence level between a state's functions and citizens, quality and standard of living. People's safety and health problems are solved by many political organizations and institutions.

In the course of social and political development, the social environment can change the political culture. This happens when the political system is unable to avoid crisis symptoms in society. And this will bring some changes to political culture; it will oppose the system. Political consciousness changes due to people's behavior. They will take an active part in social work and activity of political parties. They go to rallies and demonstrations. If the political leaders are able to eliminate crisis symptoms, i.e. change the political system, and it will get a course of emotional development. If they don't notice anything, in one part of the social political culture will qualitatively change. Under such circumstances, new forces in the society make the political forces change, thus, it will develop in a revolutionary way.

Political administration may be of a different character in different society, different country, and a different region at different stages of history. Political administration institutions of the same category cannot be either valid or applied differently in another country. In other words, it will be legitimate in one country or non-legitimate in another. Longevity of any form of political administration depends on the level of legislation of the society. Moreover, there is no common legal form of political administration. Principles of political administration are connected with national, regional and geographical peculiarities of the country. Each society recognizes and supports own political administration. Its origin should be sought in the political culture of the society, i.e. in general political actions of the citizens who belong to a definite community. (27)

4 Mutual relations between political culture and political stability

Russian political scientist K.S. Gadzhiev (28) mentions that political culture can also be studied in the following situation: members of the society accept the principles of the administration and feel their own political weakness toward it, and then they seem to have admitted the methods of that game.

In analyzing the political culture of the society, its elements and foundation play a big role in political behavior. In accordance with this, it is possible to show the following elements of political culture:

- to assess symbols and official figures of administration institutions;
- to claim for absolute transparency of power;
- its position to 'game rules' and principles of individuals, society, and state;
- the norms of long-established political traditions and political experience;
- concepts and judgments between different political public institutions.

Social structure is a definite typical image of political culture.

However, separate elements that make the social structure are the bearers of political culture. Social diversification of society will lead to changes in political culture. In many cases, this type of relations can be seen in the era of social cataclysms. The majority of nations don't get involved in revolutionary issues. However, all population of the country remains a target of big experiments. It changes the rule of sharing material benefits, and social structure of the political system also changes.

Political culture is a permanent unchangeable stereotype of political consciousness and behavior. Therefore, it is impossible to destroy it. Altering the social structure does change the political culture.

In accordance with the type of revolutionary development, i.e. change of political culture will influence the social structure of the society. There are two ways of development. First, the authorities are interested in making reforms. They realize it with the help of social institutions and explain the meaning and aims of these reforms. The method of realization is an expected outcome. Or, political culture changes under the influence of social environment and political power. In order to avoid social cataclysms, it is necessary to accomplish some political social reforms.

The classification of political culture depends on its subjects (holders). It may include the typology of stability and political culture. The primary point is the uniformity of society. If the society is uniform and political culture is homogenous, it can be comparatively stable. But, if social uniformity of the majority of subculture is not evident, the society is not stable. Social groups are primarily based on stability (middle class), and they are always considered as the root of instability (marginals). It is possible to assess the level of stability through the relations of these two groups.

Researching mutual relations between the typology of political culture and the internal system of the society, we think it is better to unite suitable conditions for a stable society.

As it is mentioned above, social groups and nations make up the society. And each of them has own political culture. The societies are differentiated from each other by their own mentality, culture, traditions, and lifestyle. Their own special interests are their own peculiarities. The political culture of a society is not a mechanical combination of groups and nations, but it is their equilibrium. Such a balance of interests takes place when the society is uniform. Uniform society is the bearer of the homogenous political culture. If the society is divided into several subcultures, the equilibrium suffers, and society gets destabilized.

When the society is adapted to self-development and self-regulation, it will increase its relations with different elements of that system. These relations are promoted by political culture. We comprehend them as a political and economic system, and social and cultural character of the society, and the growth level of political culture. It is important to have convenient relations in order to keep the balance of the system. Negative trends are to be eliminated as soon as they appear. As a result of it, better conditions for steady and prosperous development are provided.

Political stability is the dynamic condition of external and internal relations. It affects to maintain basic characteristics of the political system. Basic attributes of political stability are systematization, dynamics, non-extremality of the trends, the active role of the subjects, the ability to respond to the factors that pose threat to administration.

The criteria level of political stability is the harmony of political interest and action. Social escalation will lead to instability and deprive some phenomena of administration ability. Any country, state and political system has its own typical optimal political stability.

Thus, it is important to provide two conditions in order to maintain stability in society. They are uniformity of the society and convenience of mutual relations. All of them are realized by homogenous political culture. As we think, there is a link between these two conditions, and they can't exist without each other. Contemporary political culture is connected with separate elements of society. Moreover, each of these elements corresponds to the growth level of political culture. Formation and development of political stability is carried out by the process of political socialization. The main aim of this process is to maintain and facilitate human groups that stabilize society.

Stability of the society is the derivation of many political and social obligations. They are social order, single legal area, the level of trust between the functions of a state and its citizens, quality and standard of living. People's safety and health problems are solved by many political organizations and institutions. The state will be unable to cope with current and anticipated difficulties unless it establishes close relations with public organizations. With the help of these relations, it fulfills the interests of the representatives of different social groups and achieves the peace. Public associations play a significant role in establishing political stability. Individual people can actively participate in social work via these public associations, and to some extent, they influence the formation and activity of state power and local administration.

This is a phenomenon that exists only in a stable society. The principle maintained in this society will be evident via the relations between the elements of the political system. During the crisis, the political system is deprived of its balance. Its separate elements completely change, or, in many cases, they don't exist. Therefore, in order to cope with any crisis and create an equal society, the state needs perfect legislation to maintain the stability of society.

5 Conclusion

By analyzing the mutual relationship between political culture and political stability, it is possible to draw the following conclusions:

- Social values and norms cross the culture on the basis of social actions and relations, their order, integrity and preliminary planning of the social life, and play a decisive role. Only through these values and norms of the culture, people can determine, maintain and develop themselves in mutual relations.
- Political culture includes political elements of society and phenomena. They are connected with public political institutions and political processes. Their formation and functions will orientate the political behavior of the state, political institutions, and political processes.
- The basic method of political culture is the process of socialization. Political socialization, on the one hand, is determined by the norms, values, and role that are required by the political system. On the other hand, political socialization is formed by new political skills and experience. Their harmony will result in the stability of the political system and constant change.
- Stability doesn't exclude changes and reforms; it is achieved by a definite order. In this sense, stability is to maintain power in society. It provides a social system, high spirit of the society and integration of social-economic process.
- Factors of the stability are: maintaining power and constitutional order; appropriate use of force in stable development of power; absence of significant structural change in power organization; successful realization of a well-planned strategy of the state; government tolerance to the opposition; execution of government functions;
- Factors of instability are: cultural and political division of the society; failure of the government to supply human needs; competitiveness of the political parties and their diverse ideological positions; promoting antisocial ideas and positions;
- Stability of political regime is a challenging phenomenon. It is maintaining control, approving civil behavior, and having legitimate and reliable administration.
- Stability is connected with the political culture of the society. All members of society are characterized by sharing common values and achieving unanimous decisions and ideas.
- Political culture greatly influences the way how the political system works. Especially, it plays a big role in defining its directions, and developing and flourishing society.
- If we analyze political culture as a socialized institution, it provides political and social mechanisms of enhancing the stability of the society and political system. In world political science, value orientation of political culture is explained by the political behavior of citizens and anticipating their actions, and stability of the political system is explained by political trends of citizens.
- As political culture covers political knowledge, value orientation and behavior of social individuals, possessing sound political knowledge, balanced behavior and determined value orientation is the key to the sustained development of the society.
- But, on the contrary, political illiteracy of citizens and uncertainty of values will lead to stability in the society.

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METHODS OF PLAYING WIND INSTRUMENTS (USING THE FLUTE AS AN EXAMPLE)

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Abstract: In the second half of the XX century, the use of the latest performing techniques for playing woodwind instruments was the results of searching for unusual timbres and non-traditional sounding. Rethinking and interpreting traditional methods of sound producing, searching for a new sounding “color” and non-traditional ways of notation led to tremendous changes in musicians’ performing techniques, and broadened the horizons of ideas about the possibilities of wind instruments. However, professional musical education in a number of countries does not pay due attention to the study of contemporary performing techniques characteristic for the music of the XX and XXI centuries composers. This situation does not cope with present challenges, as the performance of the music of the XX and XXI centuries composers is an obligatory component of the programs of most international competitions, participation in which is impossible without the relevant knowledge and possession of contemporary performing techniques. Possession of contemporary performing techniques is necessary for every professional musician. Nevertheless, unfortunately, the study of the latest techniques and their application is episodic and depending on individual expressive means of each composition. The article makes an attempt to determine the typology of contemporary performing techniques for the flute in terms of musical and performance characteristics. The author gives recommendations on the study of techniques, the mastering of which contributes to the improvement of professional performing skills. The purpose of the study is to present the typology of contemporary methods of playing the flute, classifying them on the basis of the properties of musical expressiveness. The empirical and theoretical approaches to the study were used as the research method. The use of the comparative typological method in the analysis of musical expressive and performing properties made it possible to determine the typological features of contemporary methods of playing the flute. This resulted in: - the determination of the typology of contemporary performing techniques for the flute; - giving the characteristics of these techniques; - more fully revealing their performance characteristics. The results of the study make it possible to identify the features of contemporary methods of playing the instrument and open the prospect of applying the results obtained in the notation and performing the music of the XX and XXI centuries composers.

Keywords: Contemporary methods of playing the flute, Flute, Music of the XX and XXI centuries, Typology of contemporary techniques, Performing art.

1 Introduction

When analyzing the state of the contemporary musical art, we can observe the process of active search in the field of forms, compositional structures, harmonies, melodic lines and rhythm that led to the accumulation of new linguistic and compositional elements at the turn of the 20th and 21st centuries. The unusual interpretation of the sound of instruments has become one of the important ways in this area. It concerned also the field of flute music performance. At the same time, composers concentrated on complicating traditional methods of playing the flute and introducing fundamentally new methods of sound producing. The solo genre for the flute, which is in demand among composers, is the consequence of the active development of the instrument. There is a different degree of intensity of these processes in different national composer schools. All the more important is the study of the integral picture of experimental flute music.

It should be noted that domestic musicians often do not possess the volume of information that is necessary for professional contact with the field of contemporary flute music performance. The quantity of so-called "new music" for the flute, not to mention the rest of the instruments, is so great that it requires constant study and reflection. At the same time, the study of the current state of the problem is impossible without comprehending the logic of the emergence and development of flute art.

Undoubtedly, attention to the history of the development of the instrument will give the composer and performer a deeper understanding of the nature and capabilities of the instrument, to which their interest is addressed. Knowledge of the origins of the instrument will make possible a more complete vision of the processes that are taking place nowadays. This is especially true when singers use new methods of playing the flute, since understanding and using the flute's capabilities is inextricably linked with the understanding of its structure.

The expressive possibilities of musical instruments are characterized by a certain historical perspective. The path to improvement and transformation of the instrument, which began in the XVII century and gave rise to a lot of controversies, continues to this day and is naturally associated with the appearance of compositions for the flute in different genres. In the twentieth century, the flute, unlike in previous times, when it was often regarded as an instrument imitating the singing of birds, significantly expands its expressive potential. As a result, the flute becomes a means of translating almost any composer's idea. The performance capabilities also increased significantly due to the increase in varieties of this instrument represented by piccolo, alto and bass flute. Earlier these instruments were used only occasionally and to a greater extent as a special orchestral color but in the twentieth century, the alto flute and the piccolo flute often act as solo instruments participating on an equal footing with the Western concert flute in international competitions and festivals[1].

The use of advanced performing techniques in contemporary flute music becomes an urgent necessity. Since the middle of the twentieth century, new techniques have been a significant creative and methodical component of many practicing musicians, composers, and educators.

Contemporary means of musical expressiveness of the flute are aimed at using the whole sound richness and all the capabilities of this instrument. When searching for a new sound, composers of the twentieth century used non-musical sounds (noise, screaming, laughter), which did not have artistic expressiveness up to that point. In addition, through new techniques, composers introduced sound-imitative effects in order to imitate the sounds of nature (flutter-tonguing, pizzicato) and empowered the flute with the ability to function as and/or to mimic the sound of other instruments: multi-voiced ones (multiphonics, double buzz), unpitched percussion ones (beatboxing) and vocals (double buzz). As a result, the artistic capabilities of the flute as a concert solo instrument are significantly increased.

In the scientific literature, N. Rimsky-Korsakov, N. Zryakovsky, Y. Usov, D. Rogal-Levitsky, and V. Berezin devoted special chapters on the development of the structural features of the flute and on its expressive capabilities. In these chapters, as a rule, a brief description of the development of the instrument is given, while the authors do not pay special attention to the study of all innovative solutions in the design of the flute and indicate only the crucial moments in its evolution. The problems of instrument construction, including those from a historical perspective, have been discussed in more detail in the works of such researchers as H. Berlioz, N. Toff, J. Hotteterre, A. Carse, L. Granom, H. Wisham, T. Boehm, P. Guiraud. One of the reasons for this study was the desire to compensate for the apparent imbalance in the ratio of Russian and foreign sources. At the same time, the panorama of the evolution of the flute and of its expressive capabilities from the point of view that the flute is a solo and concert instrument is presented in a multifaceted manner.

When studying the musical art of the XX century, a modern researcher has the opportunity to rely on a whole body of works devoted to various aspects of such a study. Without setting a global task to cover in the review of literature all the works

[1] For example, in 2016 in Munich (Germany) the thirtieth competition of performers playing western concert flute and alto flute was held.

devoted to the music of the 20th century, we will designate only the most significant ones, as well as those who found themselves in an area directly adjacent to the problems of flute art.

2 Materials and Methods

The basic monographs and collections of articles on 20th-century foreign music, on the theory of contemporary composition, on the harmony in 20th-century music, on music in the postmodern era, and on the musical culture of the United States of the 20th century, as well as the monographs of M. Druskin, C. Kohoutek and G. Schneerson are among the basic works concerning the definition of the methodology of music research of the XX century. A remarkable monograph by V. Kholopova and Y. Kholopov about A. Webern contains significant generalizations regarding the aesthetic foundations of the new art. L. Akopyan's articles on E. Varèse, A. Maklygin's articles on textured forms of sonorous music, T. Zolozova's articles on the phase structures of A. Jolivet's First Symphony, O. Puzko's dissertation on the Darmstadt International Summer Courses for New Music are valuable in terms of the methodology of the analysis.

Much fewer research works are devoted to the flute art of the twentieth century. The dissertation of V. Davydova entitled "Music for the flute of the Russian composers of the second half of XX century (using the concert and sonata genres as an example)" is among the most exemplary research works on this subject.

Special attention should be paid to studies devoted to the current state of flute performance. These are, first of all, the articles of John Heiss, where for the first time the variants of multi-sound complexes for the flute are presented, as well as Bruno Bartolozzi's book "New Sounds for Woodwinds." These authors, for the first time, touch upon the question of the new expressive capabilities of the flute, whereas Robert Dick' coverage of the problem is more consistent and detailed. In his work "The other flute", he presented (and, if necessary, corrected) the examples given by Heiss and Bartolozzi, and developed the ideas formulated by his predecessors.

We would like to conclude the literature review concerning the problems of contemporary flute performance by mentioning Harvey Sollberger's book "New flute" and the work of the German flutist Carin Levine "Contemporary techniques of flute playing". It is also necessary to mention the dissertation of I.V. Viskova "Ways to expand the expressive capabilities of woodwind instruments in the music of the second half of the XX century."

In her paper, a general criterion for the typology of contemporary techniques for flute playing is such properties of their musical expressiveness as dynamics, pitch, and timbre, the characteristics of which largely determine performance technique.

3 Typology of Contemporary Techniques for Playing the Flute

Contemporary techniques of playing the flute form a typology consisting of three main groups: dynamic, pitch and timbre ones.

3.1 Dynamic group of performing techniques

Table 1. Dynamic group of performing techniques

Dynamic		
Vibrato	Smorzato	Shake

This group of techniques is characterized by dynamic changes in sound, the ancestor of which is the vibrato, which has become a traditional means since the second half of the XIX century. Unlike the vibrato for the string-bow instruments, the same technique for the flute, as well as for other wind instruments, is formed due to the greater intensity of dynamic, rather than pitch changes. The vibrato technique is the most traditional performing means which served as the basis for the formation of a number of contemporary techniques that differ in the range of the amplitude of air vibration such as smorzato (less intensive), shake (more intensive) etc.

The smorzato acts as an intermediate technique between the vibrato and non-vibrato. This technique without changing the strength of the air jet or pressure is achieved by moving the jaw. The rate of such oscillations can be periodic, be in a certain rhythm or be rhythmically free. In notes, a composer often gives instructions concerning the frequency of performing a technique according to a certain tempo:

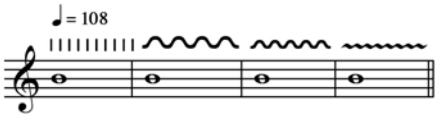

Figure 1. Designation variants for the smorzato

An artificial, slight and intermittent sound jitter created by the diaphragm muscles is the distinctive feature of the shake technique.

Leading wind instrument players consider the vibrato technique as an important factor of expressiveness of sound, noting its similarity with the same means of string-bow instruments. "The vibrato is the language of the soul, the language of feelings," A. Nicolet said, "each musician has his own individual vibrato. But you need to be able to control it, as the leading violinists of the world do." (1)

A characteristic feature of this group of techniques is the change in the amplitude of air vibration, which was interpreted very diversely in the works of the twentieth century. Such examples include the works of such composers as Robert Dick, Toshio Hosokawa, Klaus Huber and others (2-4).

3.2 Pitch Group of Performing Techniques

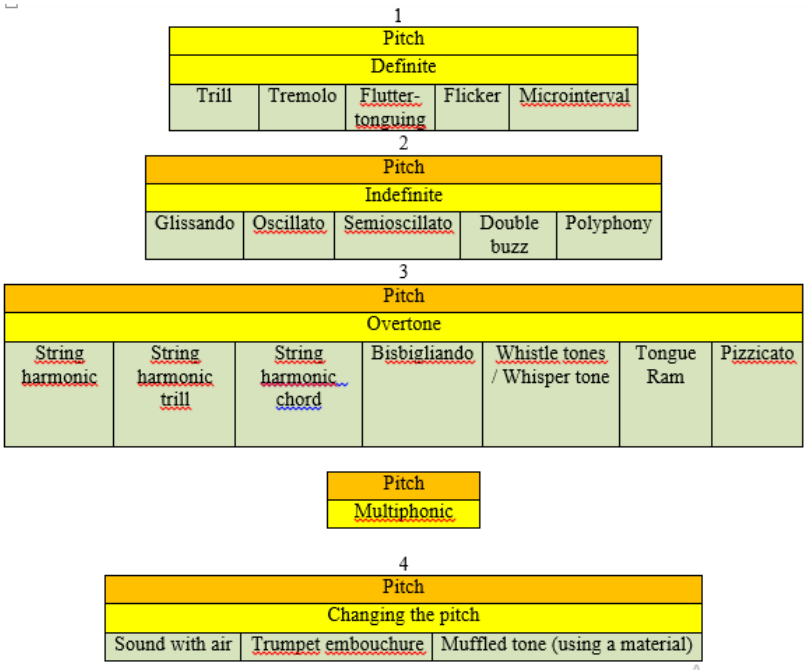

Figure 2. Pitch Group of Performing Techniques

The entire pitch group of contemporary techniques for playing the flute can be divided into four subgroups, each of which is characterized by a change in any component of the sound.

The first subgroup is characterized by definite pitch, which is the base for the formation of trill, tremolo, flicker, and microintervals.

The second subgroup, on the contrary, is represented by methods with indefinite pitch such as glissando, oscillato, semioscillato, double buzz, and hidden polyphony. A common feature of these methods is the permanent change in the fundamental tone in the form of glissanding, which is complicated in the last two methods by the addition of a second tone or hidden polyphony.

The third subgroup includes techniques that are formed on the basis of overtones, the participation of which determines the stratification of the pitch parameter of sound. As in other subgroups, string harmonics, which are the ancestor of this subgroup, are a more traditional technique. Nevertheless, unlike the vibrato or the trill, string harmonics for wind instruments is the feature of the music of the 20th century, because of borrowing similar techniques from stringed instruments. This most traditional method in this subgroup subsequently becomes more complicated in the form of string harmonic trills, chords and bisbigliando (an artificial string harmonic that allows creating the illusion of simultaneous sounding of two or more sounds). Multiphonics (multi-voiced combinations of sounds achieved by using a new fingering and a special state of embouchure) are a variety and complication of the string harmonic subgroup.

The fourth subgroup includes techniques with a varying fundamental tone (like the second subgroup). However, their sound formation is characterized by special timbre effects, in which the following non-musical parameters are involved: sound with air noise, trumpet embouchure and muffled tone (using a material). These techniques have an unconventional timbre, which is common to contemporary music, and in contrast to the techniques of the timbral group, here the pitch is definite. At the same time, this subgroup is indicative of its intermediate position between pitch and timbral techniques.

Many performing techniques of the first subgroup are formed as a result of combining the means of expressiveness. An indicative demonstration of such a complication is the contemporary modification of the trill. According to the generally accepted definition, "trill is a quick change of two sounds"[2], i.e. the alternation of two adjacent notes separated by a minor or major second. For many centuries, trill was the most common musical ornament. In the music of the 20th century, composers use a sophisticated version of trills, such as:

1. Ornamental microinterval trills (from ¼ to ¾ tone) that a performer can freely combine;
2. Double trills are more often used in microtonal music. They differ from simple ones by the fact that not only the fundamental note and the fundamental tone but also an additional string harmonic tone sounds. The alternation of sounds is carried out through different fingerings, and is performed at a rather rapid tempo;
3. Multiphonic (timbral) trills have different ways of notation. Due to the technical complexity of this method, the speed of its performance does not always correspond to the instructions of a composer, so the multiphonic trills have a limited duration of sounding (Figure 3);
4. String harmonic trills are a fairly complex technique in the flute playing since they require considerable strength and preparedness of the embouchure.

[2] V. Dal, Explanatory Dictionary of the Living Great Russian Language

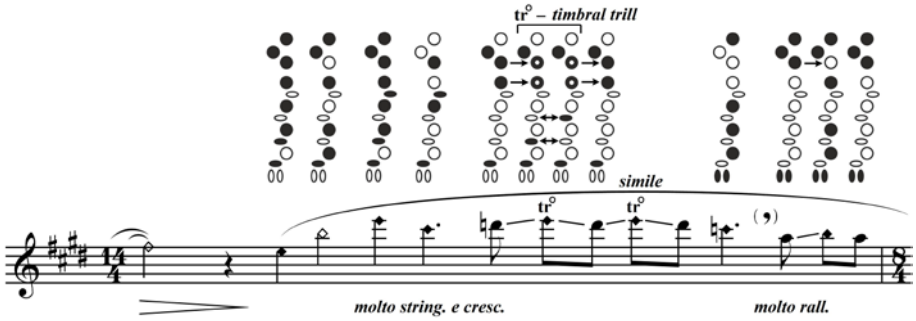

Figure 3. Clarke, I. Orange Dawn

The tremolo and "flicker" techniques show the genetic ratio of traditional and innovative features. Due to the peculiarities of the sound and its performance characteristics, these techniques are similar to the trill technique discussed above, with which they share uniform and rhythmic alternation of notes. Unlike trills, the tremolo technique is an alternation of sounds at a distance of more than a second (Figure 4). The flicker technique can be described as almost silent, "phantom" tremolo, which gives reason to consider it as a complication of the traditional method of playing the flute.

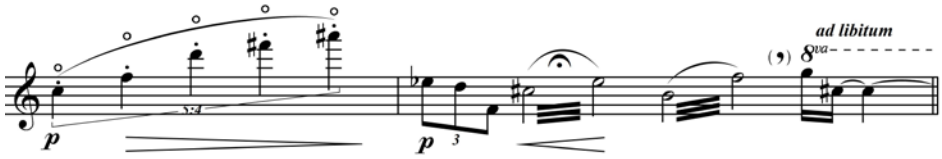

Figure 4. Tremolo

Microintervals, as intermediate sounds between semitones, have also been defined in the first subgroup of the “pitch” group of techniques. Robert Dick, in his work “The Other Flute” (5), presents the fingering table, which describes in detail the principle of sound producing. For the composers of the XX and XXI centuries, the use of microinterval technique is very important, since it is connected with the expansion of the idea of the sound capabilities of the instrument.

A characteristic feature of the second subgroup is the change in the pitch of the fundamental tone and the presence of intermediate tones in the performing techniques. The glissando, oscillato, and semioscillato are a clear example of this. By varying the position of the embouchure hole of the flute in relation to the performer and by rotating the instrument the flutist changes the section angle of the outgoing air jet with the edge of the embouchure hole, thus he achieves the performance of the glissando almost in the semitone range without changing the fingering (Figure 5).

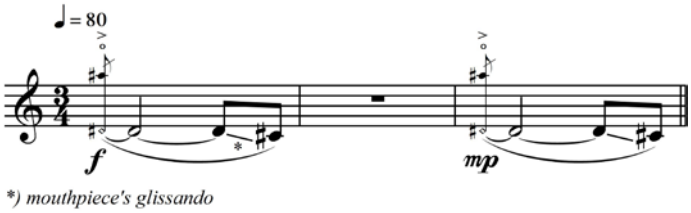

Figure 5. Moreno, F. Beat flute

The glissando is often used within a tone. However, there is a technique of finger glissando, with which it is possible to perform a passage (Figure 6).

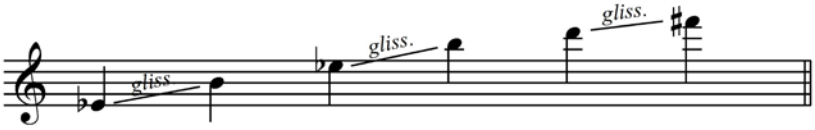

Figure 6. Glissando passages

In addition, it is possible to raise or lower the sound by varying degrees of lip pressure. When weakening lip muscles, the sound gets lower. When straining lip muscles, the sound rises. This, in combination with changing the section angle of the air jet by rotating the flute, makes the technique more effective.

The oscillato and semioscillato, as types of glissando, are a glissanding movement towards one direction from the fundamental tone with a subsequent return (Figure 7).

Figure 7. Jeney, Z. Solliquium No. 1 for solo flute (1967)

The flute glissando differs from that of bowed string instruments, the performing principle of which consists in the fact that a slight gliding of the finger over the string along the neck reproduces the transition between sounds. Among the wind instruments, the glissando is easier to perform with the trombone where such a sound is achieved by the movement of the slide.

The third subgroup is united by the string harmonic technique, which makes it possible to control the overtone scale and to reveal the sound potential of the flute. This technique was the base for a group of similar techniques united by overtones. In the above table, each subsequent contemporary technique of this subgroup is formed by complicating the previous one or by increasing the number of simultaneously produced sounds.

A string harmonic (an overtone) is achieved by overblowing the fundamental tone. It is thanks to the overtone that we can judge the quality of the sound and its coloration. Pierre-Yves Artaud (6) constructed a scheme of the overtone scale, which makes it possible to demonstrate clearly the number of produced overtones. The flute has up to 9 string harmonics formed on the basis of the fundamental tone, the role of which most sounds can play. However, some sounds such as Si, Do, Do diesis, Re and Re diesis of the 2-line octave have only two overtones (Figure 8):

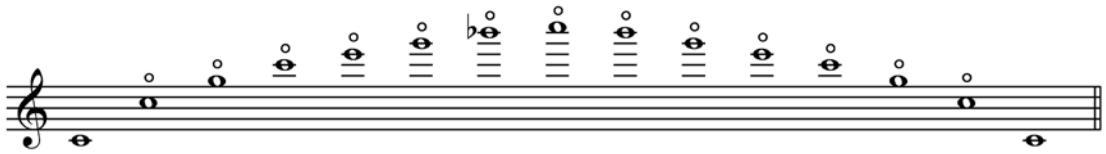

Figure 8. Natural String Harmonics of the Western Concert Flute Beginning From Do of the 1-line Octave

Composers often use string harmonics to achieve the echo effect or as an opposition to the fundamental tone.

It is possible to perform both the string harmonic scale and string harmonic trills but this is a rather complicated technique, which is extremely rare since it requires a serious amount of power from the embouchure. Also, it is possible to perform an overtone (string harmonic) chord, which is built by gradually blowing the overtone scale from the fundamental tone. There is the simultaneous sounding of two (or three) different overtones, and it must be taken into account that the lower sounds of these consonances are very weak.

The daily performance of the string harmonic playing technique, as skill practice, leads to the improvement of the sound of the instrument, due to the fact that the specific air supply requires constant control over the respiratory apparatus.

The most fascinating technique of playing the flute is the multiphonic one, which is a variation of the string harmonic technique of playing the flute. The multiphonic is a combination of two or more (up to 4) simultaneously sounding notes. As a rule, the flute is considered as a monophonic instrument, the capabilities of which allow only one sound to be reproduced but with the multiphonic technique, the sounding of several sounds at the same time is possible. To obtain the polyphony, you need to control the airflow by manipulating the vibration inside the tube and to reach the producing of two or more sounds at once. The scheme (Figure 9) shows it in the form of two different waves existing inside the same tube: (7)

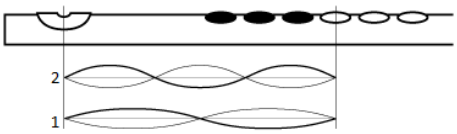

Figure 9. Multiphonic Technique

Contemporary methods of multiphonic playing are described in detail in the textbooks of R. Dick and W. Offermans with the attached fingering table. However, not all multiphonic combinations can be performed on all dynamic levels. Some intervals can sound only at a very soft (pianissimo) dynamic level or, on the contrary, at a very loud dynamic level. Robert Dick's work "Performance Manual of Contemporary Techniques" (5) describes in detail the errors that flutists commit when they start to study multiphonics. For better sounding of this flute playing technique, a performer must imagine in advance these sounds separately and together, in order to form an air jet before it is produced.

In the works of contemporary composers, a multiphonic is used not only as intervals and chords but also as trills and tremolos. However, these techniques are rather difficult to perform and are used less often. It should be noted that not all multi-voice combinations of notes are performed with the flute, so composers need to consult with a performer (Figure 10).

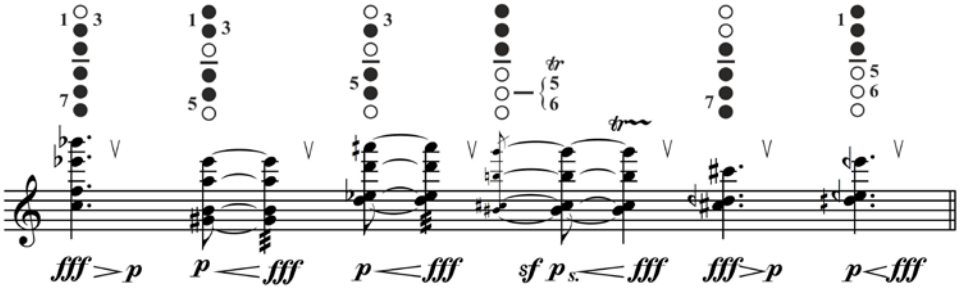

Figure 10. Fakhradov, Z. "Magum II"

A general characteristic of sound, which unites a group of pitch techniques, is a certain method of changing the pitch, which can be definite and indefinite, i.e. it can be broken down into the range of the fundamental tone and different kinds of additional sound specifically colored by noise characteristics. The above tables reflect the complication of the more traditional methods of playing the flute, such as trill, glissando, and string harmonic, which are, like vibrato, in the dynamic group of techniques. They are the ancestors and one of the main factors in the formation of contemporary performing techniques.

3.3 Timbral Group of Performing Techniques

Articulation		
Pizzicato	Tongue Ram	Slap-Tongue

Noise	
With voice	Without voice
Laughter	Aeolian sounds
Pronunciation of vowels, consonants, syllables	Sound with air noise (breath)
Sizzle	Sound with air noise (exhale)
Roar	Jet Whistle
Screech	

Figure 11. Timbral Group of Performing Techniques

The timbral techniques represent completely new sound capabilities of the instrument, thanks to which the repertoire of contemporary flutists has been expanded several times. Many flutists write compositions using new flute techniques and become composers and performers of their own works, as it was before the XIX century. It is quite justified that the conceptualization in working on "new" music is one of the mandatory requirements for a contemporary musician. The accuracy, correctness of reading the author's text and performing professionalism provide for listeners an understanding of the meaning of the work and contribute to the creation of emotional contact with music.

The brightest performers of the contemporary flute music are the following musicians: Robert Dick who wrote a series of works based on new playing techniques; Robert Aitken who brilliantly performs both academic and avant-garde music; Ian Clarke who became one of the first flutists who composed commercial melodic music using contemporary techniques; Matthias Ziegler an educator and a famous contemporary flutist who combined academic and jazz music in his works. That is what Ziegler says about the flute, "Inside the flute, there is a whole orchestra that allows me to play solo-polyphonic music."

According to the principle of sound formation, a group of timbral techniques can be divided into two subgroups such as articulatory and noise ones.

In the first subgroup of the timbral group of techniques, a sound is produced in the flute with the help of special types of articulation. In this case, it is possible to draw a parallel with some performing techniques for bowed string instruments, where the sound is produced from the instrument with the help of striking the string with the stick of the bow (col legno); or to draw a parallel with some performing techniques for percussion instruments, where the sound is produced with a palm blow or with drumsticks.

One of the techniques considered, borrowed from stringed instruments is pizzicato . The lips of the flutist are tightly compressed, and then they are opened by a strong air jet, then the syllable "pa" is pronounced without striking with the tongue, i.e. a sound shorter than staccatissimo is performed. In notes, it is designated as▼:

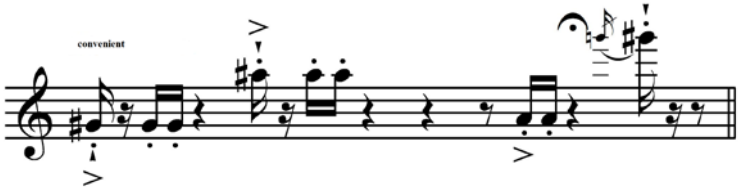

Figure 12. Daldenbai, B. Illusion

The tongue-ram technique for the flute can be compared to the percussion sound of percussion instruments. This technique has its own feature: the flute is turned inward; the tongue is deep in the hole, an air jet is intensively blown into the instrument and the syllable "dah" or "doo" is performed by sharply striking with the tongue. This technique is often performed in the lower register, and sounds lower by a seventh interval in relation to the fingering performed:

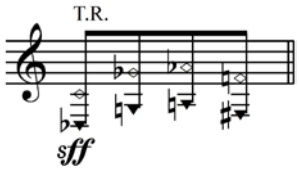

Figure 13. Kawashima, M. "Manic Psychosis"

The slap-tongue for the flute is performed by clearly and shortly striking with the tongue onto the edge of the embouchure hole. The tongue makes a sharp strike accompanied by a strong diaphragm impulse and the syllable "te" is pronounced but without blowing the air into the instrument.

This subgroup of contemporary techniques is characterized by using non-traditional methods of articulation involving the lips and the tongue, which determine the specific timbre coloration of the sound, in which the pitch level is present but does not form the basis of expressiveness. Therefore, the articulatory subgroup occupies an intermediate position between pitch and noise techniques.

The general characteristic of the noise subgroup consists of the content and method of contemporary techniques. A characteristic feature of the second subgroup is the creation of a noise effect, additional colors that increase the range of the flute sound and expand the horizons of the concept of sound.

Table 2. Noise Subgroup

Noise	
With voice	Without voice
Laughter	Aeolian sounds
Pronunciation of vowels, consonants, syllables	Sound with air noise (breath)
Sizzle	Sound with air noise (exhale)
Roar	Jet Whistle
Screech	

This subgroup includes two types of techniques, i.e. those using the vocal tract and those not using it.

The first type includes such techniques of playing the flute as laughter, roar, screech, sizzle, whisper (Figures 14, 15), as well as techniques with the pronunciation of vowels and consonants (Figure 13). At the performance, it is impossible to recognize a certain pitch; it is possible only to consider a "melodic" line moving up or down and to see a general trajectory of motion.

In musical notation, these techniques are designated in the form of words or comments indicating which syllable or sound effect is to be pronounced:

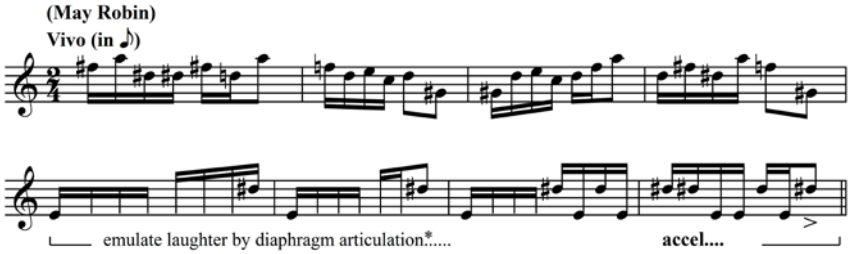

Figure 14. Polin, C. Solo (1981), "Mojiganga"

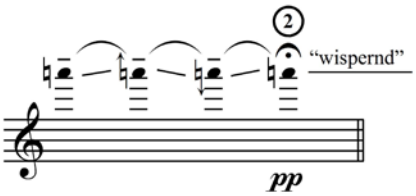

Figure 15. Willdberger, J. Retrospective II

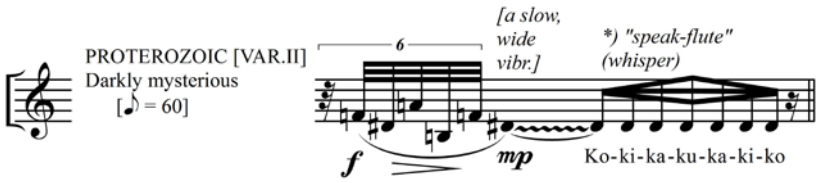

Figure 16.

In the second type of techniques of the noise subgroup, the source of sound producing is a stream of air that forms special effects: aeolian sounds, sound with air noise (breath), sound with air noise (exhale), i.e. noise techniques that give a performer the opportunity to depict "whisper of the wind", "rote" and "raging blizzard". The principle of performance is to create an "air" sound without a certain level of pitch. A performer must blow the air into the flute with soft relaxed lips for the sound with air noise (breath) or, on the contrary, pull the air into the lungs for the sound with air noise (exhale). The amount of noise is often indicated in the notes (for example, ½ of air noise – ½ of sound, ¼ of noise – ¾ of sound etc.). The embouchure should be as relaxed as possible, the flute should be located at a distance from the embouchure in order to avoid the appearance of high-pitched tones:

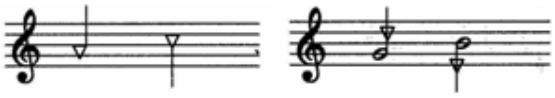

Figure 17.

Aeolian sounds are a technique in which only breathing is heard (with a relaxed embouchure) (Figure 18).

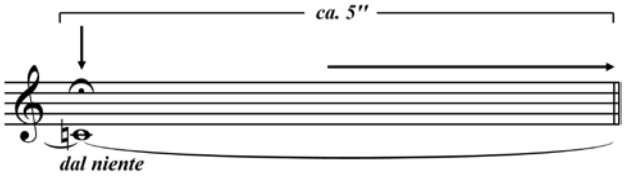

Figure 18. Holliger, H. "T(air)e"

The jet whistle is a vivid and dynamic technique. The embouchure hole is tightly closed with the lips and a sharp pulse of the diaphragm intensively produces a sound similar to a "whistling shot". This technique is indicated with a large broken arrow above the note or with the letters J.W. (Figure 19, 20).

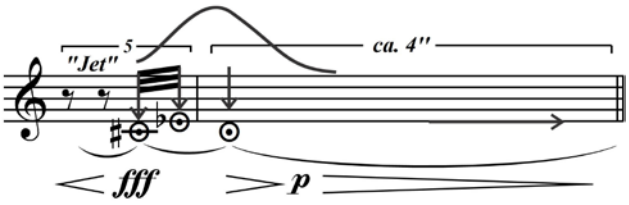

Figure 19. Holliger, H. "T(air)e"

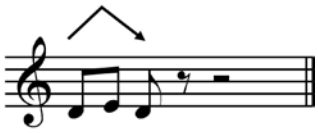

Figure 20.

In the timbral group of techniques, we can also find more traditional means, which are the basis for the formation of new performing techniques. Thus, in the articulatory subgroup, the pizzicato appeared as a result of borrowing a similar method from bowed string instruments. However, on the other hand, the noise subgroup is characterized by techniques that do not have more traditional analogs. This subgroup of techniques reflects the intensive search for new forms of sound that are characteristic of avant-garde music, and also serve as a significant factor in the formation of new performing means.

As a result of the work, a typology of modern techniques for playing the flute was presented, i.e. their classification on the basis of the properties of musical expressiveness.

In the special literature, contemporary methods of playing the flute do not have single and stable criteria of characterization that could serve as the basis for their versatile scientific typology. For example, O. Tantsov (8) in his work "New techniques of playing the flute" divides the contemporary means of playing into two different groups: pitch and special effects, in

which there are techniques that differ significantly in musical characteristics, i.e. in pitch, timbral and performing features. The same very general criteria are used in the work of R. Dick "The Other Flute" (5), in which performing techniques differ in the features of monophony and polyphony. As a result, there is also a combination of the most diverse performing means. In “New sound for woodwind”, B. Bartolozzi (9), like Robert Dick, divides the contemporary techniques of playing the flute according to the principle of the monophonic or polyphonic sounding of the instrument. In addition to similar works, which use the most generalized characteristic of the distinctive criteria of performing techniques, there is an opposite tendency in the special literature to describe in detail the techniques, with the definition of the set of individual groups that form a heterogeneous picture that does not have common typological qualities. Such works have the characteristics of an anthology describing the set of groups of particular techniques, as, for example, in the work of C. Levine and C. Mitropoulos-Bott “The Techniques of Flute Playing.” (10) Great importance in the literature is attached to the development of methodological recommendations for the implementation of contemporary techniques for playing the flute, but in our opinion, the construction of a single and versatile typology can serve as a basis for a more complete and objective characterization of performance characteristics.

4 Conclusion

In conclusion, it should be said that the dynamic development of the instrument and the accumulation of flute literature give an extensive material for understanding the features of contemporary musical thinking and complex artistic processes occurring in the musical art. It is quite obvious that the problems identified in the article should become the subject of constant attention not only of theoretical researchers but also of practicing musicians.

Since the active introduction into the professional sphere, the flute has undergone a number of significant changes that have affected its design and materials for manufacture. The result of a long way to improve the instrument was a significant accumulated flute repertoire, a considerable part of which is the works of the twentieth century for solo flute. In line with the question posed, the work shows the most significant changes in the instrument, which led to the expansion of the technical and expressive capabilities of the instrument. The results of the research give a complete basis for asserting that the formation of the flute's design is closely related to the accumulation of flute literature that reflects all the transformations and improvements in the instrument. The obvious is that, despite the universality of the flute design made by Boehm, this process continues in our days; the illustration of which is the newest flutes created by request specifically for the performance of modern music of the XX and early XXI centuries.

The newest flutes created by order specifically for the performance of contemporary music of the XX and early XXI centuries is the example of this. The flute solo repertoire of this period is incomparably extensive and diverse in the background of the previous XIX century. The solo flute works analyzed in the article are chosen as the main indicator of the introduction of the latest performing techniques for the flute into the individual composers’ styles using the leading composers’ techniques of the 20th century such as serial technique, aleatory, sonorism, etc. These works are included in a number of the most performed plays at various concerts and international festivals of modern flute music. On the one hand, the analysis, which is limited to these plays, is based on curriculums of music education institutions of the United States, Canada, France, and Germany; on the other hand, these works are the most vivid example of the synthesis of the new composers’ techniques of the XX century and the latest techniques of flute performance. In the course of the study, it became clear that the basic initial developments in this direction have already been made and an active process of their implementation is now in progress. The expanded interpretation of the instrument finds a new form and content in the creative ideas of contemporary composers of the late XX and early XXI centuries.

The result of a comprehensive study of experimental pieces for solo flute by foreign authors of the second half of the 20th century is the indisputability of the fact that new performing techniques become an integral part of the new music and modern composition techniques. As a result of the theoretical analysis of works for solo flute, the author comes to the conclusion that in new flute music the timbral characteristics play the same important role as the other components of the composition such as rhythm, melody, and harmony, and become one of the formative elements. This is confirmed not only by their active introduction into the structure of musical material but also by the fact that they appear as the main component of experimental works, which are often written entirely on the basis of an extended interpretation of the instrument with using traditional techniques as an exception. It can be said that at the present time this process has reached a kind of climax and in the near future it does not indicate a decline.

This is logical since experimental music is a kind of a symbol of the epoch, which reflects the dynamics of the development of society and of art in general. The musical art of the late XX and early XXI century comes to a new level. It is included in the process of total renewal of artistic pursuits. All techniques are used by composers not simply as spectacular sonorities, but logically express the idea of the author. Every new work created in the course of the experiment seeks to outstrip a preceding one, which is a sign of the development of modern art. The letter of Varese, which was groundbreaking, has now been taken as a basis by our contemporaries, whose efforts are aimed at finding new techniques.

Since the second half of the twentieth century, music for wind instruments marked a noticeable tendency to renew the musical language. This is due to the emergence of new specific playing techniques and special playing effects. It is worth noting that, to a greater extent, it touched precisely the woodwind instruments, due to their acoustic characteristics and specificity of sound generation. Thanks to the new performing techniques, the timbre and intonational expressiveness of the wind instruments' sound has been greatly enriched.

Unconventional methods of playing served as the basis for creating musical notation and, as a consequence, a complicated performing technique requiring flexibility and mobility of embouchure, high level of motor motility, auditory orientation and emotional reaction of a performer. (11) The received results are relevant for writing compositions for wind instruments with the use of contemporary playing techniques. The work has practical value in the performing and pedagogical activity of a modern musician. Methodical recommendations for the implementation of modern techniques for playing the wind instruments, in particular, the flute, will help young performers to learn new material more easily.

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Primary Paper Section: A

Secondary Paper Section: AJ, AL

PREREQUISITES FOR CREATING AN INNOVATIVE REHEARSAL PROCESS IN A MIXED CHOIR IN THE CONDITIONS OF THE XXI CENTURY

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Abstract: This article focuses on certain prerequisites, enhance the effectiveness of the mixed choir rehearsal process, and to identify the degree of impact on the choir rehearsal of new methods of training to help reduce the time of preparation for the concert performance of choral works of various levels of complexity.

Keywords: Mixed choir, Conducting, Choir rehearsal, Performance.

1 Introduction

The changes that are taking place in the sociocultural life of society such as globalization, mixing different traditions, creating interstate educational programs, reviving the national culture, searching for innovative technologies in the educational process, all of this requires rethinking the forms and content of professional training of choirmaster. Because not only the special training of the choir leader, but also his ability to work with the collective at the level of cooperation, partnership, and co-creation are important components of the choirmaster's activities. In addition to the above, in order to achieve the best results in the modern sociocultural space, it is necessary to search for new forms and types of work with the choir.

This problem is relevant both at the national and global level. This is indicated by appeals to its study in the framework of thesis researches, articles, discussions. Although the problem of innovative methods in the rehearsal process was not specifically studied in Russian art criticism, sections of a number of dissertations are devoted to its individual aspects. For example, Y. Saprykina (1) diversifies the methods of working with the timbre of the choir. A feature of her approach is interdisciplinary. It attracts methodological material based both on ancient choral traditions and on the modern interdisciplinary approach. Communicative aspects in the work with the choir are designated in the work of N. Yurchenko (2), where she defines the methodological basis for the formation of a culture of creative communication between the conductor and the choir. M. Dynnik (3) considers the sociocultural issues, the influence of choral performance on the formation of personality, on patriotic education. The specifics of working with the chorus in Asian national cultures at the present stage are investigated, for example, on the material of Singapore. The role of the choral class in the educational process in the Singapore High School is determined by researchers Ai-Girl Tan and Flora Yee Woei-Chee as significant for the socialization of young people. (4) The following methodology considers the provisions of these works, but mainly builds on the practical activities of the author.

As the leader of the mixed choir of the KNC named after Kurmangazy since September 2006, as well as an artist (since 2002) and choirmaster (since 2013) of the B. Baikadamov Kazakh State Choir, the author gives a number of objective reasons for modernizing the rehearsal process in the mixed choir KNC behalf Kurmangazy. Based on his own observations, analysis, systematization of certain aspects of the development of the art of choral singing both in Kazakhstan and abroad, the author determined the following set of historical trends and objective factors:

1. Changes in some conditions of study in the field of choral conducting in Kazakhstan in the conditions of the 21st century;
2. The growth of the amount of information related to the field of vocational education and simplifying access to it, due to the development of relevant areas of scientific and technological progress;
3. Increased competition in the field of musical performance;
4. Reducing the timing of preparation for a concert performance.

In this paper, we will try to consider in more detail each of the above paragraphs.

2 Changes in Some Conditions of Study in the Field of Choral Conducting in Kazakhstan in the Conditions of the 21st Century

Observation and analysis of the general level of professional training of applicants of the Department of Conducting of the KNC named after Kurmangazy since 2006, as well as systematic participation in the work of the selection committee, allowed to draw the following conclusions:

- there is a stable, annual growth in the number of applicants, as well as an increase in the number of state grants for applicants. If in 2007, 20 people arrived to arrive and 16 were taken, then in 2014 this ratio looked like 27 to 22, respectively;
- applicants come to come from almost all regions of the Republic of Kazakhstan, demonstrating a different level of professional training;
- the greatest degree of proficiency in professional skills, such as conducting, hearing analysis, playing the piano, is demonstrated by graduates of the Musical College of Almaty named after P. Tchaikovsky and K. Baiseitova Republican Secondary Specialized Boarding Music School for gifted children. At the same time, it is worth noting the overall level of professional training of graduates of secondary schools that has deteriorated (as compared with the end of the 20th - beginning of the 21st century). The basis of this phenomenon is such factors as:

a) the lack of initial musical training of those who are entering secondary schools;
b) the lack of innovative methods of the development of skills of hearing analysis, sense of rhythm, aimed at students who do not have initial musical training.

The above factors at the time of the applicant's entering to the conservatory lead to a very mediocre level of reading choral scores from a sheet music (both when singing and playing the piano), which is a fundamental skill in the choirmaster's profession.

Under conditions of specialized educational institutions, standards and strategies developed as early as the twentieth century and designed to ensure that an applicant has a primary musical training are taken as the basis for learning solfeggio. Unfortunately, at this juncture, the leadership of the choral conducting departments of music colleges may decide enrollment of applicants with minimum levels of proficiency, which are reduced to having the ability to repeat a given rhythmic configuration uracil (so-called "sense of rhythm"), the ability to play a predetermined pitch with own voice (so-called "timekeeping"), and the basics of singing skills. Undoubtedly, the process of teaching such a student requires a special approach against the background of his more developed classmates in terms of mastering the professional skills. Few of these students have time to "catch up" in the development of reading skills from a list of their classmates at the time of graduation from the music college, and even at the end of the conservatory. In order to move into the category of "advanced"

at any stage of the study, a student must do a considerable amount of work in the field of highly specialized self-development, or direct participation of a teacher who guides and supervises the development of skills of such a student is necessary, often in extra time. Based on the given circumstance, taking the skill of reading from a sheet as a priority for the profession of choirmaster, you can talk about a different level of preparedness among students of the same course, and this trend, unfortunately, continues up to the graduation course. (5, 6) The criterion for the readiness of choral pieces to a concert performance is, among other things, the general degree of memorization by the collective of the work material based on reading skills from a sheet, and the degree of readiness is largely monitored through the most poorly trained and memorized members of the collective.

3 The Growth of the Amount of Information Related to the Field of Vocational Education and Simplifying Access to It Due to the Development of Relevant Areas of Scientific and Technological Progress

The last decade was marked by rapid growth in the field of IT-technologies, mobile devices, and access to Internet resources. For a successful development, a performer or a team of performers become unprofitable and extremely unreasonable from the point of view of advancing in the music field a lack, or even complete lack of information about themselves on the Internet, especially for young or developing performers, or teams. In this regard, musicians everywhere create profile pages on social networks or even entire sites, with the placement of photo, audio, video files about their activities. Moreover, different degrees of mastering the skills of using and moving media resources in the field of digital technologies are demonstrated by musicians of various categories without an upper or lower age threshold. Moreover, the existence of at least one electronic mailbox ceases to be exotic even among academic teaching staff of pre-retirement and even retirement age categories, since there is an understanding of the possibilities of accelerating the search, transmission, and perception of various information in the field of professional activity. (7, 8) By means of the possibilities of the Internet, stages of various competitions are held, mainly selection rounds, for example, on the basis of video recordings of concert performances. The Internet plays a special role in expanding the audience at the expense of the possibility of direct (with a minimum time delay, the so-called "online") broadcast of competitive performances.

4 Increased Competition in the Field of Musical Performance

In connection with the main idea of the previous paragraph, we can talk about moving part of the audience from the real to the virtual aspect, when the acquaintance with the work of any performer or music group occurs (due to the inability to attend a concert for some reason through personal presence) on the Internet.

The concept of "competition" here is applicable in the following respect: representatives of the audience have a choice:

- the visit to a concert performance either through personal attendance, or virtually (in case of the availability of online broadcasting of this concert performance);
- the visit to any concert performance through personal attendance with a predetermined repertoire of compositions performed by a certain composition of participants, or watching and listening to these works by searching among Internet resources, performed by various on composition, geographical affiliation and skill level of musicians. (9)

Certainly, a personal attendance of a concert performance allows one to experience a closer contact with the beautiful, contributes to a deeper perception of the ideological content and artistic image of the works. However, if you look from the point of view of financial opportunity, not every music lover is able to personally attend a large number of concert performances, unlike the almost limitless possibility of watching and listening to a huge amount of musical (as well as artistic, theatrical) pieces through Internet resources. The average performance of monthly fee for using the Internet for individuals is about 4,000 tenge without limiting the amount of downloaded information. Up to date, there is the possibility of a large choice among tariff plans for providing Internet access among mobile operators in the Republic of Kazakhstan. One of them offers the possibility of receiving up to 5 gigabytes for just 990 tenge. For example, one visit to the play “La Traviata” on May 30, 2015, at the Abai National Academical Theater of Opera and Ballet will cost from 600 tenge (for a seat on the balcony), up to 2500 tenge (for a place in the stalls). If we take into account the possibility of choosing the performing staff of a work, for example, La Scala or Metropolitan Opera, based on freely available video in good quality, then we can say that visiting a large number of concert performances through personal attendance becomes the prerogative of true music lovers a certain level of financial well-being. In this regard, the value of free access to samples of musical art by students and people of retirement age, who are the most vulnerable to the pricing policy of some concert institutions, is very great. It should be added that the cost of attending a concert performance with performers invited from abroad, as a rule, increases significantly. It is necessary to note the considerable practical significance of free access to specialized Internet resources from the standpoint of the development of professional skills on the basis of comparison and analysis. Some ten years ago, the direction of development of this level of digital technology was determined by the world, when by a few clicks on the screen of a smartphone or tablet, the user gets the opportunity to get acquainted with different versions of the same piece. Everywhere appear digital libraries and multimedia libraries with the ability to use resources from anywhere in the world.

In many ways, the above information relates to a mega-resource YouTube. According to the Play Market virtual hypermarket, the mobile application was downloaded and installed on more than 1,000,000,000 mobile devices based on the Android operating system. YouTube is the undisputed leader in the ability to view video files and contains the most well-known samples of music pieces from the most frequently performed (popular), replenishing hourly. From a study of the given materials of this resource, automatically generated information appears in the user's field of view, similar to the selected, for example, the same piece performed by a different composition of membership, and/or other pieces performed by the same lineup.

Thus, the possibilities of the Internet in this area suggest the widest choice:

- products;
- performing membership;
- quality of audio-video parameters.

It should be noted that the musicians are interested in expanding the quantitative value of this kind of audience, since the views of the information posted as a video file lead to new views, with the prospect of receiving positive feedback and further work advance of the performer or group, because the Internet, and accordingly the file with a sample of creative work, has no geographical boundaries. Frequently, the number of people who have watched a concert performance on the Internet can be way beyond the number of people who attended a concert performance. Moreover, some performers arrange a significant proportion of their concert activities and promote them through the possibilities offered by the Internet. No matter how cynical it may sound, but music from the point of view of management is a product that requires promotion and marketing in a competitive environment. (10)

It should be noted that the above-said is the subjective opinion of the author of the article, and, therefore, can be a controversial point of view.

5 Reducing the Timing of Preparation for a Concert Performance

When a performing musician or a music group reach a certain level of mastery, their level of fame and popularity increases. It is difficult to imagine an artist who does not aspire to be in demand in his profession. A popular music group or performing musician, as a rule, has a fairly rich concert schedule, even if the music group is educational. There is a need to expand the repertoire with new pieces, while the stock of pieces that are already accumulated and repeatedly performed in concert performances must be systematically repeated with new members of the music group (for example, the mixed choir of the KNC named after Kurmangazy is updated annually by 25% by means of 4-year students who graduated and first-year students who entered). Successful performance or participation in any concert life of such an educational group as the mixed choir of the KNC named after Kurmangazy, and in this case, it is necessary to adjust the program which may lead soon (for example, on the occasion of a significant date) to a new, unplanned performance. Such cases are not rare in the concert schedule of graduates working on the works of the state exam program in the specialty "Conducting". Such circumstances of changes in the timing of preparation may also affect the scope of activity of professional choirs, for example, the B. Baikadamov Kazakh State Choir. The need to participate in a concert with a new piece (s) is sometimes confirmed in a very short time regarding the date of the performance. On the other hand, even in the event that a concert performance is scheduled a few months ago, the dates for the start of preparation for it can significantly shift towards the date of the performance due to the following, as a rule, force majeure circumstances:

- the impossibility of the participation of key performing musicians and the subsequent replacement of the performed pieces with others;
- late preparation for the work of musical material;
- the inability to allocate a sufficient amount of rehearsal time to prepare for the performance due to concert overload. (11)

6 Results and Discussion

In the cycle of special conducting disciplines of the curriculum choral class occupies a special place. The choral class has an important psychological significance, helping students from the first steps to cultivate the volitional and artistic qualities necessary for the conductor. This is the central discipline of the cycle, the basis of the formulation of the educational process of the specialty “musical education”, therefore it is difficult to overestimate the importance and relevance of the development of the questions of the method of organizing and organization of activities of the educational choir. (12)

The main reason is the lack of clear methodological guidelines and unified principles for organizing the work of educational choirs. In fact, in each educational institution, the activity of choral classes is organized and proceeds differently.

It would seem that the manifestation of the initiative in the search for the best form of organization of the work of the academic choir is a positive fact. Practically, in the absence of uniform methodological guidelines, this often leads to serious pedagogical errors and, ultimately, to a decrease in the level of professional training of graduates. Without setting a task to at least briefly characterize the various methods of teaching the choir that exist in practice, it must be emphasized that with all the variety of forms in the organization of this work, the activity of the choral class of most educational institutions easily reveals one common shortcoming. (13) It is expressed in that it is necessary to provide students with as much practice of working with the choir as possible. Throughout the school year, graduate students work with the training chorus (preparation of graduate programs) and junior students work with the chorus. The role of the teacher-leader of the choral class is, in fact, reduced to nothing. He only plans for the students' rehearsal work, attends classes and monitors the observance of the discipline. As a result, the choral class is a professional base for training future music teachers, as well as a discipline for practicing the student chorus and, as an academic discipline, ceases to correspond to its purpose. (14)

No one will deny the importance for the future choirmaster of practical work skills with the choir. This problem still needs to get back to in the future. But the choral class is an academic discipline and no less important than, say, conducting or piano. Therefore, the choral class, like any other academic discipline, must be taught. And teaching in an educational institution can be entrusted only to the teacher, but not to the students, even if they are senior students. The recognition of these undisputed truths should lead us to the following important conclusion: the teacher, the head of the choral class, must work with the choral class himself. This is the main form of teaching the choral class, as the central discipline of a special cycle of conducting and choral disciplines, and only under this condition can the choral class successfully cope with the tasks facing it. (15)

In the educational process, the professional formation of the choral culture of a future music teacher in the context of higher education should be decided on a professional basis and by the choral class as an academic discipline.

First of all, generalization and practical consolidation of theoretical knowledge and practical skills acquired by students in the process of studying a number of special disciplines such as choral studies, choral literature, conducting, voice-training, reading choral scores, choral arrangement, harmony, solfege, analysis of musical works, etc. (16) Similar generalizing function is performed by other academic disciplines, and, first of all, by conducting. Classroom learning of conducting, perhaps, is impossible to build constantly, without relying on the full range of professional knowledge that the student has at this stage of education. At the same time, the process of consolidating knowledge is quite effective. Nevertheless, even classroom classes in conducting cannot replace the generalizing and practical meaning of work in a choral class, which is completely built on the real (and not imaginary) sound of the choir. No wonder one of the founders of professional choral education A. D. Kastalsky, emphasizing the role of the choral class in the upbringing of future choirmasters, said that choral conductors "were educated by the choral sound itself, like many symphonic and opera conductors were educated by the orchestra, where they had previously played." (17)

Another problem facing the head of the educational music group is the vocal education of its members. The ability to control one's voice, practical mastering of the techniques of singing are necessary for the future music teacher - choirmaster, no less than any other special theoretical knowledge and practical skills. After a while, he will have to stand at the head of the choir collective himself and, as a conductor, lead his vocal education as a conductor.

“The conductor should, first of all, learn the simple truth: you can’t teach others something if you don’t know it yourself,” said P. G. Chesnokov. (18) Consequently, the future leader of the choir should acquire sufficient knowledge in the field of the theory of vocal singing, learn to master singing breathing perfectly, have a clear idea of the technology and practically master the techniques of correct sound formation, know how to use resonators, cultivate a complex of vocal and technical skills, necessary for the performance of works of various styles and any vocal complexity. The amount of vocal knowledge and skills to ensure a high level of vocal and choral culture of the future music teacher, which, in turn, will be the key to the vocal and choral culture of the choral group led by him.

Methodically correct, persistent and purposeful vocal and choral work with an educational choir, as a rule, allows, in the end, to achieve highly artistic results. The sounding of the student choir (usually completed with voices of a very average quality) becomes bright and expressive, the performance abilities of the collective greatly expand, its timbre palette is enriched.

The vocal hearing is a form of a sense of pitch, characterized by a special sensitivity to the sound of a human voice in all its finest timbre, dynamic, intonation, and other shades. Without vocal hearing, it is impossible to distinguish the noble "closed" sound from the deaf, "overlapped"; beautiful, "round", clear from unnatural, non-artistic, etc. Only having a vocal hearing, the conductor can judge the degree of artistic design of the sound, therefore, the expressiveness of the vocal qualities of the voice. (19)

The work on the vocal side of the piece is closely associated with the education of students' ability to accurately intonate the choral voices of the score while maintaining good sound quality. During the lessons of the educational choir, such specific skills of choral performance as skills of the choral tuning system, choral ensemble, etc. are acquired and improved, the technology of the rehearsal process is thoroughly studied, and the skills of interpretation performance are brought up. (20)

Future specialists acquire all these professional qualities in the process of singing in the educational choir group, for “the education of the choral conductor should be carried out in constant connection with the practice of singing in the choir.” (21)

The work of the choral class provides a concert program of graduate students. The defense of the state exam in the specialty “conducting” and “working with the choir” is the result of the students' work, during which the knowledge and skills accumulated by the student during his participation in the choir as a singer are enshrined and improved; skills of practical work with the choir are acquired when students perform in open concerts of the choral class as conductors, and a number of other organizational and creative tasks are being solved. (22, 23)

The combination of the successful solution of all these problems on the basis of the correct organization of the educational choir, ultimately, ensures the correct formation of the choral culture of the future music teacher. And here again, the problem of quality, the level of choral culture of the educational choral group, is put forward. “Just as a pianist cannot be taught to play an instrument of poor quality, so a conductor cannot be trained on the sound of a bad choir. The educational choir... should be brought to the level of a highly qualified artistic group.” (19)

It is obvious that even the most talented student-trainee cannot bring up and form such a group. This task is only possible for an experienced, highly qualified teacher. Singing choral voices is the most important moment in the development of choral work. The study of voices is achieved in two ways: playing choral parts on the piano and repeating them in voice. This is the so-called mechanical method of memorizing melodic lines of choral parts. Such an assimilation of material is positive because it takes a relatively small amount of time. Another way of mastering choral parts is ear training. This method requires more time and attention, but is more effective in terms of the student’s musical development: it develops a musical ear for students, intonation accuracy and fosters the ability to sense the vocal characteristics of each choral party.

Pedagogy considers the education of the individual and the development of special skills and abilities as a single indivisible process. It is also well known that the formation of a creative individuality can never do without the influence of another, no less vivid creative individuality. In this regard, it is impossible not to say about the huge educative value of the personality of the teacher, the entire professional image of the leader of the choral class in the complex process of forming the creative individuality of each student, and in the future of a music teacher. (24, 25)

The personality of the teacher-musician is also important. The teacher-musician should appear before the audience not just erudite in the field of cultural history, but who can think, compare, analyze, and most importantly - loving, understanding students who can emotionally perceive art. He must not only competently perform the musical text, but also convey the ideological essence of the work, his emotional structure, and have wide erudition in various fields of art. Therefore, the comprehensive development of musical abilities, learning the basics of choral culture - the most important tasks in the process of preparing music teachers in secondary schools. An acquaintance of a teacher with the musical material is an educational process since in the course of it the understanding of the material being studied is expanded. (26, 27) The teacher introduces the period of creating a musical composition, the main stages of the author's creative path, the structure and form of a musical work, overcoming the performing techniques of the technical content of the composition, and is faced with the search for expressive means of music in the work on the artistic way. The peculiarity of this knowledge is that they are directly related to the reflection of history, modern life, social problems, human feelings and experiences, which form knowledge and skills, personal qualities that have educational potential. The generalization of theoretical knowledge and skills, their application in the performing interpretation, the ability to synthesize them develop choral training of a music teacher, orient value-relationships to reality, actively form the spiritual world, artistic taste, therefore, perform an aesthetic function in the educational process. (28, 29)

7 Conclusion

The fundamental task, the primary goal, the urgent necessity during everyday work as the mixed choir conductor of the KNC named after Kurmangazy from 2006 to the present has been the search for such innovative methods of conducting the rehearsal process in preparation for the concert performance of choral pieces of varying degrees of complexity, which would allow to achieve the maximum practical results with the minimum time spent.

In the process of studying the discipline, traditional and interactive educational technologies should be used, in the form of individual lessons under the guidance of a teacher and independent work of the student. In this process, the main task of the teacher is to teach the student to independently use the knowledge, skills, and abilities that he gained during the training process. In accordance with the program requirements, a lesson plan is drawn up, which can be adjusted in the course of work.

At the same time, the acquisition of practical work skills with the choir is carried out primarily in the process of systematic work of the student with the choir collective. The choral class must always remain an academic discipline and, under the guidance of a teacher, consistently solve other problems on the path of the conductor’s professional development, the main of which is the formation of the choral culture of the future music teacher. To achieve this, a choral class should be a good performing group, the principles of work and sound quality of which for many years can become a model for each student in his future professional activity.

One of the main problems of the activity of the school choir is the performing education of future music teachers, which is unthinkable without the systematic concert work of the student choir. Any performing musician cannot limit his professional activity to the framework of rehearsal work since in such a case he will inevitably lose those necessary artistic qualities of the personality that only the stage brings up - communication with a live audience, the whole atmosphere of a concert performance. During the period of study, these skills are acquired primarily in the process of singing in the academic choir under the guidance of an experienced master teacher. It should be emphasized that if the upbringing of a complex of professional vocal and technical skills occurs in the conditions of the rehearsal process, then only a public concert performance can serve as a stimulus for the development of performing talent and artistry. (30)

Only in the setting of a concert performance under the guidance of an experienced conductor, who perfectly knows the secrets of performing interpretation, combining in his creative appearance a clear mind, will, performing temperament, rich creative

imagination and other features of genuine artistry, the choir can reach significant heights of artistic and performing skills. Being a full-fledged accomplice to such a performance, the student is able to survive the moments of real creative inspiration, to experience the exciting feeling of the joy of creative creation. Such moments are unforgettable, they give rise to the need for constant creative expression, lead to the tireless search for new artistic impressions, the ability to cause a new rush of inspiration.

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FORMATION OF KAZAKH PATRIOTIC VALUES AMONG PRIMARY SCHOOLCHILDREN VIA LOCAL HISTORY MATERIALS

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Abstract: In recent years, attention to the spiritual wealth of the cultural heritage of peoples has increased. This should be seen as the desire of peoples for national revival. There are not a single people who would not strive to preserve national identity, which is manifested in native language, folklore, traditions, and art. Today, the leading principle of education should be based on the roots of the national tradition. The cultivation of a holistic personality requires the use of interrelated means and various forms of influence. A distinctive feature of the approach in question is its propaedeutic (elementary, accessible) character, which allows a primary schoolchild to accumulate a certain range of knowledge and ideas necessary for educational areas through local history materials. The goal of the approach in question is to ensure that primary schoolchildren are introduced to the history of their city, region, Kazakhstan and the basics of legal, ethical, spiritual and moral knowledge, to foster a love for the countryside and native nature, to form conscious ideas about norms and rules of behavior.

Keywords: local history, patriotism, primary school, ethnopedagogy, patriotic education.

1 Introduction

The first years of a child's life are of decisive importance in the development of his/her personality. Therefore, it is important to organize properly the education and the active learning of social life. Feelings of citizenship and patriotism, are they proper for young children? On the basis of the experience in this area, we can give an affirmative answer: primary schoolchildren, especially older ones, have a feeling of love for their native city, native nature, for their homeland. (1-2) Moreover, this is the beginning of patriotism, which is born in knowledge, is formed in the process of purposeful education. To be a patriot is to feel oneself an integral part of the homeland. This complex feeling arises in preschool childhood, when the foundations of a valuable attitude to the world are laid and are gradually formed in a child in the process of nurturing a love for kindergarten, for their native places, for their native country. (3-4) Primary school, as a period of personal development, has its potential for the formation of higher moral feelings including a feeling of patriotism.

Patriotism is an important component of the public consciousness of citizens. The insufficient effectiveness of the educational work on the formation of patriotism, the weakening of the spiritual and cultural foundations of society and the State, the low level of public awareness of global problems, and international conflicts, as well as the weakening of morality at individual and social levels, determine the importance of improving the quality of patriotic education in the general education system of the younger generation. (5-6)

One of the objectives of the State Program for the Development of Education of the Republic of Kazakhstan for 2011–2020 is the formation of an intellectual nation, whose representatives possess not only competitive knowledge and creative thinking but also high civil and moral principles, a sense of patriotism and social responsibility. (7)

The conditions for the effectiveness of work on patriotic education are

- analysis of the content and state of the educational process
- evaluation of achieved results
- identification of new opportunities and approaches for implementation

In the authors' opinion, the most effective is the ethnopedagogical approach, including the use of local history materials, to the nurturing patriotism. Ethnopedagogical approach to education

- integrates the main aspects of the cultural and systemic approaches;
- serves as the basis for nurturing patriotism of schoolchildren;
- updates the knowledge of teachers and students about social processes;
- puts forward the subject-subject interaction and self-actualization of personality in culture as priority orientations.

In scientific literature, ethnopedagogy is presented as a science that studies folk pedagogy as a traditional practice of mentorship and education historically formed by various ethnic groups. Researchers of folk pedagogy (e.g. K.D. Ushinsky, A.S. Makarenko, and V.A. Sukhomlinsky) showed the mutual influence of classical, modern and folk pedagogy, which complement and enrich each other. An analysis of the sources shows that education is closely related to the ideas of folk pedagogy (in oral folklore). The lore of people is closely connected with the description of the actions and life of a person.

According to G.N. Volkov (8), ethnopedagogy studies the process of social interaction and social influence, in the course of which a person is educated, and developed, as well as acquires social norms, values, and experience. It collects and systematizes popular knowledge about the education of children, the popular wisdom reflected in religious teachings, tales, songs, riddles, proverbs, sayings, family and social norms, life, traditions, and the whole pedagogical potential that influences the process of cultural personality formation. Thus, the ethnopedagogical approach to education determines the goals of the formation of civil and patriotic qualities of a person, sharing them with other norms and values. Representatives of different cultures have similar views on the issues of the education of the younger generation, ideas about patriotism, kindness, diligence and other human values. However, every nation emphasizes qualities of paramount importance for itself.

The problems of patriotic education are studied by Kazakh scientists. The works of Kazakh scientists (such as K.Z. Kozhakhmetova, S.T. Imanbayeva, S.T. Taubayeva, K.S. Menlibayeva, G.K. Belgibayeva, S.S. Taulanova, S.K. Nurmukasheva and others) confirm the importance of national culture and knowledge presented in the experience of folk pedagogy, in civil and patriotic education of the younger generation. (9-10) S.T. Imanbayeva (9) pays special attention to the formation of Kazakh patriotism based on the country's State ideology. K.S. Menlibayev (10) believes that the preservation of national traditions and customs is the result of centuries-old educational activities of peoples, through which every nation reproduces its spiritual culture, and peculiarities of national psychology. The ethnopedagogical approach to the patriotic education of schoolchildren implies its changing goals, allows to achieve a targeted and consistent inclusion of the pedagogical heritage of the people in it, which contributes to the formation of patriotism, tolerance, the development of creative thinking, cognitive activity, and initiative of schoolchildren. (11-13)

The patriotic education of schoolchildren becomes effective with the implementation of the following principles of the ethnopedagogical approach:

- traditions of folk pedagogy;

- assimilation of cultural knowledge and values;
- planning educational work taking into account the national identity of a school;
- engagement of schoolchildren in direct patriotic activities.

The process of patriotic education, in the authors' opinion, in addition to the above principles, should take into account such factors as the age of pupils. So, I.I. Valeyev (14) singled out the following school age groups that influence the particularities of patriotism education:

- 6-12-year-old students;
- 13-15-year-old students;
- 16-17-year-old students.

Patriotic education covers various age levels of a person. At each level, it is aimed at solving various problems taking into account the age of the pupils. First, it is necessary to consider the peculiarities of primary schoolchildren.

Age pedagogy defines the task of education of primary school students as the disclosure of abilities and the development of creativity. The primary schoolchildren age are characterized by readiness for new duties, responsibility to other people. Interest is the basis of the primary schoolchildren's motivation.

The learning activity is a leading activity at this age. The basic relations of a child with society and the formation of the basic qualities and individual mental processes of child personality are based on it. It is necessary to disclose the meaning of proverbs, sayings, fairy tales, epics, legends together with primary schoolchildren and to involve them in the process of studying folk culture with the help of folk games. The analysis of the behavior of the heroes of folk art works will allow students to learn universal human values, their role in human life and society at all times. Such work allows to revalorize old values and to build a new system of civil patriotic orientations. When considering situations from the life described in folk art, students are aware of the practical significance of previous moral ideals; popular wisdom acquires more personal meaning for students.

Ethnopedagogy, which comprises the use of local history materials, has a historically formed education system (including a patriotic education system) for the young generation. One of the leading components of education in ethnopedagogy is the transmission of national traditions in the process of interaction between generations. Since ancient times, there are traditions of raising children, teenagers, and young people, as well as preparing them for family life.

The patriotic education of students at present cannot be considered without taking into account the ethnopedagogical and social prerequisites that are the basis for its improvement. In the authors' opinion, the process of patriotic education will be more effective if it is based on local history, national traditions, culture, rituals, and customs of the people. The implementation of ethnopedagogical approach to the patriotic education among schoolchildren is aimed at their personalities.

In the work on the formation of patriotic value orientations among students, it is advisable to use the methods, techniques, and tools of folk pedagogy. The pedagogical experience of the people reflected in works of art, oral folklore, traditions, and customs has long been used in the education of the younger generations, allowing them to preserve their culture and morality.

Thus, the use of local history materials with the ethnopedagogical approach to the patriotic education of schoolchildren are an important means of improving the entire educational process. Fostering patriotism on the basis of an ethnopedagogical approach requires an organized process of interaction of traditional systems with modern educational systems, which will help create the necessary educational space.

The educational activities, including those based on local history materials, are aimed at the formation of civic patriotic values among school students and increase the potential of national education and the effectiveness of the ethnopedagogical approach to the patriotic education of modern schoolchildren (15-17).

Everyone has their own concept on the native land, the place where a person was born, took the first steps, spoke the first words, saw the sun, sky, earth, the first blade of grass, flower, tree, and animal. It is this that binds a person to a place and people close to him/her from birth. The verb "love" cannot be imperative. You can order someone to do something, but you cannot even order a slave to love. In order for a schoolchild to have a love for his/her homeland, it is necessary to actively influence his/her feelings. Modern school is a very complex organism, and it is important that all elements of this system work well and smoothly. Recently, a lot has been said that school offers students a lot of unnecessary knowledge, without giving the necessary minimum information. Local history, an academic discipline, which causes a lot of controversies, is sometimes given as an example of it. At the same time, disputes often forget that it is this subject that contributes to the education and spiritual development of students as citizens.

2 Materials and Methods

The methods and forms of work involving the use of local history materials in education are the following:

- familiarizing children with the history of their native land, life, traditions, and culture of the people who inhabit it;
- method of social roles;
- creation of gaming motivations corresponding to a topic;
- using associated interconnections;
- musical and theatrical activities;
- independent search and practical activities.

These methods help children to create in their imagination a whole picture of the world around them, to make their own small discoveries on the way of comprehending the centuries-old culture of humanity, to feel themselves the heirs of this wealth, to appreciate the authentic things of past eras. All this makes a child's life more saturated and interesting, raises his/her culture, develops his/her intellect, gives a new tool for learning about the world and successful socialization (18-20)

The predicted result of the research is the education of students capable of

- feeling one's own emotional state and the emotional state of other people;
- showing interest in the past, present, and future of their city, region, country;
- solving intellectual problems (tasks) adequate to their age (i.e. intellectual development);
- showing interest in everything new, incomprehensible, and unexplored (i.e. inquisitiveness);
- imagining, inventing, creating a new activity within the framework of age-appropriate activities, finding different ways to solve the same task (i.e. creativeness);
- being active and independent in making decisions and in committing acts (i.e. proactivity);
- perceiving the beauty of the surrounding world (people, nature, and art), feeling the beauty (i.e. emotional responsiveness);
- understanding the value of life, showing care and attention to the world.

Primary schoolchildren should know and understand

- the coat of arms, the flag, and the anthem of Kazakhstan, the coat of arms and the flag of the home city and region;
- people of different ethnicities inhabiting the country, their customs, traditions, folklore, and work;
- that, apart from Kazakhstan, there are other countries, to remember and name some of them;
- that all these countries and Kazakhstan are on Earth;
- what is a country, similarities, and differences of countries;

- songs, tales, dances, and games of the country;
- some scientists, composers, and writers (Kazakh and foreign ones) known to the whole world.

Primary schoolchildren should identify and explain causal relationships and dependencies such as

- the presence of different peoples;
- why it is important to learn different languages;
- why it is useful to get acquainted with the customs and traditions of other peoples;
- why a person loves his/her homeland.

The above program is designed in accordance with the age characteristics of children, is adjusted with the comprehensive educational program used in primary school, do not contradict the requirements of the national standards and ensure the integrity of the pedagogical process.

3 Results and Discussion

Local history material can be presented on several levels:

- local history material is included in the subjects studied according to a thematic syllabus;
- a separate local history course is introduced in the syllabus (for example, "My Town's History and Culture" and "My Land");
- local history material is involved in the organization of extracurricular activities.

Local history as part of the national regional education is based on the principles common to the education system as a whole and is aimed at the implementation of a qualitatively new personality-oriented model of mass primary school. Local history is based on the methodological foundations of history education at school, particularly relevant for primary school. In addition, the important conditions for the effective mastering of local history material are a competent selection of educational material and the involvement of younger students in active cognitive activity. When forming the content of a lesson with a local history component, such moments as the inclusion of the material in the content of the basic course and its typicality with respect to regional and Kazakh educational processes should be taken into account. A clear idea of the orientation and objectives of the local history is essential in the formation of its content. These features determine the selection of material. A local history orientation is determined on the basis of specific pedagogical conditions. It can be geographical, environmental, literary; ethnographic, and complex one. When selecting materials for systemic forms of local history activities (such as learning circle and club), one should be guided by such initial principles as expediency from the point of view of the intended goal and sufficiency for its implementation. In other words, when developing a program, it is necessary to think out a common core idea of the lessons. It is inadvisable to "lump together" diverse information that is thematically and logically little connected with each other, only because it is of interest to the teacher. Such materials can be used in the organization of other forms of classes (in a classroom, class meetings, and extracurricular activities). The next actual position in the organization of local history education is the observance of the principle of continuity in the content of education. In mastering the local history material, students rely on the knowledge and skills acquired during the lessons in various subjects. It is also necessary to take into account the local history components of the content of other subjects. This will make it possible to avoid unnecessary duplication of material and students' overload. In this regard, the issue of the rational implementation of interdisciplinary relations is actualized.

Developmental learning and activity approach are on a par with other didactic principles. It can be implemented in the course of student research and projects on local history and museum practice. Extracurricular activities including those related to local history differ from usual classes by the following criteria:

- they do not have a strict time regulation, extracurricular classes may be short-term, less and may be longer than usual classes;
- the participation of children in them is voluntary and is determined by their interests;
- they imply a large variety of problems, forms of occupation, and the freedom of the teacher in their choice.

Extracurricular work may be systematic. This includes the organization of clubs, learning circles, etc., which operate for a certain time. Another option implies the holding of episodic or one-off events such as evenings, contests, etc. In terms of number of students, this work may have a massive or group character. Recently, in connection with the desires of teachers to implement a personality-oriented approach, individual forms of extra-curricular activities have been actualized.

There are many areas and forms of extracurricular work. Let us list those that are most often found in the pedagogical practice of the Kazakh teachers: historical game, wall newspaper issue, local history display booth, literary historical display booth, historical play, contests (essays, drawings, articles on local history), quizzes, oral journal, excursion, creation of showrooms, participation in the work of school museums, etc. The examples of the names of local history student associations and extracurricular activities include "Young historian", "Young archaeologist", "My land", "Archivist", "Hello, museum!", "Museum World", "Family history - history of the city", "Old House", "Man in History", "This is how our grandfathers lived", "Folk Games", etc. With any approach to the organization of local history activities of schoolchildren, interaction with local museums, libraries, and children's centers is useful. This will enrich the content and forms of local history education.

An example of a local history education thematic plan can be found in Table 1.

Table 1. Local History Thematic Plan For Primary Schoolchildren

No.	Topic for classes and events	Tasks	Form of implementation
September **Events dedicated to the Day of Languages of the Peoples of Kazakhstan**			
1	"What do I know about my homeland?"	To determine the level of knowledge and training of children in moral and patriotic education	Questions and answers
Museum			
2	"My friend, my native language"	Develop children's cognitive interest; To foster a love for the native language; To form respect for the culture of Kazakhstan, the rules of conduct in public places.	Holiday
Showroom			

3	"Children's art school"	Attracting the attention of primary schoolchildren to the visual arts; To show how schoolchildren convey their attitude towards their home region, and towards Kazakhstan with the help of visual arts.	Excursion
Class			
4	"Kazakhstan is our common home"	To form an idea among children about the ethnicities inhabiting the territory of the Republic of Kazakhstan, about their traditions, customs, language, national clothes, and dishes, holidays, decorative and applied arts etc.	
October **Events dedicated to jobs**			
1	Preliminary work	Knowledge building related to the topic	Didactic games, exercises, reading fiction, watching presentations and videos
Museum			
2	"Minerals and fossil fuels of our region. Geologist's Job"	To get acquainted with the minerals of Kazakhstan and some of their properties; To consolidate the knowledge of children about their hometown, to introduce them to the geologist's job.	Game travel
Showroom			
3	"Labor Man"	To form active citizenship and patriotism, respect for the history of the country, pride in labor exploits and civic consciousness of the older generation.	Excursion
Class			
4	"Labor adorns Human"	To form an idea of the labor of people, to acquaint children with the types of labor in urban and rural areas.	
November **Events dedicated to the First President Day**			
1	Preliminary work	Knowledge building related to the topic	Didactic games, exercises, reading fiction, watching presentations and videos
Museum			
2	"The sky of my childhood"	To foster respect for the government, for the President of the Republic of Kazakhstan, to build knowledge about him; Develop children's cognitive interest; To foster Kazakh patriotism.	Film viewing session
Showroom			
3	"Walks and impressions" (exhibition of the works of a local painter)	To foster, among modern children, a sense of belonging to the traditions of their people; To attract the attention of primary schoolchildren to the cultural heritage and traditions of their ancestors.	Excursion
Class			
4	"Kazakhstan is my pride"	To form children's ideas about the Republic of Kazakhstan, about Astana - the capital of the Republic, about Almaty - the former capital, and about the President of the Republic.	
December **Events dedicated to the Independence Day of the Republic of Kazakhstan**			
1	Preliminary work	Knowledge building related to the topic	Didactic games, exercises, reading fiction, watching presentations and videos
Museum			
2	"Independence Day of Kazakhstan"	To acquaint children with the history of the formation of an independent Kazakhstan; Expand knowledge of the state symbols of the Republic of Kazakhstan; Foster patriotism.	Conversation
Showroom			
3	"Prosperity and Unity"	To form a civil patriotic position with the help of exhibits.	Excursion
Class			
4	"A gift to the president"	To form active citizenship and patriotism; To help primary schoolchildren to cultivate such qualities as friendliness, sensitivity, and mutual assistance; To foster a sense of active participation in the life of the country.	Contest
January **Events dedicated to the hometown**			
1	Preliminary work	Knowledge building related to the topic	Didactic games, exercises, reading fiction, watching presentations and videos

Museum			
2	"Legends of our town"	To acquaint children with the history of their hometown using legends; To acquaint children with the life, traditions, and customs of their ancestors; To expand the understanding of the traditional crafts of the past; To foster, among children, love for their native land.	Theatrical performance
Showroom			
3	"Nature and people of our land"	To develop a cognitive interest in the study of nature, history, and culture of the native land through the works of art.	Excursion
Class			
4	"My family and me"	To form knowledge about the meaning of creating a family, to teach to name family members correctly, to talk about them, to teach how to build relationships with family members, to expand knowledge about the importance of parents' work for the homeland, to foster love and respect for relatives and friends.	
February **Events dedicated to prominent people of the hometown**			
1	Preliminary work	Knowledge building related to the topic	Didactic games, exercises, reading fiction, watching presentations and videos
Museum			
2	"Poets and writers of our home region"	To acquaint children with famous poets and writers of their home region, their creativity, and achievements.	Literary reading
Showroom			
3	Personal exhibition of a local painter.	To acquaint children with the work of a local painter, and to explain that the artist expresses his/her attitude to the world with his/her works; To give pleasure to the audience, to give children moments of communication with the beautiful.	Excursion
Class			
4	"Attempt at writing" "Young artists"	To form a creative and socially active person; To provide primary schoolchildren the opportunity to show their creative abilities under the guidance of parents.	Contest
March **Events dedicated to the Nauryz holiday**			
1	"Games of the Kazakh people"	Showing interest in the customs and traditions of the Kazakh people; Tolerance education.	Celebration
Museum			
2	"Customs and traditions of the peoples of Kazakhstan"	To acquaint children with the traditions and customs of the peoples inhabiting the territory of Kazakhstan; To foster patriotism through the study of the cultural heritage of the peoples living in Kazakhstan.	Quiz
Showroom			
3	Exhibition of decorative and applied art "Kazakh carpets" (from a regional ethnographic museum)	To acquaint children with decorative and applied art pieces of the Kazakh people; To help primary schoolchildren become aware of the main features of national art, to associate them with the climatic conditions, customs of people, lifestyle, and nature of work.	Excursion
Class			
4	"Nauryz, a bright holiday"	Knowledge building related to the national holiday, the traditions and customs of the Kazakh people.	
April **Events dedicated to the Kazakhstan People's Unity Day**			
1	Preliminary work	Knowledge building related to the topic	Didactic games, exercises, reading fiction, watching presentations and videos
Museum			
2	"Under the single shanyrak"	To foster patriotism and to develop active citizenship by studying the history and culture of sovereign Kazakhstan; To form a positive image of the homeland, a sense of pride in the achievements of their country; To form a sense of pride in the hometown, its glorious traditions, and respect for them; To study the peculiarities of the cultural values of	Celebration

		the Kazakh people.	
Showroom			
3	"Children's art school"	To form a respectful attitude to the historical and cultural traditions of all peoples, to their lifestyle, and ethnic characteristics; The harmonious development of interethnic relations, the promotion of peace and friendship between nations via painting and sculpture.	Excursion
Class			
4	"Commonwealth of Countries"	To acquaint children with the names of the countries neighboring with Kazakhstan, to tell them about the Commonwealth of Independent States, to cultivate a friendly attitude towards all peoples regardless of the country in which they live.	
May **Events dedicated to the Defender of the Fatherland Day** **Events dedicated to the Victory Day**			
Museum			
	"Rear-front"	To reveal the role of the rear in ensuring victory over the enemy in World War II; To acquaint children with the main activities of the government in organizing resistance to the enemy; Foster patriotism and faith in the power and strength of the people; To acquaint children with the contribution of their home region to the defeat of the enemy.	Meeting with veterans
Showroom			
	"Nobody is forgotten, nothing is forgotten" (from a regional Museum of Arts)	To show, via visual artworks, the destiny of soldiers and workers of the rear of the home region.	Excursion
Class			
	Defenders of the Fatherland	To form ideas about the People's Army and about military branches; To cultivate respect for the soldiers of the Kazakh Army, the desire to be like them.	
	"Lasting memorial"	To form active citizenship on the basis of knowledge about World War II; To cultivate respect and pride for front-line soldiers and war-time workers of the hometown.	
	"Traveling around the country"	Determining children's level of knowledge and training in moral and patriotic education.	Intellectual game (diagnostics at the end of the academic year)

4 Conclusion

Every person needs to know the native nature, history, and culture of the people to which he/she belongs and his/her place in the world. We must be sure that children and grandchildren will be fine in the future; we must respect ourselves and teach this to others. If the integrity of this process is broken, the link between generations will collapse. Fostering patriotism is and will be one of the main components of the education of little citizens.

Patriotism is the main feature of the peoples of Kazakhstan; it helps to cultivate feelings of love for the native land and the world. It depends on adults what children will be like, what they will carry out from childhood.

In the general system of educational work in primary school, moral and patriotic education occupies a very large place, so the foundations laid in primary school will help to successfully solve the main task - to be an active citizen and

patriot for the city, the region, the homeland. (21-23)

The development potential of local history is unusually large. A pupil who discovers new sides unknown to him/her in the historical development of his homeland feels like a pioneer. During training, a student begins to grow as a citizen: he/she acquires such qualities as national pride and the ability to sacrifice himself/herself for the good of the homeland. A local history lesson at primary school can and should be emotionally colored. (24) During a lesson, a teacher should be "warm": kind, positively accepting the child as he/she is, emphasizing good, rather than bad life experience. At its core, local history studies at school are a comprehensive study, under the guidance of a teacher, of the natural, socio-economic and historical conditions of the native land. Local history studies are the lessons of civic studies, which help the student to form his/her own system of values, in which patriotism is in the first place. Patriotism begins with the love for the hometown and the home regio.

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THEORETICAL ASPECTS OF FUTURE TEACHERS INTELLECTUALITY DEVELOPMENT

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Abstract: The purpose of the study is to identify the main problems and prospects of the education system in the context of innovative development, as well as intellectualism of future teachers. The authors of the article conducted a factor analysis of the ongoing reforms in the education system. The transition of the economy to the innovative way of development and the overall socio-economic situation in Kazakhstan and other countries requires a rethinking of some priorities prevailing in politics and focusing on building a new type of society based on the development and mutual integration of three main elements such as education, innovation, and research. These elements are impossible without intellectualism and critical thinking. The formation of innovation policy should contribute to the development of a set of measures in the system of higher professional pedagogical education that organize and stimulate innovative activities and promote the integration of education in the scientific and technical space. This integration process will serve as the basis for the formation of the strategy and tactics of innovative development based on intellectualism and critical thinking.

Keywords: intellectualism, personality formation, pedagogical education, innovative development, fundamental knowledge.

1 Introduction

It is necessary to develop and create more and more civilized conditions for the development of the invaluable mental capital inherited from the former education system. Given these external and internal challenges, the education system is going through a period of deep and phased strategic modernization. Moreover, since the core and the basis of the educational process is the formative and training process, its restructuring always plays a key role.

Modernization should affect all levels of the educational process and especially primary and higher ones. The period of youth should be the subject of special state responsibility because the foundation of the future is laid in the present. Regardless of internal and external circumstances, global crises, climate change, displacement of magnetic poles, growth of anthropogenic impact on the environment, etc., the absolute priority is to ensure the synchronous development of the intellectual, physical and social components of the young generation for the formation of harmoniously developed personalities, builders of the future of humanity. In a broad sense, the history of the civilized development of humanity is a continuous process of expanding consciousness, which was provided by the developing contours of the educational system based on the continuous growth of the level of cultural and technological development of human society.

In general, as the history of human development shows, all its education systems have always been aimed at the formation of a harmoniously developed personality for their epochs, in accordance with the tasks of development and the challenges of time. As the level of scientific, technical and cultural development of humanity increases, there is a steady increase in time spent on the educational process. In the early stages of the Industrial Age, the time spent on human education was a necessary condition for the formation of a harmoniously developed personality. In addition to basic fundamental knowledge, it is also necessary to form intellectual, physical and social competences, which takes about 27 years (from the age of 3 to 30 years) or almost half of the active human life. Such is the "life fee" for the formation of a person fitted to the conditions of competitive functioning in the new environment. The development of new technological paradigms implies the need to modernize constantly the system of pedagogy by expanding the use of new educational technologies. The education system in the period of global development will certainly require the application of knowledge and experience of the whole of Humanity in the pedagogical activity through a wide exchange between scientists, teachers, schoolchildren, and students, borrowing new curricula and advanced learning technologies and practices. A graduate of the national education system must have all the knowledge and skills similar to those adopted in advanced educational systems of developed countries of the world, and only then he/she will he be able to compete on equal terms in the global economy of the 21st century.

The most important condition for the successful implementation of the trajectory of education is the correct choice of the type of strategy for building an education system, which should go one step ahead in relation to the type of economic development. Often in world practice, people are trying to achieve accelerated development or a modernization breakthrough in the development of the national economy, while continuing to maintain the inertial type of development of the education system. In this state, the existing education system cannot adequately contribute to economic growth and turns into a deterrent to the current and further development of the national economy. It is known that during transitional periods and periods of growth and modernization, a significant change in the structure of the economy takes place: new technologies are created, new goods and services are produced, new markets are developed and information communications are intensively formed, which in total radically changes the requirements for the level of training and retraining. (1-2) Under these conditions, the level of development of the education system should be ahead of the level of economic development; this should be the norm for future success in economic development since a lag in education always leads only to the restraining of the development of any type of society.

Today, when Kazakhstan and other countries enter a new stage of their development, complex studies in various areas of social development are particularly relevant. One of these topical issues is the problem of the formation and development of an intellectual nation, the support of a state, the basis for the further development and prosperity. This problem is multifaceted; it covers many areas, such as the formation of intellectual society, the multiplication of the people's intellectual potential, and the strengthening of the media information policy for forming the richest intellectual nation.

In the modern world, human capital is one of the most effective factors of socio-economic and political development. It has become the main instrument for the formation and development of the innovation economy and the knowledge economy as the highest stage in the development of the world economic system today. The basic development methodology of the United States and leading European countries is based precisely on human capital, which accounts for more than 70-80% of their national wealth. (3)

It can be stated for sure that concern for the development of human capital is one of the foundations of building a new society. (4-5) The three basic aspects of the formation of an intellectual nation are a breakthrough in the development of the education system, the development of science and the increase of the country's scientific potential, and the development of an innovation system. (6-7) These areas should constitute the main vectors of scientific-pedagogical research in Kazakhstan and other countries. The strategic task of any complex research related to the development of intellectualism is to trace the

patterns of development and improvement of social processes taking place at a given time in society.

The need to understand and comprehend social change is acutely felt by all social scientists and educators. The results of large-scale empirical research will certainly become the basis for building the concepts of the transformation of society and pragmatic technologies for the regulation of the modern historical process including the development of intellectualism of future school teachers.

2 Materials and Methods

At the present stage of development of society, it is necessary to abandon the economic paradigm of education. The most important paradigm of science should be the original, unique personality with an individual system of values, personal meanings, and attitudes. Therefore, the basis of the learning process should be technology that can ensure the development of personal potential: the inclinations and abilities of a growing person.

In that light, science needs to rethink theoretical positions, adapting them to the practical application in the pedagogical process. R.A. Gilmanov (8) notes that pedagogical science is still largely at the level of empirical phenomenological research. The quest for quantitative certainty of qualitative pedagogical patterns is a vital necessity. Without scientifically based measurements, an objective analysis of the pedagogical process is impossible. (8) Hence, the task of translating pedagogy from the level of an empirical description of observed phenomena at the phenomenological level, their qualitative explanation and verbal description to the level of modeling the essence of phenomena with quantitative methods for describing and applying models is put forward. In science studies, modeling the essence of phenomena with quantitative methods of description is the third step in the formation of scientific knowledge. The fourth step is the design of technology that in practice can provide the detection or tracking of functioning or the implementation of pedagogical patterns. The peculiarity of pedagogical processes is the impossibility of their absolute reproduction in all the details of research.

One of the first attempts to give a theoretical understanding of developmental education based on a peculiar understanding of the nature of humans, society, and education was undertaken by the ancient Chinese philosopher Confucius. In Confucianism, education is understood as the development of human qualities given by nature. He considered these qualities as a natural material for educating a perfect person. Confucius anticipated the idea of the need to find a good quality in every child and try to maximize it. Human essence must be developed in every person. Human is the most perfect being on earth, who has the right to unhindered development of all his powers and talents. Learning and development appear as a system of dialectically interconnected aspects of one process. Education is the leading driving force of mental development and of the formation of the totality of personality traits.

The process of personal development, i.e. the assimilation of experience of previous generations, has its own laws in terms of the sequence of its deployment; it has its stages, due to the age characteristics and logic of the material being mastered. At the same time, personal development is one of the main functions of the activity. The development of the subject himself/herself is a product of activity. P.Y. Galperin (9) noted that any activity can be called learning, “since, as a result, the performer of the activity acquires new knowledge and skills or previous knowledge and skills acquire new qualities.”

Not all activities are suitable for the formation of positive qualities. Therefore, a significant role in the modern concept of education is played by a principle concerning the leading type of activity that provides the necessary conditions for the successful development and formation of personality. Learning combined with other activities provides such conditions for a wide age range.

The development of self-awareness is studied as part of the development of the intellectual aspect of personality since the concept of “personality” as a cultural and social education is equal to self-consciousness, and what is commonly called personality is nothing other than the self-consciousness of a person. At the same time, in the process of developing self-awareness, the control of one’s own psyche and one’s own behavior occurs, the dependence on external factors decreases. Therefore, among the most important elements of personal development, the development of will is distinguished, which allows one to act under the influence of one’s own worldview. The fundamental unit of a personality being formed is the law of construction and development of higher mental functions. L.S. Vygotsky (10) insisted on the fact that personality does not come down to individual functions and protested the view of the combination of these functions as “a bundle of cut branches put in one vase.” L.S. Vygotsky (10) defined the system underlying the personality formation as not branches but shoots of a growing tree having their own developmental logic different from the mechanisms of “implanting cultural forms of behavior” from the outside to the inside. Thus, development should be understood as a process where any subsequent change is associated with the previous one and the present, in which the previously broken personality traits manifest themselves, that is, “every new development step is directly determined by the previous step, by all that is already broken and originated in development at the previous stage.” (11)

In the theory of developmental learning, the basic concepts are learning and development. It is generally accepted to define learning as a joint activity that ensures the assimilation of knowledge and the mastery of ways of acquiring knowledge. Relations in the learning process are indeed a joint activity. The essence of such relations in the traditional system of education is that “the teacher leads the students to the intended goal (and the more firmly and confidently he/she does it, the better), while the students follow the teacher (and the more precisely they follow his/her instructions, the higher their chances of success are).” (11) In the system of developmental education, the essence of the relations between teachers and students is to help determine the next goal and find the best path to it. In the course of the educational process, it is necessary to organize the educational search activity, analyzing the real course of training and building a forecast of its deployment.

The organization of educational activities has a significant impact on the development of personality. There is a principle of holistic learning activities and their impact on development. The formation of learning activities according to this approach implies the independent formulation of learning tasks, comparing different ways of learning actions and choosing the most appropriate one, as well as owning all types of self-control and self-assessment. The most significant factor for intellectual development is not individual aspects of learning activities but holistic activities including the motivational understanding of the learning task, operational (strictly learning) and the regulatory component (control and self-control). Learning performed in the form of a holistic cognitive activity is itself a characteristic of intellectual development.

The educational and cognitive process reoriented to intellectual development is based on the following basic principles: if there is a learning cognitive process, then there is a process of its development. At the same time, knowledge and motives act as conditions for the psyche's development of personality. Levels of intellectual development are defined as the zone of current development and the zone of proximal development.

3 Results

In order to solve the tasks, set in the research, it is necessary to strengthen scientific training of personnel, as well as awareness of the significance and role of the humanities, i.e. recognition of a person as the most important social value and the respect for his/her personality. The educational system should provide a high level of training for graduates, in particular, within the

framework of the system of higher professional pedagogical education. To improve the quality of training and the level of integration of the educational services market in services in demand on the labor market, it is important to choose an innovation-oriented way of development of the educational system. (12-13)

The transformation and modernization of the educational space in Kazakhstan and other countries are quite active, and these processes affect both the structures and functions of the educational system as such, the technology of education, and the informative characteristics of the educational process as a whole. However, these processes are not without contradictions, internal and external problems, and this confirms the need for research the development and functioning of all educational systems including continuous ones, networks of educational institutions and, of course, individual institutions.

When paying attention, for example, to the level of humanities knowledge of graduates of secondary and higher education, the inconsistency of the educational system with the requirements dictated by the modern development of society can be noticed. The following disappointing conclusions are obvious, such as poor knowledge of foreign languages, low level of knowledge of the literary normative language, low ability to express logically their thoughts, insufficient knowledge of the world and national history, cultural history and its values, as well as legal, economic and political illiteracy. Given these internal and external challenges, the education system must undergo a deep phased strategic modernization. The formative process is the basis of the educational process, so its modernization always plays a major role.

First of all, modernization affects secondary education, which is characterized by the following areas:

- development of actual literacy of students (for example, in Kazakhstan, for the first time in the territory of the former USSR, a National Action Plan was made up to develop functional literacy for 2012-2016, which provided for the development and reinforcement of pupils' competences, the ability to effectively apply their knowledge in real life situations);
- pilot implementation of e-learning (by the beginning of 2020, a relevant project should cover 90% of schools, digital educational resources such as e-books, libraries, and constant access to the world's best educational resources will be the new attributes of the school education system);
- transition to 12-year education;
- learning English at all levels from elementary school to university. From September 1, 2013, the study of English from 1st year of school is implemented in all Kazakh schools;
- educational work within the framework of the National Plan aimed at forming in general education schools a spiritually, physically and intellectually developed members of society, capable of creative thinking, able to choose the right professional way and ready to develop throughout life;

Practice shows that at present, many institutions of the educational sector, when forming their management system including that related to innovation, use expert-empirical approaches based more on the experience of their own (or competitors'), as well as on the intuition of decision-makers. (14-15) At the same time, it is necessary to develop certain systems of principles and/or concepts that could be used by any higher educational institution in determining their own development trajectory in the external environment, more and more resembling a competitive one, on both the research and educational markets.

The survival and success of a higher education institution is largely related to the selection and organization of three integrated processes in the management system (16):

- quality control;
- innovation management;
- intangible asset management (obtained as a result of research activities).

The latter means the transition of the leading universities in Kazakhstan and other countries to the research university format implying significant changes in the educational process. In developed countries, universities are in fact the powerhouses of basic research. Although applied research is conducted there, it does not seem to be the face of academic science as such. As a rule, research departments of large companies and scientific research institutes carry out applied research.

Fundamental and applied types of research are two completely different types of activities. (17) Fundamental research deals exclusively with the increment of new knowledge, while applied research deals only with the application of proven knowledge. Gaining new knowledge is the vanguard of science, which tests new knowledge, i.e. it is the substantiation and verification of knowledge once obtained, the transformation of current research into the "hard core" of science. A practical application is an activity of applying "hard-core knowledge" to real-life problems. (18) As a rule, the "hard core" of science is displayed in textbooks, teaching aids, teaching materials and all sorts of manuals.

One of the main signs of fundamental knowledge is its intellectualism. As a rule, it has the status of scientific discovery and is a priority in its field. In other words, it is considered to be exemplary and model. (18)

One of the most important problems of higher education is the optimization of the correlation of the fundamental and applied types of research, the transition of education to a holistic picture of life and, above all, to the world of human, culture and the formation of the systemic thinking of an individual. Theoretical and fundamental knowledge can ensure the future existence of humanity in the world. The solution to this problem lies, firstly, in the need to strengthen scientific training. Secondly, it lies in recognizing the significance and role of the humanities, i.e. the recognition of a person as the most important social value, respect for his/her personality, the creation of opportunities for the discovery of abilities. (19)

Taking into account the current state and trends in the development of higher education in the context of the evolution of socio-economic relations, it should be noted that the interpenetration of innovative progress with the processes of training highly qualified scientific and technical specialists has become intensive and dynamical. The market orientation of universities is a determining factor in the designation of their scientific and technical potential. Higher education is the center of science and culture from the standpoint of socio-economic development. The system of professional higher education is characterized by fundamental and multidisciplinary training of students, which will make it possible to continue studying at a university at all subsequent levels. Independent work and individual forms of education share a significant proportion of the academic workload of universities. Taking into account the dictates of time, the shift of emphasis from educational activities to the scientific aspect can allow to solve most of the problems of training and retraining of personnel in accordance with modern realities.

The system of higher education training activities is based on the integration of the innovative potential united in the system of higher education institutions. Accordingly, both strategic and tactical orientations of higher educational institutions are based on a scientific and innovative foundation. (20) Science should be the main activity of the university; therefore, the modernization of the higher professional education system should be oriented towards this. Innovations in this area are an indispensable element for obtaining a high level of specialist training and improving the financial and economic position of a higher education institution.

It is equally important to take into account the opinion of experts about possible priority measures that would increase the

competence of specialists in descending order of importance. In particular, these measures include ensuring a stable and sufficient funding, raising teachers' salaries, providing a modern information environment, modernizing logistics capacity, creating conditions for financial and economic growth in the real manufacturing sector, developing research work in higher education institutions, an appropriate provision with textbooks and teaching aids, refresher training of teachers, renewal of educational standards and programs, toughening qualification requirements for teachers and students, and strengthening the competitive selection of applicants and students. (21) It is easy to see that the first four measures require a significant increase in funding for higher education, and the implementation of the full range of measures (and not only those mentioned above) requires significant institutional changes in the higher education system. The problems of higher education in such countries like Kazakhstan are due to the difficulties related to their transition to a new social system. At the same time, they not unique in their nature and should be considered in the global context of transforming the foundations of the education system in an information society, taking into account the globalization of politics and economics.

Higher education in its essence is both science, education through science, and science as the goal and result of innovative development. The development of each specific institution of higher education requires the formation of strategies and tactics based on its own innovative potential. Such a potential will strengthen their competitive advantages, will maintain their niche at all stages of innovation development, will predict needs for the forms and volumes of educational services, as well as will develop, rank and replicate products of innovation activities on the market.

The information and research environment form the creative activity of higher educational institutions. (22) The integration of higher education in the scientific and technical space should be organized and stimulated through the formation of innovative policies in the development of a set of measures for the higher education system. These integration processes should serve as the basis for the formation of tactics and strategies for the innovative development of the education system.

4 Discussion

We can say the emotionality of Sudeykin is a special nature, it's not open but it's directed to the viewer. The choreography is unique art of its kind in many respects. The empathy and co-creation play a significant role in the ballet. The artist encourages viewers' activity, realizing this he outlines only basic contours of the psychological state of the characters but otherwise, he relies on the viewer's imagination.

Duo or a group of dancers usually are placed in the foreground of S. Sudeykin's compositions who divides into separate pieces gradually shaded by the sidelined. The duo who comes into the picture, doesn't include "plug-divertissement" and it constitutes its atmosphere, it superimposed on its background exactly. There are no formal protagonists in the pictures. The group is their hero but also the life of this group doesn't exhaust the content of the work. Allegorical figures of animals, cupids, and angels are so

beautiful and significant for Sudeykin, they wove into the character and melody of their dance quite organically, full of the cloth fine narrative because Sudeykin's ballet is a ballet-tale, a ballet joke, a ballet-irony. The dancers know the value of silence, introspection, dive into some state unknown for us.

The topic of the landscape arises in collaboration with the characters. The environment nature in Sudeykin's works is an essential part of that helps him to discover his own original method of understanding and interpretation of ballet story. The picture of the "Ballet" (1910, GRM) is particularly revealing in this regard. Nature and dance are probably the main theme of this work. Its meaning is dissolution state mind of the hero in the environment. The life of nature and the life of the soul, the nature of mood and the mood of dance are equal to each other. These traits become central here manifested before in other works, their vague contours coagulated, symbolism acquired some kind of poetic visibility. We must not forget that we are talking about sentimentalism in the poetics of which a landscape inspires the soul, calms passions, harmonizes the world. An equal cool color of the "Ballet", giving a symbolist to feel a credo, is an aroma of flower fairy "Blue Rose", it differs from a live color smear "Ballet pastoral" or "Ballet apotheosis". Dancers in white and purple glare looked like hallucinations as they are woven from the water, mist, and fog. They are gently modeled by the artist, lose real contours, dissolve in feathered contours of blue landscape engaging with each other in pictorial and spatial harmony.

"Russian Ballet" (1931, OAM), "Russian Ballet. La Sylphide" (1930, OAM) of K. Somov - these works, as well as works of S. Sudeykin are interesting not so much for the foreshortening theme as expressed in it the artistic view of life is formed by the distance, which the preterit set. That is why the theme of these works isn't the ballet and rather emotional memories of it. A dreamy illumined image of Sylphide returns us to the engravings of the 19th century, to the images of M. Taloni and A. Istomina, the then romantic direction in the ballet. But the fundamental difference between the

works of Somov consists in other, it consists in an effort to see the ballet plot ambiguous, not straight forward and in the unity of the diverse qualities.

5 Conclusion

Psychological and pedagogical knowledge is a specific methodological principle of analyzing practical situations and criteria for evaluating the effectiveness of actions performed by a teacher. It is possible to express real changes in the levels of knowledge and personality formation of students only in psychological terms. Such changes occur in practice and are the psychological result of interaction in the educational environment. Theoretical knowledge determines the level of professional competence of a teacher, which is manifested in his/her ability to navigate in socio-pedagogical situations that are constantly changing, and to solve pedagogical problems quickly and correctly. (23-24)

Cognitive skills are based on developed perceptions, attention, thought, imagination, and memory. These skills form the intellectual basis of a future teacher's professional work. Cognitive skills imply the ability of an individual to perform logical thinking operations (analysis, synthesis, comparison, classification, selection of the main thing, etc.) effectively in the process of mastering the system of psychological and pedagogical knowledge, and problem solving in the process of professional activity. (25) Communication skills help a teacher to communicate with colleagues, students, and their parents, to exchange information and thus to establish pedagogically expedient relations with them.

The development of pedagogical thinking at the preparatory stage in higher pedagogical educational institutions implies, on the one hand, the assimilation of the system of theoretical knowledge and practical skills by future teachers. On the other hand, it implies mastering the logic of pedagogical thinking, which eliminates the spontaneity of learning methods and techniques of pedagogical activity and determines the logic of learning. (26-27) Consequently, the transition to competence-based education actualizes the importance of such a component of the future teacher's professional competence as pedagogical thinking - an integrative characteristic that is based on fundamental knowledge about the features of pedagogical activity, provides a generalized and indirect reflection of professional reality, adequate promotion, and solution of professional tasks. (28-29) This integration implies singling out four interrelated components in the structure of pedagogical thinking:

- cognitive component (professionalism of methodological, psychological, pedagogical, methodical, and technological knowledge, the cognitive orientation of thinking);
- motivational component (professional and pedagogical attitudes, interests, needs, orientation to the manifestation of pedagogical thinking, its development, and improvement as an important value);
- operational component (possession of the cognitive, communicative, organizing, and design skills in the process of implementation of pedagogical thinking and presentation of its results);
- reflexive component (awareness, critical analysis, determination of ways to improve pedagogical thinking and relevant professional pedagogical activity).

The teacher is not only a profession, the essence of which is to transmit knowledge and experience to the younger generation, but a high mission of creating a personality. Given the leadership role of teachers in this activity, society always places high demands on them. These requirements are objective. They include requirements for the teacher's personality and erudition, for the qualities that determine his/her attitude towards children and pedagogical activity in accordance with the moral norms of modern society:

- high civic responsibility and social activity;
- love for children, need and ability to give them the heart;
- genuine intellectualism, spiritual culture, the desire and ability to work together with others;
- high professionalism, innovative style of scientific and pedagogical thinking, readiness to create new values and make creative decisions;
- need for constant self-education and readiness for it;
- physical and mental health, professional performance. (30-31)

Building up such competencies is a long and complex process, which includes the need to adapt, for these purposes, not just individual areas of social and economic policies (primarily, education policy) but also the public environment as a whole. It implies the formation of a "climate" in society, providing freedom of creativity and self-expression, encouraging and rewarding people for their competences and their success achieved through their use.

Modernization of pedagogical education is an integral part of the process of modernization of general education since both processes are based on strategic guidelines for the development of the education system, as well as on planned and implemented innovative projects. The analysis of the conducted research of general and pedagogical education allows to highlight the general results that characterize the essential changes in the education system that occurred during the previous stage of modernization. These results are the following ones:

1) Characterization of the modern educational paradigm, new values of the renewing education, namely: understanding of a teacher as an intermediary between students and the culture; understanding of education as a process, the driving forces of which are the search for personal meanings, dialogue and cooperation of its participants; understanding of the educational process as a process of cultural identification of students in the multicultural space of the dialogue of cultures; the formation and development of the cultural identity of an individual; various forms of expression of human individuality.
2) Justification of the legality and inevitability of building a general and pedagogical education on the ideas of the competence approach as the current stage of the research on the activity basis of education.
3) Characterization of key competencies that are formed in school as the basis for the formation of general professional and special professional competencies of a future teacher at a university.
4) Identification of new professional functions and tasks of a teacher in a modern school as the basis for constructing the content of future teacher training.
5) Substantiation of the new architecture of the educational process in schools and universities on the basis of a study of the diversity of individual educational routes and the non-linearity of the educational process.
6) Identification of the factors that have the greatest influence on the educational achievements of students related to their and teachers' personalities, and to the organization of the educational environment.

The development of the results obtained in the context of the tasks of sociocultural modernization determines the choice of an appropriate methodological basis. This research makes a significant contribution to the development of existing ideas about the continuity of education, the impact of education on the formation of a person, which will allow to discover new development orientations of general and pedagogical education.

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LEXICAL FEATURES ASSOCIATED WITH THE LIFESTYLE OF THE KAZAKHS IN CHINA

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Abstract: The language of the Kazakh people living abroad is studied in the Dialectology of the Kazakh Linguistics in the late 60s of the last century. The peculiarities of the language of the Kazakhs living outside the Kazakh land is considered along with the dialect of the Kazakh land according to their location and closeness of the genus in the structure of a particular group (the western, southern, north-central, eastern) of dialects.

Keywords: language, history, Kazakh dialectology, terminology, Kazakh language, literary language, Diaspora, Kazakh people, folk literature

1 Introduction

Besides Kazakhstan, the Kazakhs live in over fifty countries. The main part of the Kazakhs lives in the countries bordering with Kazakhstan. The largest Diaspora of the Kazakhs are in China (2.7million), Uzbekistan (1.5 million), and Russia (1.2 million). (1) Since gaining independence in 1991, about 1million ethnic Kazakhs (repatriates) returned to the country. Kazakhstan is one of the few countries in the world such as Germany, Israel, Greece, and Russia, dealing with problems of ethnic compatriots.

Kazakh-Chinese relations have deep historical roots. For several centuries, these countries have experienced periods of diverse political interactions. (2-3) The latter include mutual hostility, misunderstanding of each other, territorial disputes, wars, etc. Since deep antiquity, both countries have sought to learn, and often, to conquer new lands. Accordingly, this led to provoking bloodshed. Nevertheless, there was another form of relations, i.e. trade, which had the main role in influencing the establishment of peace processes. The Silk Road occupies a special place in such processes, connecting, in particular, Kazakhstan and Central Asia with China, and globally connecting Europe with Asia. Its famous story has absorbed the best traditions of human relationships.

The Silk Road also serves as a definite source for analyzing historical processes not only between the two states but also throughout Asia in general. Historical roots are the source and support for the development of bilateral cooperation of neighboring states such as Kazakhstan and China, and their peaceful coexistence. It is not by chance that there is a saying in both Kazakh and Chinese: “A close neighbor is better than a distant relative.” It is significant that, in the regional context, the ancient policy of Kazakhstan has not undergone significant changes until now. Ablai Khan sought to ensure good neighborly relations primarily with Russia, China, Khiva, and Bukhara. These same issues are high on the agenda of the policy of the new Kazakhstan. (4-5)

In the twentieth century, relations with China were complex. On the one hand, the Kazakhs have repeatedly found salvation and protection in China, fleeing from the tsar's punishers in 1916, from the famine of the 20s and then the 30s. Thanks to this, the largest foreign Kazakh diaspora has been formed in China, and the language, culture, traditions, and customs have been preserved there. On the other hand, the Kazakhs do not cease to see their eastern neighbor as a threat to their security. The proverbs retain anxiety in this connection: “In the Chinese captivity there are tight nooses, and the Russians have wide nooses”, “When Black Chinese surround on all sides, Russians will seem dearer than the father”, “The Chinese conceive a trick for 40 years ahead.”

Ospan Batyr, who fought for the creation of Kazakh autonomy in the PRC, was persecuted. In this struggle for the freedom of the Kazakhs, he paid with his life. The postwar years of the Soviet era also cannot be called serene. The two peoples started as “brothers forever”; at school, the correspondence between schoolchildren from different countries of the socialist bloc was practiced. In 1958, the young Nursultan Nazarbayev entered into a correspondence with a teacher at the secondary school No. 5 of Zigong City, Sichuan Province, Zhou Bai-Xiao. (6) Moreover, in the 60s there was a worsening of relations, right up to military conflicts. It was with such a legacy that we entered into a new relationship in 1991. (7-8)

Diasporas began to attract close attention of researchers only from the late 1970s. It was then that a number of works appeared, mostly of American scientists, which served as the starting point for further research of a wide range of problems generated by diasporaization. A truly broad scope of the diaspora themes has appeared only since the 1990s when diasporas began to acquire the features of transnational communities. As the well-known expert on ethnic issues, Professor of the University of California R. Brubaker (9) notes, in the 1970s the word “diaspora” or similar words appeared as keywords in dissertations only once or twice a year, in the 1980s it was 13 times, and in 2001 it was 130 times. Interest in this topic is not limited to the academic sphere, but also extends to paper and electronic media. Currently, the Google search engine contains more than a million references to the word “diaspora”. (10)

At this stage, the historiographical information of domestic researchers on the problem of the formation of the Kazakh diaspora is becoming large-scale and gaining momentum since this topic got its relevance only in the second half of the 1990s, after gaining and establishing the sovereignty of the Republic of Kazakhstan. (11-12) Up to this point, this problem has not been studied, due to censorship and ideological bans on many studies related to ethnopolitical and other processes. Many studies on Kazakhs outside the USSR that were conducted during the Soviet period were not something that did not find their relevance but they did not reach the press as they were subjected to harsh criticism for ideological reasons, and the authors of the studies were often in repressive circumstances and, accordingly, they could no longer continue their research activities. In Soviet historiography, there was the only monograph on the Kazakh irredenta in China, that of G.V. Astafyev entitled “Kazakhs of Xinjiang” but again, in favor of internationalism, peace, and friendship with the PRC, important issues in the territorial and political respect were smoothed out, and the Kazakhs of Xinjiang turned from irredenta into a diaspora. As for the articles on the historical and ethnographic problems of the Kazakhs of China, the notable example of it is the article by N.N. Mingulov (13) entitled “The National Liberation Movement of the Peoples of Xinjiang as an integral part of the Chinese Revolution (1944-1949)” published in the collection “Questions of the History of Kazakhstan and East Turkestan,” and then translated into English and published in the journal Central Asian Review with the title “Uprising in northwestern Xinjiang, 1944-49”.

The history of the media in the Kazakh language in China begins in the mid-1930s. Then in the Altai, Tarbagatai and Ili districts of Xinjiang province, the first newspapers and magazines in the Kazakh language were published. Such publications made attempts to arouse the interest of the Kazakhs in their past, to recall the rich culture and traditions. (14-15)

A new impetus to the development of the media in the Kazakh language in China was given after the proclamation of the People's Republic of China and the emergence of Kazakh autonomies in its structure in the mid-1950s. At present, according to the deputy editor of the Kazakh editorial office of the main daily newspaper of Xinjiang Uyghur Autonomous Region (XUAR) of the People's Republic of China "Xinjiang Ribao" ("Xinjiang Gazeti"), Adil Semeyhan, in XUAR, both at the level of the autonomous region and at the district level, a sufficient number of periodicals of various formats are published in the Kazakh language. (16)

Detached from the main ethnic territory at the beginning of the 20th century, Kazakhs from China are of considerable interest to analyze the changes that have occurred during this period in their traditional culture, language and self-consciousness as a result of contacts with the surrounding peoples such as Uyghurs, Dungans, Tatars, Uzbeks, and others. Since the late 1950s, the People's Republic of China openly advocated a program of forcible assimilation of non-Han peoples, one of the manifestations of which was the abolition of the Arabic alphabet for the Uyghur and Kazakh languages and the introduction of the Latinized script, which was based on the Chinese phonetic alphabet. Turkic ethnic minorities were forced to learn Chinese and forcibly introduced to the Chinese cultural traditions, which practically led to the ban of development of their own ethnic cultures. All this led to outrage from the non-Han peoples, especially the Kazakhs and Uyghurs, which led to repression by the Chinese authorities. These repressions caused the Soviet-Chinese border crossing, at first, by small groups, and then a massive flow of refugees from China. (17)

The features of the language of about half a million Kazakhs in China are distinguished with a variety of territorial characteristics and diversity. Firstly, the number of Kazakhs in Xinjiang is very big (two million according to some sources). Secondly, the Kazakhs in Xinjiang had the opportunity to develop their language freely. Here Kazakh schools have been opened, newspapers, magazines, books, and textbooks were published, and radio and television have been working in the Kazakh language. (18-19) The Kazakh language in this area is systematically investigated. They had the opportunity to develop the Kazakh language as compared to the language of other Kazakh Diaspora living in other countries. Third, the Kazakhs in Xinjiang have reserved rich fund of Kazakh folk literature, and these values have been published in about 80 volumes in Xinjiang. Fourth, the language of the Kazakhs in Xinjiang is distinguished by its rich dialectic, regional phenomena and its diversity. (20)

2 Materials and Methods

The results of a survey of repatriates made by Kanagatova (21) showed an almost homogenously priority attitude towards nationality as an attribute of personal and ethnic identification and towards the native language as the main, obligatory and most important attribute of the identity. The concept of the native Kazakh language has no duality or uncertainty, for them, it is inextricably linked with the ethnic group/nation, i.e. the linguistic identity derives from ethnicity. (22) The social adaptation began for repatriates by the overcoming of the language barrier and obtaining a Soviet passport. The language situation in Kazakhstan was shaped by the functioning of Kazakh-Russian bilingualism. Thus, the Russian language in society held rather strong positions, which are caused not only by the ethnic composition of the country's population but also by historical realities. These problems were the most difficult for returnees.

As for the rites performed in China, which were preserved after moving to Kazakhstan, repatriates named religious rites related to the birth of children, mutual assistance, weddings, and funerals. The significance of mutual assistance ceremonies and rites characterize ethnic consolidation and identity. However, repatriates indicate that Kazakh rites are different from those conducted by Kazakhs in China.

The repatriates pointed to the dombyra and kobyz when asked about folk musical instruments sounded in the territory of their previous stay. They called such songs as "Yelim-ay" and others as Kazakh folk songs known to them at their previous place of residence.

The cuisine is largely determined by the nature and characteristics of the households of a particular ethnic group. Basically, the Kazakhs assign an important role to food of animal origin. The same trends can be traced when considering the cuisine of the Kazakhs who moved from China. Naturally, they prepared traditional Kazakh dishes such as beshbarmak, kuurdak, etc. Of course, it was impossible to avoid the influence of the foreign ethnic environment; this was traced in the kitchen utensils. The repatriates claim that for a long time, even after arriving in Kazakhstan, they used wooden chopsticks, the so-called choke, and later they switched to cutlery.

Such data make it possible to unambiguously judge the subcultural distinction of the Kazakh repatriates. (23-24) The main arguments are a large percentage of people who do not speak Russian and more strict adherence to Muslim rituals. Differences at the level of basic elements of culture (language, religion, and values) cannot but affect its other components. At the same time, the most important adaptation factor is the native language, which all Kazakhs speak.

3 Results and Discussion

When talking about the features of the language of the Kazakhs in China, there is no reason to assert any sharp differences, or the existence of a special dialect. (25-26) At the same time, of course, among a small people (compared to the Han Chinese) in a different culture and political system, differences in language could not but arise. Moreover, the features are not only in the language, they are also manifested in the value orientations and mentality. The peculiarities of the language of the Chinese Kazakhs, firstly, arose due to the use of two languages. As for phonetic features, the Chinese Kazakhs pronounce the sound "ch" at the beginning of words instead of "sh". For example, they would have pronounced the expression "Şäken şöñkemen şaytasıdı. Şal şalğımen şöp şaptı" as "Çäken çöñkemen çay tasıdı. Çal çalğımen çöp çaptı." Also, often "f" is replaced by "p", "h" by "q", and "g" by "k".

The folk art of the Kazakhs of Xinjiang, having absorbed the ancient oriental poems, as well as legends of a later period, underwent a large and complex process in its development. (27) Many later legends appeared on the basis of ancient epic traditions. In these later works, narratives about real events are interspersed with patches of legendary nature. The Kazakh epic tradition of Xinjiang can be classified as follows: the first group is the epics about batyrs known to all Kazakh people (Kobylandy batyr, Alpamys batyr, Yer Targyn, Kambar batyr, etc.); the second group of works is based on the Middle East plots (Leyli-Majnun, Tahir-Zuhra, Zhusip-Zuleikha, Bozzhigit and Karashash, Shakir-Shakirat, Zhamsap, Seifulmalik-Zhamal, etc.); the third group includes legends that appeared in the XVIII and XIX centuries and are united by the idea of fighting the external enemy (Arkalyk Batyr, Kabanbai Batyr, Zhanybek Batyr, Myrzash Batyr, etc.). Another group of famous works contains reflections on the injustices that exist in society, including social ones: Damezhan, Burkitbay, Zukhra, Kerey Tolkyn, etc. The last group of legends in this classification is devoted to the feeling of love and tells the story of lovers (Tukibai-Sholpan, Yerden-Balkash, Nurlangan and Aigulim, Khasen-Zhamilya, and Shaykan-Kulyash).

The level of ethnic identity of the Kazakhs of China can be traced by such features as the state of the language, the preservation of traditional material and spiritual culture, the use of symbols, national character and self-identification. Of course, the Kazakhs of China are members of the society, which is in their social, economic and political characteristics different from that of Kazakhstan since it has passed through a different historical path. According to psychologists, the main features of

the national character are in constant dependence on the way of housekeeping, lifestyle, social system, climatic conditions, and the forms of communication. Many Kazakhs in China are still engaged in nomadic animal farming. Severe conditions of nomadic life and difficult climatic conditions influenced the freedom-loving and harsh nature of the local Kazakhs. The peculiarities of social and political life also left their mark. Local Kazakhs give accurate characteristics to all neighboring peoples, clearly distinguishing themselves from others.

As one of the descendants of the modern Kazakhs were Sakas, we may notice some Sakas' words in the Kazakh language. There were people speaking Iranian among Sakas and they brought a part of the Iranian language into the Kazakh language in a natural way.

According to Nygmet Myngzhan, (28) the language used by the tribes, which contributed to the formation of the Kazakh people as a nation, laid the foundation for the formation and development of the modern Kazakh language in the ancient period.

When we look at the history of the Kazakhs of Xinjiang and the Turkic peoples in Xinjiang we can set that its roots are too deep.

The traditions of the Kazakhs in China cannot be separated from the traditions and customs of the Kazakh people in other places. However, there are area differences existing from the era of tribal union and each of them has its own features. (20) From the time of the settlement in their homeland in Xinjiang, the Kazakhs have not yet stopped nomadic life and have not abandoned yurts.

In the course of the study, the authors identified the words connected with housing, shelter, and other outbuildings for household purposes in the language of the Kazakhs in China, for example:

dalang – corridor;

koshe - hallway (*Kun zhyly bolgan song, kosheni ui etip otyrmau* - As it is warm, not need to sit in the hallway);

shoal – closet, a room for storing food in the winter and for cooking in summer (*Shualda et, azyq-tulik turady* - Meat, foods is stored in the closet);

zher saty – stairs in the house;

shyqqysh – staircase, ladder for going up the haystack;

kilet – pantry, store room;

tam – a house (*Tort bolmeli tamda turady* - He lives in a four-roomed house).

qazandyq – hearth without a chimney;

qumyra/botelke – In western Kazakhstan used as "bottle", in Semei region - snuff box for snuffing or chewing tobacco is also called as *qumyra*;

baqyr – metal pot with a handle for frying wheat (*shelek* (bucket) - in southern regions, *ozhau* - in the language of the Kazakhs in China);

shorke – a log for chopping wood, (*from Russian* "tchurka");

tese – a tool like a hoe, less than a hoe;

lapas – indoor barn yard. In the south, it is called as *kurke*;

aq kerish – lime, chalk. In the south of the republic, it is called *aq balshyq.*

bagar – woven sack for wheat;

boqsha – bag, briefcase;

dodege – a synonym of the cornice;

shot – door hook;

shapashot – hoe;

shapqy – backsword;

turpi – large rasp (the phrase "*turpidei tiu*" means "to act rudely");

mostemir – tripod (for cooking);

bedre – bucket;

shattauyq – metal clip, pliers;

les – quadrangular pan for baking bread;

karlen kasse – porcelain cup;

akpish, kuyente – yoke, shoulder-yoke to bring water; *moiynagash, iykagash* (in other places);

bukteme – pocketbook, wallet;

sebet, koridor – an entrance hall;

tiek – hook on the door;

dalba – hut, shack; hut to rest in a field;

meskei – bowl, from the Russian word *miska*.

tegesh – half-liter ware;

katel – bucket, perhaps from Russian word *kotel;*

tausha – niche in the wall for dishes. In some places used as *assadal;*

das – a large bowl (for food). In many places of Kazakhstan used as a metal basin for hand washing;

qama – gates, large door for cars;

shishaqpaq – a match. In other places: *keuirt, shyrpy, shaqpaq, shagar;*

myq – a small nail (*Ozi myq shegedei* – He is like a small nail, i.e. strong one).

yin agash – yoke, shoulder-yoke, also it is called *kuyente;*

tartpa – scythe, sickle;

aiyragash – pitchfork;

pershil – doctor, from the word *feldsher* (medical assistant);

qulaqshyn – a mug;

quima – water for washing;

baki – shaver;

sharshaq – pitchfork;

zhozy – a low round table;

qoyan qulaq sham – light without a lamp.

Research works in the Kazakh dialectology were associated with diasporology and lexicography (dialect, regional dictionaries). We need to mention "Regional Dictionary of the Kazakh language" edited by S.S. Sarybaev, who collected all the materials of research, scientific papers, and dictionaries of the Kazakh dialectology. The basic material of the dictionary includes lexical, phonetic and grammatical peculiarities of the language of the Kazakh Diaspora in Uzbekistan, Karakalpakstan, Turkmenistan, Tajikistan, the Russian Federation and far-abroad countries like Mongolia, China, Afghanistan, and Iran. (29)

These selected and analyzed language features can become the rich source for the identification of some controversial issues, as well as some of the problems concerning the history of the Turkic and other languages. Many researchers have been conducted and scientific essays have been written on the Kazakh language of these above-mentioned regions. Studying vocabulary of Kazakhs abroad and creating the regional dictionaries contributes greatly to the development of our state language and stabilization of its norms. From this point, to create a large regional dictionary that covers one of the large sections of our vocabulary-regional words combining them into one direction, one of the current urgent problems of the Kazakh Linguistics. Such scholars like S.S. Sarybaev, A. Nurmaganbetov, S. Omarbekov, Z. Bolatov, G. Kaliev, and O. Nakysbekov participated in creating a dictionary and conducting the study, and they are the members of the dialectological expeditions.

However, we cannot say that the materials of the Kazakh language in foreign countries, texts, poems, folklore, phraseological units, and regional language units, appeared as a result of a relationship with the local languages, have been completely collected. Now we need to carry out an investigation of the Kazakh language and the language situation of the Kazakhs in China, Turkey, Mongolia, Afghanistan, and Iran in the socio-dialectological aspect. Their Kazakh language (in China and Mongolia) may be subjected to changes after some time due to various political and social factors, language situations and influence of another language environment.

In order to show the condition, changes and use of the Kazakh language in these countries, we must take into account the fact that the language oft here Kazakhs is not only used as a dialect but also as a written and oral language with the literary norm, with its established vocabulary and terminology. Language status of the Kazakh language must be determined, because the periodical publications, political literature, fictions, and textbooks are available as well as radio and TV programs, transmitted in the Kazakh language in China, Turkey and Mongolia. There is so men on-compliance of written literature in the Kazakh language in foreign countries with the literary language in Kazakhstan, not saying already about spoken language. (30)

At the same time, there is no systematic character of terms used in the areas of management, technology, economy, science, politics, etc. Each region uses lexical units borrowed from other languages and their own terms. Along with the borrowed items, there are original terms, which are used successfully in the language of the Kazakhs in China, Turkey and Mongolia. To identify the similarities in terminology, gathering these facts and use these terms for the benefit of the literary language in Kazakhstan is a priority issue, as these language units are a source of enrichment of terminological fund of the Kazakh language.

4 Conclusion

The authors have concluded that the language of the Kazakhs in China remained as a literary language. Studying the lexical features of returnees, we noticed that their language has bilingual characters a result of a close relationship with the people of the country where they have settled. The reason for such phenomenon is the internal and external linguistic factors. Lexical differences appeared due to the impact of the translations in Chinese. (31-32)

Language is a dynamic phenomenon and constantly evolving process. Changing the vocabulary is changing the meaning of the word. Changing the meanings of words enhances the quality level of the language. According to scientists, the meaning is completely updated and its frame sometimes expanded and sometimes reduced. Along with the changes of epochs, the concept of mankind is also changing and evolving. Borrowing words from other languages, word formation, and expansion of meanings and functions of these words will lead to new concepts. When talking about the returnees' language, we must take into account the different historical, political and socio-economic circumstances that they have experienced. First, it is the limitation of relations with the Motherland, a result of political-social opposition during the Soviet Union. Secondly, it is the lack of schools and kindergartens, cultural centers, the press, TV programs in the Kazakh language. Thirdly, the difficulty of Russian Cyrillic, as they used Arabic and Latin script. Fourth, the function of the Kazakh language was only in the oral household level. Fifth, the impact of the language environment with whom they have a close relationship and where they live, etc. However, despite such difficulties and the opposition, our compatriots were able to comply strictly with the order of use of the native language. The lexical characteristic of the Kazakh returnees' language is a large number of loan words. Due to the variety of differences between the language of the Kazakhs in China and the literary language, the problem still needs an investigation.

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INNOVATIVE APPROACHES OF UNDERSTANDING HEALTH SAVING TECHNOLOGIES IN CONDITIONS OF UPDATED EDUCATIONAL CONTENT

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Abstract: The article discusses the issues of innovative approaches to the introduction of health saving technologies in terms of new educational content. The authors propose a solution to the problems encountered by participants in the educational process with the help of health-saving technologies. New content of education requires the application of new value orientations and strategies of health-saving technologies.

Keywords: Health saving technologies, Updated educational content, Value orientation, Education strategies, Physical state, Students' psychophysiological characteristics.

1 Introduction

The 2017 Report on the Situation of Children in the Republic of Kazakhstan, prepared by the Sange Research Center by request of the Ministry of Education and Science of the Republic of Kazakhstan, the following strategic measures that demonstrate major positive changes in the use of health saving technologies in the education system are noted:

- the range of normative legal acts on the protection of the rights of children has been expanded;
- the interdepartmental collaboration has been activated;
- population growth has stabilized, about 400 thousand babies are born annually;
- the growth of incomes of the population increased the percentage of financial security of the subsistence minimum;
- the availability of social support such as fertility stimulation, increasing the prestige and authority of mothers of many children, support for families with disabled children, support for low-income families, etc. (1)

According to sociological polls of the population of Kazakhstan, 79% of parents note that their children do not have health problems and evaluate their health to 4.5 points out of 5 possible, 13% of children indicate that when they are ill, their parents do not pay any attention to it, 4% of children say that they have never been ill, and 84% of children say that they trust their parents in their treatment, while 72% of children do not always receive medical care and for 5% of children, medical assistance is not available due to the absence of any medical assistance. (2)

Thus, the state support of the population is carried out in accordance with the strategies of the country, but the existing problems orient teachers-researchers to all emerging issues of applying health saving technologies in the process of training and education in the educational system.

The following subjects have been introduced as part of the renewal of educational content:

- Natural History and Information and Communication Technologies and the new content of the discipline Learning the World for elementary school;
- Introduction to Science in grades 5-6;
- History of Kazakhstan will be studied in parallel with the World History from the 5th grade;
- integrated subject Mathematics (Algebra + Geometry)

Also, in high school there will be a choice of subjects and, most importantly, in our opinion, the introduction of a trilingual learning model, subjects of natural and mathematical cycles will be studied in English and therefore English is included in the program from grade 1. And such subjects as Kazakh Literature, History of Kazakhstan and Geography will be studied in the Kazakh language, and World History in Russian regardless of the language of instruction.

The process of introducing the updated content of education in the school is purposefully implemented, however, there is a perception that it has become more difficult to study, as a survey of parents of primary school students (1-4) of secondary school No. 11 in Almaty showed the following results (Figure 1).

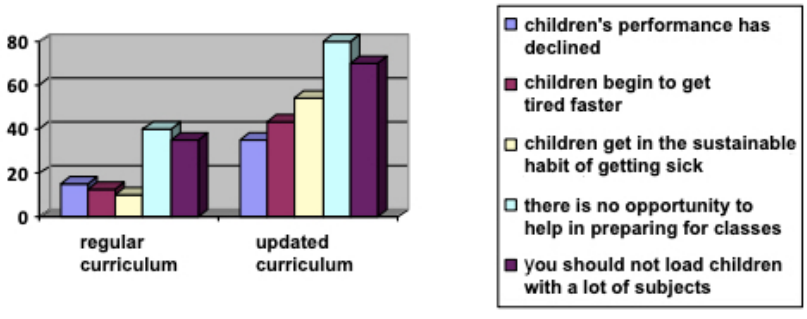

Figure 1. Parents' Satisfaction with Teaching Children with the Updated Educational Content

As the Figure 1 shows, parents who are actively involved in the child's life experience difficulties because it is difficult for them to help with assignments and therefore they believe that it's impossible to study subjects in different languages as part of the implementation of updated educational content. Training according to the updated curriculum, according to parents, entails various diseases, disorders, and a decrease in children's academic performance.

A survey of school teachers showed different opinions on the introduction of updated content, the majority accepted the update as a way to improve new professional skills (61%), other teachers (43%) complained that they were not ready to update the content of education, others (19%) did not see the perspectives of children to learn under the new content of education.

All these problems that arose in the process of introducing the updated content of education in all schools of Kazakhstan, despite the training of teachers, for example, up-skilling of teachers (2016 - PC for 10 programs, 2017 - 25 programs), still require the readiness of children to learning. And an important place in the system of teaching children in school is occupied by the use of health-saving technologies.

2 Materials and Methods

It is known that health-saving technologies in the education system are especially significant because, as mentioned above, students experience difficulties in moving to the updated content of schooling: firstly, teaching in three languages requires enhanced visual attention and perception; secondly, information overload affects their emotional state; thirdly, the new knowledge assessment system baffles parents and students accustomed to concrete and understandable assessments; fourthly, the applicable nature of certain objects, despite their interest in them, is still quite difficult, because it requires the presence of such qualities of mental activity as breadth and depth of mind.

In addition to the above-mentioned difficulties for students, the following reasons such as environmental hazard and social tension are quite objective. On the issue of environmental hazard, it should be said that, by the nature of the impact on a person, they are divided into harmful and traumatic. In the last decade, environmental pollution in many regions of the Earth has caused a sharp increase in diseases of the population, increased child mortality and impaired psychophysical development of the younger generation. (3) Social tension is such a state of social consciousness and behavior when a person comes to the realization that the satisfaction of any needs is threatened or the specific situation of perception and assessment of reality becomes impossible. (4) In such a situation, children have dissatisfaction, apathy, pessimism, fear, etc.

From the point of view of modern psychologists, in order to preserve the mental, psychophysiological and physical health of students in school, it is necessary to use health saving technologies. Psychological and pedagogical literature traditionally distinguishes three subgroups such as organizational and pedagogical, psychological and pedagogical, and educational technologies. Organizational-pedagogical technologies help prevent states of overwork, sedentary lifestyle, and other desadaptative states; psychological and pedagogical technologies associated with the direct work of a teacher with children and provide psychological and pedagogical support of the educational process; educational technologies are aimed at organizing training on taking care of one’s health and developing a culture of health among students.

Traditionally, it is customary to single out the following principles for the introduction of health-saving technologies such as the complexity of the usage of health technologies, taking into account the state of health of students, the structure of the educational process, the conditions of training and education; continuity of recreational activities throughout the year; the use of non-drug means of recovery, the widespread use of agents that stimulate the body's defenses; implementation of activities to increase motor activity, mental health-care, as well as to improve the health of children with functional disorders and chronic diseases. (5)

Innovative approaches to the use of health-saving technologies in the context of updating the content of education should be holistic and systematic. There are 7 known principles of health-saving education such as “no harm”, “the priority of effective health care”, “the triune notion of health”, “continuity and succession”, “subject-subject relationship with students”, “conformity of consciousness and the organization of training age features of students”, “a combination of protective and coaching strategy”.

In terms of introducing updated content of education in secondary school, the principle of priority of effective health care for students and teachers is, in our opinion, clearly seen in the presence of long-term, medium-term and short-term goals for studying subjects, in such way long-term goals orient the student and teacher to understand the approaches and ways of their joint activities, which means the preparedness of the participants of the educational process to the procedure of long-extensive training. Such a mindset to the implementation of intellectual, physical and psycho-physiological learning opportunities requires careful preparation of the teacher for choosing health saving technologies, for example, directed to the teacher's constant attention to the student's correct posture and constant support understanding of correct posture for students that leads to a comfortable perception of knowledge, i.e., the student will not often get tired and overworked with a healthy back.

Important, in our opinion, is the understanding by participants in the educational process of the triune notion of health, this postulate must be clearly followed by the school administration, teachers, but also, importantly, each student is obliged to monitor their own health. (6) From this point of view, the preservation of the physical health of students is a primary task of the school; here, measures aimed at preserving health should be traditional, for example, a comprehensive study of students' health, continuous monitoring of the health of children with a weak or weakened state.

So, in practice at school we introduced a monitoring system not only of general health indicators, but also conducted constant monitoring of changes in physical health after, for example, physical education classes, determined how much different physical education classes affect the student’s general condition, how weak they are not only in physical condition but also in matters of tension, anxiety, emotional and cognitive perception of knowledge in subsequent lessons.

In the presence of deviation after physical education lessons, in the form of a breakdown or, on the contrary, a state of emotional arousal, we offered the teacher various exercises with health-saving technologies to support the general condition of children. We have proposed school administrations a quarterly examination of children by general practitioners with a view to identifying the physical health and physical abilities of schoolchildren in order to attract them to active sports activities. (7, 8)

The use of health saving technologies to determine the psychophysiological state of children should be continuous, which means that every lesson introduces elements of health protection, for example, when studying Natural History in elementary school, aimed at developing skills in design and research activities, the ability to understand the causes of investigative relations, the formation of a holistic vision of the surrounding world, the child’s general idea of his uniqueness as a living and contemplating and In turn, the teacher is focused on the organization of group work, taking into account the age characteristics of the trainees.

An important factor in personal development is considering the principle of combining protective and coaching strategies, which is how effective the learning environment is in terms of the level of the study load, the degree of responsibility for one's health, and the presence of control on the part of parents and teachers. The following problems should be solved at school:

- the organization of proper nutrition of schoolchildren during their stay in an educational institution;
- prevention of harmful effects on students' health factors directly related to the educational process (prevention of school diseases);
- protection and promotion of mental health of students (prevention of school stress, distribution of bad habits, addictions, etc.) among students;
- the formation of a culture of student health and competence of teachers in matters of health and health-saving technologies;
- organization of cooperation with parents of students on the issues of preserving and strengthening the health of their children.

Mental health of children in the context of the introduction of updated education curricula requires closer attention from scholars and teachers since the transition to a new system for assessing students' knowledge causes perception difficulties, not only among students but also among teachers and parents. The traditional assessments are replaced by new forms of assessment

such as formative and summative. The continuity of formative evaluation, on the one hand, provides the teacher with a timely adjustment of learning strategies; on the other hand, without special training, it is difficult for the teacher to adequately carry out the evaluation. For students who are used to getting specific marks for the work done or the task, it becomes psychologically difficult to build a process of mutual and self-assessment in such a system. Students begin to feel dissatisfaction, which is directly related to the self-esteem of the child's personality, which can be deflated, inflated and reasonable. (9)

Summative evaluation is a way to identify students' intellectual and cognitive growth. The problems of not understanding the process of summative evaluation are to determine the quality of the material studied by students and the willingness to apply this qualitative knowledge in practice.

Health saving technologies used in school should be focused on high consciousness, developed thinking, greater inner and moral strength, encouraging creative activities and the creation of peace of mind and adequate behavioral responses.

3 Results and Discussion

The student's educational environment is all that encompasses it in the learning process, all that it interacts within this process. Characteristics of the health of the student's educational environment can be viewed as an organization of the educational space at all levels, at which high-quality education, development, education of students is not accompanied by damage to their health. (10) As a result, for the formation, preservation, and strengthening of these components of single human health, health saving technologies are introduced into the activities of an educational organization, which help to solve the most important tasks such as saving the child's health, accustoming him to an active healthy life. Health-forming educational technologies are all those psychological and pedagogical technologies, programs, methods that are aimed at educating students of a culture of health, personal qualities that contribute to its preservation and strengthening, forming an idea of health as a value, motivating a healthy lifestyle. (11) When introducing health saving technologies into the educational process, which involve a set of pedagogical, psychological and medical actions aimed at protecting and ensuring the health of students, the formation of their value-related attitude to their health, the health of the student's educational environment is organized. (12, 13) Health saving technologies include the conditions for a child's schooling (lack of stress, adequacy):

- rational organization of the educational process (in accordance with age, sex, individual characteristics, and hygienic requirements);
- compliance of educational and physical activity with the age possibilities of the child;
- necessary, sufficient and rationally organized motion state.

The educational environment of introducing health saving educational technologies creates the maximum possible conditions for preserving, strengthening and developing the spiritual, emotional, intellectual, personal and physical health of all subjects of education (students, teachers, etc.). (14) Organizing a healthy lifestyle requires the creation of a health saving educational environment in a general educational institution. The educational environment is an environment that consists of elements that have vital effects on students in the process of receiving an education. (15, 16) And it shows integrity, which contains the whole range of impacts on students such as relationships with other participants in the educational process, features of the organization of the educational process, environmental characteristics, etc. Vital needs for a schoolchild are the needs for physical activity, in the mode of the day and change of activity, in proper nutrition, the optimal parameters of physical environmental factors in the needs pyramid, according to Maslow, occupy the lowest level. (17) These are biological (physiological) needs, which must first of all be satisfied. Higher in this pyramid are the needs for security, love, and recognition, which are always important and for everyone and must also be satisfied in the course of educational activities. In a general education institution, it is necessary to create conditions to meet the specific age-related basic needs of schoolchildren. (18) Based on the needs of students, it is possible to identify the characteristics of the educational environment, important for the preservation of their health. (19):

- the general organization of the educational process (curriculum, class schedule, duration of lessons and changes, etc.);
- learning technologies;
- style of interaction of participants in the educational process;
- the motion state of students;
- sanitary and hygienic conditions of training and education;
- medical care and health procedures during the school day;
- healthy eating.

The algorithm for introducing health saving pedagogy can be represented by the following provisions. (20, 21):

- awareness of the problem with the negative impact of the educational organization on students' health and the need for its urgent solution;
- recognition by teachers of an educational institution of their joint and several obligations for the ill health of students;
- mastering the necessary health saving technologies (gaining competence);
- the implementation of the acquired knowledge and skills in practice, in close cooperation with each other, with the doctors, with the students themselves and their parents. Health saving technologies perform the following functions:

1) formative: carried out on the basis of biological and social patterns of personality formation. At the heart of the formation of personality are hereditary qualities that predetermine individual physical and mental properties. Social factors, the situation in the family, the classroom, the orientation towards saving and increasing health as the basis for the functioning of the individual in society, learning activities, and the natural environment complement the formative impact on the individual;
2) informative and communicative:

- provides transmission of the experience of maintaining a healthy lifestyle, the continuity of traditions, value orientations, forming a careful attitude to individual health;

- health saving (preventive vaccinations, the provision of physical activity, vitaminization, an organization of healthy eating);
- health-giving (physical training, physiotherapy, aromatherapy, gymnastics, massage, herbal medicine, art therapy);
- fostering a culture of health (optional classes on the development of the students' personality, extra-curricular and extra-curricular activities, festivals, competitions, etc.). (22, 23)

Health saving pedagogical technologies should ensure the development of the child's natural abilities such as his mind, moral and aesthetic feelings, the need for activities, mastering the initial experience of communicating with people, nature, and art. The use of health saving technologies in the educational process allows students to more successfully adapt in the educational and social space, to reveal their creative abilities, and allows the teacher to carry out prevention of asocial behavior effectively through the formation of the health saving educational environment. Thus, the modern concept of a healthy lifestyle defines it as conscious in its need for the constant implementation of the rules to strengthen and preserve individual and public health. The elements of a healthy lifestyle are such as education from early childhood, healthy habits, and skills; safe and habitat-friendly environment, knowledge of the effects of environmental objects on health; smoking cessation, withdrawal from drugs and alcohol; moderate nutrition corresponding to the

physiological characteristics of a particular person, awareness of the quality of the products used; physically active life taking into account age and physiological features; observance of the rules of personal and public hygiene, possession of first aid skills. Formation of a healthy lifestyle in schoolchildren requires the creation of a health saving educational environment in a general educational institution with the help of health saving technologies. (24, 25)

4 Conclusion

The concept of "health saving" refers to the qualitative characteristics of any educational technology, which shows how the implementation of this technology solves the problem of maintaining the health of students. (26)

A systems approach to applying health saving technologies is an awareness of the negative impact of the school on students' health and the need to solve them with the help of health saving technologies from the point of view of determining the value of the learner as a developing personality; mastering the competencies for continuous improvement of educational activities on the basis of gaining experience in using health saving technologies in the class.

A holistic approach means the use of health saving technologies to ensure a healthy lifestyle by creating an environment conducive to improving the health of students, the development of tactics of health and preventive measures, compliance with hygiene standards and training activities.

Health saving educational technologies can be considered as a qualitative characteristic of any educational technology, as a combination of the principles, techniques, methods of pedagogical work that complement traditional technologies of training and education, endow them with signs of health saving.

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THE CONCEPT AND ESSENCE OF THE TEACHER'S RESEARCH ACTIVITIES

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Abstract: Research activities are among the most prestigious, socially significant and economically viable aspects of human activity. It provides the prospective development of the economy, significantly enriches the culture, introduces a margin of safety in the intellectual potential of society, which determines social progress. The article discusses the professional qualities of the teacher-researcher. The influence of research activity on the development of the teacher's professional qualities is described. The essence of teachers' scientific research activity is reflected in different sciences – pedagogy, psychology, sociology, management.

Keywords: research activities, research culture, teacher-researcher, professional development.

1 Introduction

Many scientists, philosophers, sociologists, psychologists, educators addressed the issue of understanding the definition of "culture" and interpreted it as 1) "a high level of something, high development, ability"; (1) 2) "all types of transformational activity of a person and society, as well as the results of this activity"; (2) "a combination of a high level of development and improvement of all components of the activity, development and realization of a person's personal forces, his abilities and capabilities". (3)

From the point of view of the educational system, cultural issues were paid attention by scientists such as J.A. Comenius, K.D. Ushinsky, Y. Altynsarin, S.T. Shatsky, A.S. Makarenko, V.A. Sukhomlinsky, and others. Each of them in the approach to cultural issues has its own positions, but it is common for all educators that the teaching and education process can be carried out only by a teacher with high culture. Culture as a social phenomenon has been studied in various areas of human life, such as:

- political (A. A. Volkov, K. K. Zhanpeisova);
- aesthetic (L.V. Babich, A.S. Kirakosyan);
- musical (M.Kh. Baltabaev, Ya.I. Radzitskaya);
- professional communication (D.G. Mukhamedkhanova, A.K. Rysbaeva);
- pedagogical (E.V. Bondarevskaya, A.A. Moldazhanova);
- psychological (S.P. Ivanova, A.A. Bizyaeva, A.L. Menschikova).

The teacher's professional culture consists in providing conditions for developmental learning, aligning students with age and individual characteristics, assessing the student's understanding of the content of educational material that is formed in the process of creative synthesizing by a teacher of various aspects of knowledge (pedagogical, psychological, methodical) and the development of a teacher's professional and personal qualities (for example, empathy, reflection, etc.). The formation of the emotional and moral sphere, intellectual and volitional qualities is especially significant for the teacher's professional culture. (4)

The professional competence of the future teacher as J. Raven (5) argues, "... consists of a larger number of components, many of which are relatively independent of each other ... some of the components relate more to the cognitive sphere, and others to the emotional one. These components can replace each other as components effective behavior" and that "before undertaking an assessment of one's abilities, it is necessary to establish the values, hobbies or intentions of a given individual ... There is no sense in trying to assess human abilities and it is due to the subjective importance of the goals for him". The five personality traits, according to N.V. Kuzmina, consist of 5 elements in aggregate such as a special pedagogical, methodical, socio-psychological, differential psychological, autopsychological. (6-7)

A.K. Markova draws our attention to the understanding of competence as a combination of mental qualities, mental state, allowing a person to act independently and responsibly, possessing the ability and ability to perform certain labor functions. (8-9) According to I.A. Zimnyaya, (10) competence is represented in the professional activities of the teacher in such categories as "readiness", "ability", "responsibility", "confidence".

Such characteristics of a teacher's professionalism allow us to determine the trajectory of a teacher's professional growth, his values, which are the main content of the future professional culture of an education specialist.

The culture forming trajectory of the formation of a teacher's professionalism consists of 1) a description of the signs and an expected (planned) level of competence in a certain area; 2) determining the necessary and sufficient set of training tasks (situations), the sequence of which is built in accordance with the growth of completeness, problematics, specificity, novelty, vitality, practicality, interdisciplinary, creativity, value-semantic reflection and self-assessment, humanitarian expertise of solutions, the need to combine fundamental and applied knowledge; 3) the process technology, including the sequence of presentation of tasks to the student - situations of various types and levels; 4) algorithms and heuristic schemes that organize the activities of students to overcome difficult situations; 5) technology of support, counseling, and support for students in the process of passing the program. The given paradigm becomes significant for the training of specialists of the highest professional level.

One of the indicators of the professional culture of future specialists is their ability to research activities.

2 Materials and Methods

Research activity is one of the most prestigious, socially significant, economically viable aspects of human activity. It provides a perspective development of the economy, enriches the culture substantially, brings a margin of solidity into the intellectual potential of society, which determines social progress. (11)

In the modern world, science performs the following functions:

- analytical - comprehension of real reality, its analysis, evaluation;
- simulative - the creation of ideal schemes, models of ongoing processes and phenomena of the past, present, and future;
- system-forming - education from scattered information, facts of the system of knowledge, representations in the form of concepts and theories defining consciousness and self-awareness of man and mankind;
- optimizing - providing an optimal solution to the problems that arise before a person and society;
- orientational - awareness in real life, practice, human relationships, politics and religion, the choice of the best of them;
- prognostic - the definition of changes in nature and society, in man and knowledge;
- informational - ensuring communication and mutual understanding between countries, social systems, branches of production, science and culture;

- innovative - the penetration of discoveries into science, public practice, culture, health, and education.

The implementation of the system of continuous education implies consideration of the position of the teacher in terms of compliance with its international approaches and requirements. In this regard, it is necessary to consider the resolution of the XXVI session of the General Conference of UNESCO, according to which the concepts of "research activity" and "scientific work" of a university lecturer are split up, which are not divided in Russian science. Research activity refers to original developments in the field of natural or social sciences, culture or education, involving careful, orderly research, depending on the nature and conditions of the posed problem. Scientific work is interpreted as a process by which university students prepare scientific publications on their subject, publish their works, improve their activities as teachers. In an international organization's document, vocational school teaching is declared as a profession and is regarded as a form of public service that requires teaching staff with expert knowledge and specialized skills acquired and supported through persistent learning and research throughout life.

In the 1980s and 1990s, a number of teacher models were developed in the theory and practice of professional education. At the IX International Pedagogical Congress (1988), a model developed by Belgian scientists was approved (Table 1).

Table 1. The Model of Teacher

Requirements for a teacher as a person	Requirements for a teacher as a specialist	Requirements for a teacher as a professional
a width of views, adaptability, interest in innovation, willingness to take responsibility, in-touch capabilities, emotional strengths	solid academic education, deep knowledge in the field of education	solid academic education, deep knowledge in the field of education

In the English model of the teacher the following areas of activity are highlighted:

- knowledge of the needs of students;
- ability to assess the effectiveness of its activities;
- ability to develop curricula and materials;
- mastery of professional skill;
- the ability to be a consultant and the ability to consult with others;
- interpersonal skills;
- conducting research work;
- improving their professional skills.

In the domestic theory, there are several approaches to modeling the activity of a teacher and the following models of teacher activity are distinguished:

- the teacher performs the classic function of learning (transfers knowledge, develops skills and abilities of the future specialist);
- the teacher stimulates the student's creative activity, directs his search and cognitive activity for the independent acquisition of knowledge (the learning subject in the pedagogical process);
- the teacher strictly controls the process of becoming a specialist, applying learning technologies that guarantee a high level of specialist training;
- the teacher creates cumulative conditions (pedagogical field) that develop the personality of the future specialist;
- the teacher stimulates mental activity and a creative search for the student.

Practically in each of the models presented, the activity of the teacher is present as a component of research activities, since the social significance and the need for science is imperishable, it is eternal. Thus, research activities should be considered as a component and as a condition for the development of the teacher's professional skills. (12)

The researcher performs two main functions by organizing and conducting his research:

- firstly, he systematizes, accumulates the knowledge accumulated by mankind;
- secondly, he learns a new unknown that enriches science. These functions remain relevant at all times, only their content changes as changes occur in public life, the scientific problems studied, the methods of work.

To implement these functions, the researcher must have a number of qualities that create a solid foundation for his personal and professional growth.

Research activity is an extremely intense, creative work that requires complete commitment, perseverance, patience, dedication, creative thinking based on the feeling of the new, the desire to know the unknown. In the history of pedagogical science, there have been many attempts to list the most important qualities of a research scientist. So, K.E. Tsiolkovsky (13) believed that the main personality traits of a research scientist should be a good memory, ability to concentrate, withdraw into yourself, scientific imagination, intellectual independence, that is, independent thinking, enthusiasm, passion, obsession with science, perseverance.

V.A. Obruchev (14) identifies three basic principles of fruitful scientific activity such as planning, accuracy, and love of creativity. I.P. Pavlov (15) referred to the leading personality traits of a research scientist such as scientific consistency, strength of knowledge of science and the desire to move from them to the heights of human knowledge, restraint, patience, willingness and ability to do rough work, patiently accumulate facts, scientific modesty, willingness to devote life to learning.

K.I. Skryabin (16) noted the special importance in the scientific work of the love of science, the chosen specialty. As we see, exceptionally high demands were made to the identity of the researcher, requiring him to commit himself completely (Table 2).

Table 2. Indicators of the Effectiveness of Creative Self-Realization of the Teacher-Researcher

Directions of creative self-realization	Performance indicators	Criteria for evaluation
1. Research Instructor	Having a personal creative teaching concept; the degree of originality and novelty of the methodology (technology)	Scientific character, validity and consideration of the teacher's typology, originality, novelty, efficiency
2. Teacher-researcher	Creating a personal creative concept of education; the degree of originality and novelty of the methodology (technology) of education	Relevance, practicality, consideration of the teacher's typology of personality, effectiveness, soundness, systematic

3. Research Methodist	Construction of methodical work using the means of pedagogical diagnostics; the degree of methodological culture	Diagnosticity, efficiency, predictability, conceptuality, scientific character, validity
4. Research scientist	The implementation of holistic research on current issues of education	Theoretical and practical significance, the novelty of the research, the approbation of the results
Key abilities for creative self-realization	Ability to creative self-development, to creative activity, the vision of the problem, to forecasting, to the introduction of innovations, to research work, to the programming of their activities, to creative reflection, to the generation of ideas, to the realization of the creative concept	

The term “teacher’s research culture” is relatively new in the conceptual framework of pedagogy. This concept is only included in the broad research turnover, as evidenced by its presence and the usage in psychological and pedagogical works (I.F. Isaev, V.I. Zagvyazinsky, I.A. Kolesnikova, A.M. Novikov, V.A. Slastenin, E.V. Shashenkova).

Identify of the essence of the teacher’s research culture, its structure and functions through the basic characteristics of the initial category “culture” as a complex, interdisciplinary, general-methodological concept and “professional pedagogical culture” as its relevant component in the field of education, as well as features of pedagogical activity her, including research activities. Theoretical analysis of the research problem allows us to consider culture as a set of spiritual and material values. Creativity, the result and method of creative activity, the process of creative self-realization of the essential forces of the personality, as well as social experience, reflected in traditions and innovations and the level of personal development and self-improvement, is reflected in research activities. All this can be found in the studies of V.S. Bibler, I.F. Isaeva, I.A. Kolesnikova, G.M. Kodžaspirova, E.S. Markarian, S.I. Ozhegov, G. Rickert, V.A. Slastenin.

Essential for our study is the consideration of I.F. Isayev of culture as a process of learning activities and as a result. Analysis of studies on the general theoretical foundations of professional and pedagogical culture and its individual aspects. Research E.V. Bondarevskaya, E.V. Berezhnova, I.F. Isaeva, L.V. Zanina, I.I. Zaretskaya, V.V. Kraevsky, I.A. Kolesnikova, S.V. Kulnevich, P.I. Pidkasisty, A.P. Sitnik, V.A. Slastenina, L.D. Stolyarenko allowed considering the definitions of “pedagogical culture”, “professional-pedagogical culture” and “research culture” as an important part of the general culture manifested in the system of professional qualities and the specifics of professional activity. We found that the most significant for the determination of the teacher’s research culture, its structure is the analysis of the main aspects of pedagogical activity carried out by the system of methods of research activities and regulated by the consciousness and personality activity (Yu.K. Babansky, A.N. Leontyev, S.L. Rubinstein). Exploratory activity is defined as a special form of knowledge, a systematic, purposeful study of the pedagogical process using the means and methods of science (V.V. Kraevsky, E.V. Shashenkova, A.M. Novikov). The teacher's research culture is presented as a generalized characteristic of exploratory activity as a process of creating, mastering and using pedagogical innovations and the result as a qualitative characteristic, a high level of various manifestations of this activity.

3 Results and Discussion

Theoretical analysis, a generalization of pedagogical and psychological approaches to the characteristics of the phenomenon under study allowed us to define the teacher’s research culture, the key concept for our research. The teacher's research culture is an integrative, dynamic personal characteristic, including pedagogical values, research ways of solving creative professional tasks, creative activity and a measure of self-realization in innovative pedagogical activity. We consider methodologically sound, interrelated and interdependent components to be the structural components of the teacher's research culture:

- axiological;
- cognitive;
- activity-technological;
- individually creative. (17)

The axiological component of a teacher’s research culture is determined by a set of pedagogical values such as the humanistic orientation of pedagogical activity; professional needs of teachers in innovation and the motives of personal self-realization; assessment, understanding of pedagogical ideas, concepts, norms of professional activity, methodological reflection.

The cognitive component of the teacher's research culture includes knowledge of the basic methodological concepts of pedagogy, the categories, and patterns of pedagogical science, the methodology of scientific knowledge; psychological and pedagogical knowledge; knowledge of innovative processes in education, the principles of diagnostic methods and research tools.

The activity-technological component of the teacher's research culture determines the ways to solve creative pedagogical problems in innovation, the system of analytical, design, constructive-prognostic, assessment-reflexive research skills, methods of scientific knowledge, methods, forms and means of innovation. (18)

The individually creative component of a teacher’s research culture implies a mechanism for the teacher to master this culture and its embodiment in innovative pedagogical activity, transforming abilities in solving creative professional tasks, forming an individual style of activity, striving for self-improvement. The functional purpose of the teacher’s research culture is viewed from the standpoint of the innovation process and its result (Table 3).

Table 3. A Structurally Functional Model of Teacher’s Research Culture

Teacher’s research culture		
Structural components	Functional components (processual)	Functional components (effective)
– axiological component – cognitive component – pragmatist-technological component – personally creative component	– analytical function – design function – constructive-prognostic function – estimated-reflexive function	– methodological culture – professional thinking – pedagogical creativity, the experience of the creative activity
Innovative teacher’s activity		

The analytical function of the teacher's research culture is aimed at understanding the new goals of education, psychological and pedagogical concepts of teaching and using them as the basis of innovative activity. The design function is connected with the creative solution of the tasks of designing the educational process, the pedagogical systems at the strategic level based on the analysis of the pedagogical situation, the choice of the optimal variant of its implementation. The constructive-prognostic function is aimed at building a holistic educational process at the tactical level based on the correlation of the pedagogical analysis with the socially defined and personally accepted goal. The evaluation-reflexive function of a teacher's research culture is associated with an awareness of the importance of innovative pedagogical activity and evaluation of its results, it lies in understanding, comparing and evaluating its productive activities, creates conditions for the development of creative activity, ability to manage its activities and self-improvement. (19)

When considering the teacher's research culture as a result of innovation, we found it important to highlight the methodological culture, professional thinking, pedagogical creativity and experience of creative activity with functional components. The idea of the essence, structure, and functions of a teacher's research culture is a necessary theoretical and methodological prerequisite for analyzing the capabilities of the advanced training system in shaping a teacher's research culture.

The formation of the research culture of the future teacher is a purposeful, specially organized process carried out in the context of professional training in accordance with the official educational standards and qualification characteristics of a specialist. The mechanism of formation of the future teacher's research culture consists of an understanding of the integrative essence of the components (informational, artistic, creative, practical, value-motivational) and the recognition of each ability to influence, change and interpenetrate each other.

The pedagogical conditions for the implementation of the teacher's research culture model are based on the organization of the educational process, considering the unity of the methodological approaches to the student's research activities, on the phased formation of the research culture components and the orientation of the knowledge and skills acquired for practical application. The reliance on an individual-personal approach to each participant in the educational process makes it possible to most productively implement the interaction of active forms of student activity, such as performing, research. Thus, the model of the formation of the research culture of the future teacher is implemented in the following areas.

The formation of the informational component consists of mastering basic knowledge in the field of pedagogy methodology and application of knowledge in the laboratory. The value-motivational component is aimed at recognizing the importance of research activities in the professional development of a specialist. An essential role here is played by self-analysis of one's own professional skills, planning and building a self-improvement program, and research reflection. The integrative unity of the foundations of theoretical knowledge and activity is due to the fact that the mastery of a research culture is possible only in the process of one's own research activity, by applying the methods and methods of scientific search. Therefore, the practical component is formed in the conditions of a pedagogical experiment at school, in the design of the results of their own research by students.

The main discipline that forms the information-knowledge component is the discipline "Fundamentals of Scientific Research". The content side and subject of the latter are aimed at developing research search mechanisms among students and reflecting the specific features of research activities in the field of education. In the process of studying this discipline, students form an attitude towards science as the most important means of improving research practice, acquire basic knowledge and skills in the field of scientific research, consider the specifics of the field. (20)

The professional activity of the future teacher requires the ability to learn, design, model, and on this basis to determine the most appropriate ways to solve problems in practice. A future teacher should have the basics of research culture, which find their daily manifestation in values-based attitude to professional and research activities, the readiness of an individual for scientific knowledge based on available research knowledge, skills and abilities of an individual to build their own system of research activities. (21)

Research culture, along with professional ethics, socio-pedagogical and organizational culture, is part of the professional culture of the bachelor of education. It involves the ownership of future teachers of the methodology and methods of research. The process of forming the foundations of the research culture of future teachers becomes dominant in the process of vocational training at the university. An important component of vocational training is student research. Within its framework, the foundations of the scientific organization of labor are laid, the necessary analytical qualities demanded in professional activity are formed. Problems of research development as a component of vocational training are reflected in the works by I.B. Karpauhova, F.K. Savina, S.M. Tutarischeva, T.I. Torgashina, E.F. Fedorova, V.A. Yakovlev, A.V. Yastrebova, and others. They note the significance of this kind of activity for the development of the intellectual qualities of a person; they justify the forms and methods of its organization in the university.

Certain aspects of the formation of research culture among schoolchildren, students, cadets, and teachers are revealed in the works by V.I. Markova, O.G. Morozova, I.V. Nosayeva, T.N. Shapova, C.B. Shmachilin, M.V. Chistovoy, and others. Vocational-oriented learning technologies are disclosed in the works by M.Ya. Vilensky, P.I. Obraztsova, A.I. Uman, and others. Despite the fairly high level of knowledge of this issue, at present, there is a contradiction between the objectively growing need for a teacher's research culture and the lack of mechanisms for its formation in the vocational training system. Scientific work is an extremely intense, creative work that requires complete commitment, perseverance, patience, dedication, creative thinking, a sense of the new, a desire to know the unknown. (22)

In the history of science there have been many attempts to enumerate the most important professional qualities of a research scientist, among which are:

- good memory;
- ability to concentrate;
- withdraw into yourself;
- scientific fantasy;
- intellectual independence, i.e. independence of thought;
- eagerness, passion, obsession, and perseverance in science.

V.A. Obruchev (14) identifies three basic principles of fruitful scientific activity:

- regularity;
- accuracy;
- love of creativity.

I.P. Pavlov (15) believed that a research scientist is characterized by scientific consistency, strength of knowledge of the basics of science and the desire to go from them to the heights of human knowledge, restraint, patience, willingness and ability to do rough work, patiently accumulate facts, scientific modesty, willingness to devote life to learning. K.I. Skryabin (16) noted the special importance in the scientific work of the love of science, the chosen specialty. An important quality of a researcher is a psychological and pedagogical orientation, manifested in the constant striving to achieve the main goal such as the formation and development of the student's personality, the improvement of the quality of his upbringing and training.

Based on the above, the professionally important qualities of the future teacher as a researcher include:

- optimism - faith in the opportunity to improve the state of affairs, to work out optimal options for the creative development of students;
- humanism, involving kindness, sympathy, warmth to people;
- justice, poise, tolerance, restraint, self-control;
- the ability to conduct research work honestly, consistent with his conscience.

This, in turn, implies the demands of the researcher towards himself and the people, that is, following the standards of morality, the conscientious fulfillment of his professional duty. Sociability and interpersonal skills are essential in research. All of the above mentioned professionally important personal qualities determine the credibility of the researcher, whose components are:

- deep versatile special knowledge;
- possession of professional and research skills;
- the presence of psychological and pedagogical abilities;
- general pedagogical culture;
- ability to communicate with people;
- behavior in accordance with the norms of professional psycho-pedagogical ethics.

Thus, to the researcher, as a professional, extremely high demands were made and placed at the limit of a person's capabilities and require total dedication, which is difficult but can be done in the framework of professional education.

4 Conclusion

The main professionally important personal qualities of a future teacher-researcher, it is legitimate to present them in the following form (17):

1. General psychological and pedagogical qualities:

- professional psychological and pedagogical orientation;
- socially and professionally significant properties of the individual such as civic consciousness, humanism, optimism, stable interest in research work, justice and goodwill towards people; sociability, self-discipline and demanding of others.

2. Professional psychological and pedagogical qualities:

- psycho-pedagogical, theoretical, methodical and practical readiness;
- developed psychological and pedagogical abilities such as communicative, perceptual, projective, suggestive, emotional-volitional, constructive, didactic, organizational, cognitive, expressive-speech, creative.

3. Individual professional psychological and pedagogical qualities:

- the psychological and pedagogical orientation of mental processes such as cognitive and emotional, volitional;
- emotional responsiveness (empathy);
- development of the will;
- self-reflection.

Research culture is manifested in his professional abilities (23-24):

- intellectual (development of scientific psychological and pedagogical thinking), which determine the ability to analyze and explain the subject, to separate the essential from the inessential; conduct psychological and pedagogical experiments;
- to carry out a scientific search in the gnostic cycle "facts - model - hypothesis - result – test";
- build on the basis of experimental data a theoretical (idealized) model, find links between the quantitative and qualitative sides of the phenomenon under study, formulate valid conclusions, establish the limits of their applicability; consider the processes and phenomena in the relationship, to reveal their nature and contradictions; to abstract, analyze and summarize research material; this also includes intuition, the gift of foresight, the vastness of knowledge;
- perceptional, which underlie the ability to penetrate into the inner world of man: extraordinary intensity of attention, impressionability, susceptibility;
- communicative, allowing to establish the right relationships with participants in the research process;
- constructive, giving the opportunity to anticipate the course, development, and results of the educational process;
- suggestive, aimed at obtaining the desired result by emotional and volitional influence, the suggestion by force of words, authority;
- emotional-volitional, which allow you to manage your inner state, feelings, behavior;
- didactic, manifested in the ability to present material, interpret research tasks in an accessible, interesting, clear, clear, reasoned way;
- organizational, allowing to organize the cognitive activity of students, as well as their own work as a teacher-researcher: high self-organization, high performance;
- scientific and educational, which make it possible to quickly acquire new information;
- creative, allowing creatively to solve psychological, pedagogical and research tasks: evasion from the pattern, originality, initiative, satisfaction not so much from the achievement of the research goal, as from its process itself, the irresistible desire for creative activity.

These are the main professionally important personal qualities of the future teacher-researcher, defining him as a true scientist, innovator.

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ACTUAL TRENDS IN MODERN PERFORMING ARTS OF KAZAKHSTAN AND THE TRADITIONAL WORLDVIEW

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Abstract: The most important trend characteristic of the Kazakh performing arts is its close connection with the traditional culture. The high popularity of folk music was resulting in and is still resulting in the fact that performers necessarily include folk musical works in their repertoires. The introduction of the wide audience to the academic classical music was not possible without addressing the great inheritance of the Kazakh traditional culture. In the consciousness of society, mass culture exists, as a rule, differentially from the academic one; nevertheless, the problem of interaction of the represented spheres of art is relevant. The desire to universalize the musical language also determines one of the aspects of this problem.

Keywords: Performing arts, Traditional music, Popular music, Academic music, Folk music, Kazakh music, Kazakh culture.

1 Introduction

The performing art of Kazakhstan is a multifaceted cultural phenomenon marked by the mutual influences of diverse traditions and trends. As mentioned by many researchers, in the country's cultural life of the last century, several segments in music coexisted simultaneously and actively. These segments were academic, traditional and mass music. (1) V. Konen identifies mass musical culture as a separate area, the so-called "third layer." (2) Nevertheless, when coexisting, all these areas of performing activity, one way or another, came into contact and interacted.

For example, Kulyash Baiseitova, of course, is an outstanding figure of Kazakh culture and her performance of opera masterpieces remains in the history of Kazakh vocal art as a good example to follow. Nevertheless, today the majority of Kazakhs know her as the unsurpassed singer of "Gákku", a song by Úkili Ybyraı.

The wide audience remembers E. Serkebaev as a performer of such songs as "Alqońyr", "Iapuraı", "Aqjalmash", and this despite the fact that his performances of the roles in such operas as "La Traviata", "The Barber of Seville," "Iolanta", "Mazeppa", "The Queen of Spades" and many others are recognized today by a global audience. The same can be said about many other stars of the Kazakh academic stage. Professionals and connoisseurs of musical art know A. Dnishev and B. Tulegenova as wonderful opera performers. Suffice it to say that Tulegenova's performance of the role of Gilda in the opera "Rigoletto" and Dnishev's performance of the role of Lensky in the opera "Eugene Onegin" are kept in the Golden Fund of the Bolshoi Theater in Russia. However, the people know Tulegenova mostly as a singer of such songs as "Gaýhar-tas" and "Býl-býl"; and Dnishev is remembered as a great interpreter of Abai's songs, in particular, a folk song "Qaraǵım-aı" etc. That is, it makes no sense to talk about the national performing school without regard to the national culture, which is determined, first of all, by the repertoire.

Regarding the activities of professional folk authors performing their compositions, it should be noted that each of them is a bearer of a particular local tradition. However, their names are known everywhere in Kazakhstan. Among the traditional audience, the most popular performers of the Arka tradition are E. Shúkimanova and E. Rysqali. S. Janpeıisova, Q. Kakimov, and A. Qosanova are bearers of the Western tradition. S. Darjanova and N. Janpeıisov are bearers of the musical culture of the Zhetysu region. The epic tradition performers such as E. Shaldybekov and B. Júsipov are also active. A wide audience knows instrumentalists who frequently perform concerts, in particular, S. Shákiratov (a bearer of the Western tradition), B. Múptekeev (a bearer of the Zhetysu tradition), M. Ábýǵazy and A. Alina (bearers of the Central region tradition). Kobyz art is represented by the activities of S. Aqmoldy and R. Orazbaeva. As can be seen, despite the globalization processes, many traditions, formed in the worldview of Kazakhs, have been preserved and successfully circulated in the modern Kazakh culture, which is the determining factor of its uniqueness. Thus, in the modern Kazakh artistic space, the original Kazakh culture, despite various changes in the social context, dialogues, and interactions, exists, actively operates, preserves and enriches the most important parameters of the ethnic artistic world reflection.

In considering the activities of professional folk artists in the Kazakh musical culture, it should be noted that their art, while maintaining the unique traditions of each of the regional schools, is nonetheless marked by evolutionary factors. Despite this, the work of musicians who create in the mainstream of traditional culture is a manifestation of authenticity. Due to the peculiarities of the traditional artistic worldview, many performers create of their own compositions. On the other hand, many composers and performers often turn to outstanding examples of traditional culture. For example, Saıan Aqmolda devoted his works to the study of the phenomenon of Qorqyt, whereas Nurjan Janpeıisov performs songs by Abay and other classics of Kazakh music. This case shows the influence of new factors that are not peculiar to traditional thinking. In this regard, it is necessary to note the impact of such a phenomenon of European musical culture as musical notation. Previously nearly the entire repertoire created by professional folk performers and composers was preserved solely due to its careful preservation in the people's memory. Nowadays, the vast majority of songs and kuis are recorded as musical notation. At the same time, performers, who are also composers, bring their vision into the performance of the works of their predecessors, and respectively they transform the musical image created by an author. Thus, the performance of the works of traditional Kazakh classics by modern musicians incorporates the factor of improvisation that is an integral component of thinking.

2 Materials and Methods

In the context of the mutual influence of the traditional (oral) and European (written) ways for preserving musical works, it should be noted that the first recordings of Kazakh songs date back to 1920 and in 1925, A. Zatayevich's collection "1000 Songs of the Kazakh People" was published in Orenburg. Consequently, the processes of evolution of musical thinking associated with the synthesis of factors of various artistic systems took place in a very short time. In Europe, the formation of "written" musical thinking took place over the centuries. On the one hand, the interpretation of the recorded music text implies a more or less exact adherence to the author's concept. On the other hand, the defining parameter of "traditional" musical thinking lies in the necessary freedom of creative self-realization that is expressed in the improvisational nature of music and, accordingly, its performance. For example, Abai's song "Kózimniń Qarasy", which exists as a variety of vocal, instrumental, and orchestral editings, always gets a new reading. Of course, there are no fundamental differences in the concept; however, changes in the original intonational and rhythmic pattern are often revealed. The same can be said about the variations of many monuments of musical culture that exist in modern everyday life. (3) Thus, contemporary traditional performance is represented by the interplay of trends determined by the East-West dialogue of cultures.

In the traditional environment, in addition to the activities of professional musicians, competitive genres such as aytys and tartys are very popular. However, many participants of such events are not artists who perform concerts. In Kazakhstan, aytyses are held in capitals of districts and regions; there are local and nationwide contests. The genuine interest of the people in such contests is expressed, firstly, in their wide popularity, which gathers thousands of audiences; secondly, in their support by business and government organizations. For example, in Shymkent, an annual akyn contest is held, at which a laureate, in addition to public recognition, gets serious material incentives. Similar contests are held in other cities: on February 28, 2018, the nationwide aytys contest was held in Taraz; in November 2016, the International aytys contest devoted to the 25th anniversary of independence of Kazakhstan took place in Kyzylorda. That is, there is a wide popularity of traditional aytys in the domestic culture. As can be seen from the above, the primary forms of musical practice actively operate in Kazakh culture, both at the professional and amateur levels.

Nowadays, in comparison with the middle of the last century, many components of the traditional artistic world reflection have found their former significance. This is due to a variety of reasons such as the attainment of independence, the need for a national identity of the Kazakh artistic culture, and the high popularity of professional folk art among the wide audience. In the twentieth century, professional musical activities was carried out exclusively by musicians who received an academic education, which, despite the careful preservation of regional traditions, still implied a certain degree of unification of artistic principles. The processes occurring in the modern traditional culture of the country demonstrate the strengthening of the regional factor, and the performers, often well known among a wide audience, do not have a higher education, as they studied under the guidance of outstanding masters in their regions. In this case, it is significant that young performers perceive knowledge from a teacher directly, without resorting to writing. In particular, recent expeditions to South Kazakhstan have revealed many talented performers who have no conservatory education but carefully preserve the traditions of the national culture. (4) Thus, one of the most important trends of modern traditional performance is associated with a return to the original categories of the ethnic artistic worldview.

As for the academic instrumental performance, the influence of traditional culture is also evident here. First, it is manifested in the repertoire of domestic performers. Practically all Kazakh pianists and violinists perform great masterpieces of European musical culture; however, their repertoire necessarily contains works by Kazakh composers that are, one way or another, connected with traditional culture. For example, A. Musahodjaeva's hallmark on the world stage is the Concerto for Violin and Orchestra by G. Jubanova. The virtuoso performance of the Poem-legend about the dombra by N. Mendygaliev contributed to the world fame of J. Aubakirova. (5) Consequently, performing culture, as well as composers' art, cannot successfully operate outside national grounds. This means that, despite the fact that European culture seemed initially alien and incompatible with the traditional worldview of the Kazakhs, this synthesis resulted in the phenomenon of the Kazakh performing school, which today is an integral part of the global musical culture. (6) Thus, the most important socio-cultural factor in the success of the performing academic culture of Kazakhstan lies in its close connection with traditional art.

Traditional culture is the result of the centuries-old spiritual experience of the people. This culture's achievements survived the centuries and has absorbed in itself supreme values and ideals that determine philosophical orientations. The ethnic worldview is also an effective factor in the formation of new trends and orientations in art, including the modern art. The current musical practice reveals the following most significant factors in the manifestation of the characteristics of the traditional artistic worldview in the modern culture of the country. First, it concerns composers' art. On the one hand, the reflection of the national features in the academic composers' activities can be noted. On the other hand, the activities of professional folk authors, who are extremely popular with a wide audience is also notable. Secondly, the features of the ethnic artistic worldview are reflected in the domestic performing art by synthesizing European academism and the specifics of traditional art. The system of professional music education plays an important role in preserving the national identity of Kazakh musical culture. Consequently, the influence of traditional culture is not limited to any external manifestations (referring directly to samples of national music), but affects deep levels, thereby being an effective and promising cultural modeling factor.

3 Results and Discussion

The peculiarities of the performing style in the Kazakh culture were influenced by a variety of factors, where the decisive role of composers' art should be noted. In the academic art of composing music, the phenomenon of synthesis implemented at different levels and in different contexts comes to the fore. (7) The dominant vector of the aspirations of twentieth-century composers in the Kazakh musicology is determined by the degree of correlation of the authors' works with the principles of traditional art. This vector is also defined by the fact that elements of folk art thinking are used in the system of expressive means of professional genres. (8) At the same time, the Soviet period in the evolution of the artistic culture of the country is viewed as a stage in the development of the national principles of artistic world reflection in the prism of European art and a return to origins. (9) Therefore, the main emphasis in identifying parameters that reflect the uniqueness of the artistic space of domestic composers is placed on the innovative aspects of the musical language, mainly designated by the synthesis of the national and general civilizational attributes. (1)

Taking into account the significant role of the leading cultural centers of the USSR in the formation of the performing art of Kazakhstan in the early periods of its formation, it should be noted that in the first half of the twentieth century, concert activities were carried out by cultural figures from Moscow and Leningrad. Therefore, it is not possible to talk about any aspects of the uniqueness of the performing art of Kazakhstan of that period. However, at the same time, it is important that the arrangements of folk music, which were created by the first composers and musicologists, played a role in the development of music education in Kazakhstan. The first half of the last century was mostly characterized not by the search for the individual performing art image of the country, but on the contrary, by the integration of the culture of Kazakhstan into the world (Russian-European) cultural process. The first Kazakh performers among pianists are G. Chumbalova and N. Mendygaliev, and among violinists, these are A. Tolganbaev and A. Almat. It is characteristic that the first professionals carried out their activities in several directions, which also characterizes the socio-cultural background in the formation of the performing art of the country. For example, G. Chumbalova, the first pianist, was also a famous musicologist. N. Mendygaliev, besides purely performing activities, created music. That is, the understanding of the need for synthesis did not allow the first domestic performers to engage in purely concert work. A repertoire was needed, and the first pianists created works for a wide audience, which also underlines the significance of the national factor. Understanding the need to create prerequisites for the development of academic culture dictated the importance of a scientific understanding of traditional art in order to determine the ways and methods of integration. Thus, the formation of the performing culture of Kazakhstan in the early stages included a whole range of activities, among which the actual concert activity played a far from a decisive role and was carried out mainly by visiting artists from the country's leading cultural centers. The significance of Kazakh performers of the early stages consists mainly in understanding the ways and methods of extrapolating European academic culture to national soil (creating a repertoire, studying traditional culture, collecting and publishing traditional art monuments in order to adapt them to European standards).

As for the repertoire created by composers of that period, it is necessary to note the importance of the works of that time in education, which has been preserved until today. On the one hand, the arrangements of folk songs provided the national grounds for the Kazakh performing school, introducing future instrumentalists to the masterpieces of traditional culture. On the other hand, the set of expressive means used by the authors belonged to European artistic thinking, which determined the success of the integration of domestic performers. Thus, the early stages of the formation of the performing art can be defined, on the one hand, as the search for the individuality via the preservation of national grounds; and, on the other hand, as the striving for maximum compliance with world criteria.

In subsequent years, the search for synthesis methods covered many types of interaction: the combination of genre components, the projection of national content on the principles of European structural thinking and vice versa, various types of connections between the means of expressiveness of composer music and traditional song and instrumental creativity. (1) In addition, each composer created his own individual artistic reality: the specificity and degree of correlation was determined by the personal factor. As an example, the starting point for many composers is the genre dominant in their works, which correlates with the national culture (songs by T. Muhamedjanov, the epic trend in thinking of B. Djumaniıazov and G. Jubanova). In other cases, the degree of implementation of the traditional aspect is determined by the type of interaction with the original material (for example, the arrangements and quotations used by A. Zatayevich and Y. Brusilovsky are combined with addressing ideological categories without quotations that are proper for G. Jubanova, A. Serkebaev, and M. Tulebaev). Many authors (such as N. Tlendiev, K. Ahmedıarov, and M. Koıshibaev) created works for traditional instruments. Unlike at the previous stages characterized mainly by projecting the traditional aspect onto the European one (while elements of different traditions were clearly stratified), in the 1970s a synthetic type of interpenetration was established in musical culture, in which the components of traditions were not differentiated (e.g. A. Serkebaev and T. Kajgaliev). (7)

As can be seen, the works of almost all composers in Kazakhstan are marked with the striving for synthesis. In this context, the problem of genre interactions is especially important. The genre problem in the Kazakh musical culture was quite acute since the development of the musical art of Soviet Kazakhstan in the twentieth century was a difficult way of mastering European genres in the context of national content. In the cultural space of the country, genre types of both traditions coexisted in parallel, and their interaction, despite some inconsistency, allowed creating quite bright monuments of musical culture of that period. The emergence and successful circulation of new genre types is determined by the social context and situational factor. (10) The inclusion of thinking elements of traditional musical culture was manifested in the creation of specific genre types (symphonism based on Kazakh song traditions, opera-oratorio, symphonic kui, and others).

Whereas the early stages of the formation of the composer school were mainly related to addressing the original material (e.g. Y. Brusilovsky's operas and A. Zatayevich's arrangements), the 60-70s of the last century were characterized by the interpenetration of the European and traditional attributes. Such an interpenetration was not expressed in violent combination but in truly organic synthesis at the level of thinking and worldview. For example, in the operatic works of that period, the influence of the national tradition was manifested at the level of the artistic concept: the main factors determining the prevalence of epic thinking in operatic dramaturgy were determined. (11). The operas "Enlik-Kebek" by G. Jubanova, "Qurmanǵazy" by G. Jubanova and A. Jubanov, and "Qamar-sulý" by E. Rahmadiev are the vivid examples that illustrate the processes of genre interactions (a reflection of the plots of the national eposes and the saturation of the opera as a genre with the elements of the ritual culture of the Kazakhs).

In the field of symphonic works, the processes of genre interactions were characterized from several angles:

- introduction of the specificity of the sound of traditional Kazakh instruments to the range of European academic genres (Concerto for piano and orchestra of Kazakh folk instruments by N. Mendygaliev);
- rise in the influence of the improvisational principle, i.e. the individualization of genre types that have no analogues in the European tradition ("Dialogues" by M. Sagatov, "Frescos" by T. Mynbaev, and "Stained Glass" by T. Kajgaliev); the interaction of cyclicality and poeticality ("Rizvangýl" by K. Kujamıarov, "Jiger" by G. Jubanova, and "Jaılauda" by K. Musin);
- impact of the concert style, manifested in the influence of the national worldview, in which the individual personal factor is of the utmost importance (Concert piece by T. Kajgaliev, a musical tableau "Mergen" by M. Sagatov);
- reliance on the dramatic principles of national artistic thinking: the combination of symphonism and kui ("Daırabaı" and "Qudasha duman" by E. Rahmadiev, "Mahambet" by N. Tlendiev, "Jiger" by Jubanova and "Frescos" by T. Mynbaev);
- adaptation of epic stories ("Aqsaq qulan" by G. Jubanova and "Steppe legend" by T. Kajgaliev).

One of the defining tendencies in the development of national symphonic music is the synthesis of the dramatic principles of dombra kui and the European symphony. Kui, as a phenomenon of the traditional culture of the Kazakhs, of course, had a great influence on the formation of the most important stylistic features of Kazakh chamber instrumental and orchestral symphonic style. (12-14)

In the views of Kazakh composers of the second half of the twentieth century, kui was a kind of generalized "image of national instrumental culture," which explains the widespread popularity of kui among composers. (15) There are examples of choral kui ("Abai" by B. Baıkadamov), kui with choir ("Kisen ashqan" by G. Jubanova), kui for orchestra of Kazakh folk instruments ("Qurmanǵazy" by M. Koishibaev), and kui in ballet ("Frescos" by T. Mynbaev and "Aqsaq qulan" by A. Serkebaev). Elements of kui were actively introduced into opera. Kui, as a "generalized image of national music," had the greatest influence on orchestral and symphonic genres. The popularity of symphonic thinking in the Kazakh culture is explained by the breadth of philosophical generalizations connecting the principles of symphonism with the features of traditional instrumental music. The appeal to the symphonic genres revealed the selectivity of the artistic forms of national culture appearing only in the context of the interaction of genres. (15)

With regard to other genre interactions, such phenomena as the introduction of aytys scenes to opera and the use of ritual attributes of the Kazakh traditional culture are to be noted (Jibek's Lamentation from the opera "Qyz Jibek" by Y. Brusilovsky, bridal jar-jar, the farewell lamentation of a bride in the opera "Birjan and Sara" by M. Tulebaev etc.). The genre elements of the traditional Kazakh music were also widely used in symphonic music (joqtau (lamentation) intonations in Passacaglia, the scene of the folk game "Kyz kuu" from "The Steppe Suite" by T. Kajgaliev, and the symphonic poem "Tolǵau" by E. Rahmadiev). As for the implementation of individual expressive components, composers actively use the most characteristic qualities of national music.

As can be seen, in the second half of the twentieth century, composers tended to such large-scale genres as symphony and opera. This is largely due to the decisive role of epic thinking in traditional culture. (16) There were about the same trends in the performing culture of the time. By that time, outstanding masters of the academic stage, who had received their education in Moscow and Leningrad, worked in Kazakhstan. These were V. Tebenihin, G. Kadyrbekova, A. Akbarov, K. Andarbaev, E. Kogan, I. Kogan, and many others. In the field of vocal art, the works of outstanding singers who received education in the Russian and Almaty conservatories (E. Serkebaev, A. Dnishev,

R. Djamanova, B. Tulegenova, G. Esimov, K. Kalilambekova, and S. Kurmangalieva) enjoyed great popularity. Interestingly, the vocal school of Kazakhstan boomed much earlier than the instrumental one. This is due to the peculiarities of the national mentality, as the vocal skills have always enjoyed great honor in the traditional environment, famous singers had a special status among the Kazakhs. (16) Consequently, the peculiarities of the national worldview play an important role in the relatively fast development of the vocal school of Kazakhstan. S.A. Kuzembai writes in his dissertation about the similarity of the principles of European opera and national vocal genres. (17) In addition, the mastering of academic musical instruments was carried out by studying the European repertoire, while vocalists sang traditional songs, and operas by Kazakh composers often quoted folk material. Thus, in comparison with instrumental schools, vocal performance in Kazakhstan was formed much earlier, due to the specific features of traditional artistic philosophy.

It was noted above that the desire for large-scale genres, typical of composers of the second half of the twentieth century, also manifested itself in the performing environment. The repertoire emphasized this. Instrumentalists mainly performed works of the concert genre. A comparative analysis of the repertoire of that time, made from accessible records, demonstrates the primacy of the large-scale concert genres. For example, there is a gramophone record of the time recorded by the company "Melodiya" with G. Kadyrbekova's performance of the works of F. Liszt and Piano Sonata No. 2 by S. Rachmaninoff. That is, chamber works are not as attracted to Kazakh artists as striking large-scale works. E. Vangler, A. Musahodjaeva, G. Murzabekova, and J. Aubakirova, who appeared later on the Kazakh stage, also sought to perform large, technically complex works (piano concertos by S. Rachmaninoff, F. Liszt, P. Tchaikovsky, and J. Brahms; violin concertos by J. Brahms, P. Tchaikovsky, I. Bruch, and S. Prokofiev. At the same time, according to N.A. Govar. (18), in the Russian performing art of the second half of the twentieth century, piano miniatures were extremely popular that was associated with the weakening ideological pressure and the revival of interest in the inner world of individuality. That is, despite the close ties with the cultural centers of Russia, the trends in Kazakh performing art were marked by individuality factors. This also shows the impact of the traditional artistic worldview, in which the musician was an orator and leader and where music had world-modeling and world-correcting functions. As can be seen, the influence of the national creative psychology played the most important role in the formation of the concert repertoire of the second half of the twentieth century in Kazakhstan. The emergence of high-class professionals contributed to the creation of large-scale national style works by domestic composers (piano concertos by N. Mendygaliev, G. Jubanova, and T. Kajgaliev; Violin Concerto by G. Jubanova; Kui by M. Sagatov). Thus, among the Kazakh performers, there is a tendency to symphonization or large-scale works that is clearly manifested in their repertoire. This also shows the influence of epic thinking. Consequently, in the second half of the twentieth century, in the Kazakh performing art, the uniqueness of the national performing pattern is outlined and factors that determine the style individuality of the Kazakh performing school are appearing.

The appeal to the most complex popular works known to a wide world audience was also dictated by the need to achieve recognition from the European public. Moreover, this was an indispensable condition for success in the domestic cultural environment, as S. Eisenstadt (19) argues in his dissertation devoted to piano schools in China, Korea, and Japan. According to Eisenstadt, the first condition for the recognition of mastery in the national environment is a success abroad. Piano schools studied in his monumental work eloquently testify to this. If we compare it with the performing cultures of the above-mentioned countries, the academic art of Kazakhstan also refers to relatively young schools. the comprehension of the most important factors of European artistic thinking was one of the indispensable conditions for the formation of the national performing environment. In the world, and in Kazakhstan itself, domestic academic art became popular only after the victories of A. Dnishev, G. Esimov, B. Tulegenova, A. Musahodjaeva, J. Aubakirova, G. Kadyrbekova, and G. Murzabekova at prestigious contests. As can be seen, the formation of performing culture in Kazakhstan is part of global processes, and the most important role is played by the recognition of outstanding personalities by the world community.

If we look at academic performing arts from a chronological perspective, we can identify moments of evolution in terms of the repertoire. In the early stages there is a prevalence of works of European classics but in the 1960-70s, Kazakh musicians actively perform works by domestic composers, thus ensuring an inseparable connection with the national grounds. Modernity is represented by the concerts of academic performers, where they perform the monuments of traditional musical culture, experiment with chamber line-ups, combine violin and dombra ("Uly tau"), grand piano, dombra, bayan, and kobyz ("Bridge of times" by A. Raimkulova). The orchestras' aytys presented at the gala concert in the Qurmanǵazy Kazakh National Conservatory in 2013 had a big resonance (20). In this case, reference should be made to the primacy of the genre context of traditional music of the Kazakhs that in itself is a revolution in thinking. The success of such events, on the one hand, is determined by the high popularity of folk music among the domestic audience, on the other hand, the foreign public is also keenly interested in new trends in Kazakhstani culture and shows great interest in the new interpretation of traditional music in terms of European academism. Therefore, it is possible to nominally designate three periods in the formation of individual factors of the domestic performing culture in terms of relations with tradition:

1. The primacy of the European classical repertoire, the isolation of the academic sphere;
2. Popularization of domestic academic composers' works and the search for synthesis;
3. An active appeal to the traditional culture itself, which is manifested in the repertoire and in the search for new forms of music making, the interpenetration of traditional and academic culture.

As already mentioned, in the twentieth century in Kazakhstan, all three areas that determine the performing culture circulated simultaneously and only occasionally contacted each other. That is, the academic music existed by itself, the popular music was a separate segment, and the traditional performance also had its own special audience. In the new time, thanks to globalization, different areas actively interact with each other, which is manifested in the expansion of relationships.

4 Conclusion

The increasing influence of traditional culture on the academic one is clearly visible in the field of performance. Academic art started to acquire a mass character at the end of the twentieth century. In this connection, the works of Aidos Sagat is of interest. A. Sagat is today a prominent representative of popular culture. The creative activities of the band "Urker", of which Sagat is a creator, was a landmark on the Kazakh stage at the turn of the century. At the same time, Sagat is a talented pianist with a solid academic education. After graduating from the conservatory, Sagat was quite a serious performer, winner of national and international contests; however, he was actively involved in the sphere of mass genres. Already then, the tendency for the democratization of academic performance had started, and was confirmed later in the activities of such bands as "Uly tau", "Mezzo", and "Muzart." A musician in the traditional sense is an outstanding public figure broadcasting his/her work to the whole world; therefore, his/her art should be as accessible as possible to everyone. In addition, the desire for accessibility of academic culture manifested in the synthesis of academicism and mass character is a reflection of the national peculiarities of understanding the role of an artist.

In Kazakh culture, the influence of traditional music on the mass segment is not unambiguously manifested since, on the one hand, the works of genuine bearers of national art enjoy wide

popularity; on the other hand, the so-called popular songs have obvious traces of the Kazakh folk songs.

Searches of composers in the field of popular culture, first of all, are defined as a genre and ideological synthesis. (1) Popular music is the highest manifestation of "concertness" in a broad sense. From the point of view of the traditional artistic worldview extrapolated to the sociocultural context, popular and not academic music incorporates the whole complex associated with understanding the properties and functions of musical performing creative activities. Therefore, the appeal of composers to popular songs manifests the influence of ethnic traditions in art. (7)

The content of popular songs, despite the eternal topics such as love, patriotism, and so on, is in most cases dictated by the current context. (15) The text of the songs reflects modernity. Popular songs are a kind of document of the era. The capturing of something significant at a given moment determines the role of a popular song in the reflection of the general cultural context. When projecting these qualities onto the traditional musical culture, one observes analogies with the art of akyns that confirms the closest connection of mass culture with traditional thinking.

With regard to the Kazakh popular songs, it is necessary to note their successive connection with the oral professional tradition characterized by the "unity of sound-word." (1) In the culture of Kazakhstan, the song genre is richly represented in the works of S. Baiterekov, K. Duisekeev, E. Intykbaev, T. Muhamedjanov, and K. Shildebaev. At the same time, the genre basis of the songs adapts the canons formed in the space of traditional art to the requirements of modernity. This is expressed in the content and expressive components. Currently, the mass culture of Kazakhstan is represented by a variety of trends, of which the most important is an orientation towards national identity. Here, a number of activities are to be noted:

- Creation of artworks apparently influenced by Kazakh song art (“Urker” (21) and “Qairat Núrtas” (22));
- Arrangements of folk tunes and songs (“Muzart” and “Mezzo”);
- Arrangements of traditional instrumental works for modern line-ups (“Uly tau” (23));
- combination of expressive components of Kazakh and European music (“JCS” (24) and “Satzhan Project” (25)).

This article refers to the creative activities of the most popular professional ensembles without mentioning many successful Kazakh performers and ensembles. As practice shows, almost all the trends presented here are popular with a wide public. Regarding the proximity to authentic samples, it should be noted that the synthesizing trend is most distant from the original parameters of traditional artistic thinking. Thus, the secondary forms of musical practice in the mass culture of Kazakhstan are represented by different trends; several evolutionary stages (quotation-recreation-synthesis) exist simultaneously.

When talking about arrangements present in the works of, for example, the band “Muzart”, it should be noted that these samples do not always literally reproduce the original, as often folk songs are subject to adaptation. For example, the song “Úshqońyr” is performed in a polyphonic texture, which in itself contradicts traditional philosophy. It is harmonized in a pop manner and with a significantly updated sound. (26) The same can be said about the arrangements of folk songs performed by the band "Mezzo." (27) This also shows the trends that synthesize the national and general civilizational aspects.

In academic art, the stadial development of composer thinking is represented by historical evolution but in mass culture, all stages occur in a single time field. First, this is due to the relatively recent attainment of independence that resulted in a deep interest in traditional art. Secondly, in the context of globalization, the preservation of the parameters of the uniqueness of an ethnic artistic worldview is one of the decisive issues. Globalization dictates the need for the integration with the world cultural process that contributes to the development of the synthesizing thinking and raise the national culture to the international level. Consequently, the reproduction of the parameters of the traditional creative philosophy in popular culture is dictated by a need formed by the current context.

Therefore, in the mass musical culture of modern Kazakhstan, the influence of traditional culture is decisive and manifests itself in different areas of composers’ art (professional folk and modern popular areas).

All of the above is naturally reflected in academic performance. Today it is impossible to refer academicism in its generally accepted sense since the work of modern performers is characterized by a mixture of components of different layers of the performing art. For example, the activity of the State ensemble “Camerata of Kazakhstan” is not limited to the performance of purely academic music. The search for innovative ways of developing performing art manifests itself at different levels of activities. On the one hand, this is reflected in the repertoire of the chamber orchestra that includes the arrangements of the songs by the legendary band “The Beatles,” film music, and jazz concerts with popular vocalists (the concert with the talented jazz singer Janna Sattarova who died young). (28) Also, there was a concert of J. Aubakirova, held in Astana on September 29, 2018, at which she presented an interesting program consisting of the arrangements of traditional music samples. (29) As practice shows, this trend is gaining momentum and is very popular with a wide audience.

On the one hand, such a search reflects performers’ role at the present stage of development of the academic culture of Kazakhstan. The market economy makes new demands on performers able to maintain their popularity among the widest possible audience. This is a significant sociocultural aspect of the activities of modern performers adapted to the requirements of society. On the other hand, the striving for the democratization of academic art clearly reflects the impact of traditional psychology of artistic creativity. Thus, at the turn of the century, features of the uniqueness of the national performing school reflecting the peculiarities of the traditional worldview of the Kazakhs are clearly manifested.

All the above has yielded a number of conclusions. In the evolution of the socio-cultural parameters of the domestic performing art, a significant role is played by the traditional worldview of the Kazakhs, and therefore the history of the development of academic art is conventionally divided into a number of stages:

1. 1930-50s. The formation of the performing arts of Kazakhstan. The primacy of the influence of the principles of European artistic thinking. Performing arts are promoted by visiting masters;
2. 1960-90s. The synthesis of general civilizational and traditional aspects. The creation of the national concert repertoire. The emergence of domestic masters of performing art. The rise in the influence of traditional musical culture;
3. The end of the twentieth and the beginning of the twenty-first centuries. The final formation of the parameters of the uniqueness of the Kazakh performing school determined by the primacy of the traditional worldview.

The most important property determining the individuality of the Kazakh performing art is the significance of a performer’s personality closely related to national creative psychology. On the other hand, the influence of the socio-cultural context, which also determines the originality of the performing culture of Kazakhstan, is manifested in the maximum democratization of academism reflected in the mass character or democratization of academic performing art.

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Primary Paper Section: A

Secondary Paper Section: AJ, AL

B PHYSICS AND MATHEMATICS

BA GENERAL MATHEMATICS
BB APPLIED STATISTICS, OPERATIONAL RESEARCH
BC THEORY AND MANAGEMENT SYSTEMS
BD INFORMATION THEORY
BE THEORETICAL PHYSICS
BF ELEMENTARY PARTICLE THEORY AND HIGH ENERGY PHYSICS
BG NUCLEAR, ATOMIC AND MOLECULAR PHYSICS, ACCELERATORS
BH OPTICS, MASERS AND LASERS
BI ACOUSTICS AND OSCILLATION
BJ THERMODYNAMICS
BK LIQUID MECHANICS
BL PLASMA PHYSICS AND DISCHARGE THROUGH GASES
BM SOLID-STATE PHYSICS AND MAGNETISM
BN ASTRONOMY AND CELESTIAL MECHANICS, ASTROPHYSICS
BO BIOPHYSICS

INFORMATIONAL AND MATHEMATICAL MODELING OF THE IMPACT OF EMISSIONS INTO THE ATMOSPHERE ON PUBLIC HEALTH

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Abstract: In the article proposed methods of processing and analysis of materials of air pollution research and its impact on public health. There are developed mathematical-statistical models of the influence of the environment on public health. The article aims to examine the possibility of mathematical modeling assessment of the impact of harmful emissions into the atmosphere of the industrial region on the population's health. The developed mathematical model can be used by the industries for the efficient solution of environmental problems.

Keywords: mathematical model, atmospheric pollution, model for numeric variables, model for non-numeric variable, public health.

1 Introduction

To predict the occurrence of a particular environmental situation, the degree of concentration (C) of pollutants in the air has high importance. According to its excess over the maximum permissible concentration (MPC) and the limit, there can be given the advice to reduce emissions, or the length of time the work of enterprises.

According to many authors, there are between 100 and 250 quality forecasting techniques of the atmosphere. (1) However, the leading experts believe that it makes sense to speak only of the three methods: the expert, extrapolating and modeling. (2) And all the rest are merely variants of these methods.

Expert prediction method can be used if the forecast data cannot be processed completely or at least partially. It is based on a system of obtaining and processing of specialized assessments of the forecast of a situation by interviewing experts in the field of science.

Extrapolation and interpolation methods are used mostly for short-term forecasts. It is based on the study data (both quantitative and qualitative) for a few years prior, and if the change in the environmental situation does not undergo abrupt jumps, implying a trend change in the status for the next forecast period.

In practice, the most widely used method is the method of modeling. For the preparation of the model required to fulfill three basic conditions:

- Identification of factors that are essential for the prediction;
- Determination of the actual relationship of elements to a predictable phenomenon;
- Development of algorithms and programs.

This method is useful because it is possible to use computers for data processing. Further, as it is not a complicated model (it is always easier for forecasting object).

Using this method does not require the involvement of highly qualified specialists. It allows taking into account the probability of occurrence of a particular environmental situation.

The method of mathematical modeling is the most representative (both in research and medical practice). It allows simulating the occurring processes realistically, highlights the most relevant and optimal values of the plurality of options, quantitatively reflects the relationship of many factors of the exposed qualitative analysis, uses of independent forecasts and dynamics of individual elements, builds a system of interconnected models. (3)

The modern development of humanity defines a constant transformation and change of biological processes in the entire globe. And it is worth noting that the dynamics of these processes can go both to the benefit and to the detriment of a person. In this case, it is important to be able to determine the trend of development of biological processes for a possible correction, especially in the early stages of their existence. In practice, to solve this problem, there can be used the simulation method based on a mathematical analysis of biological processes parameters method. (4) Mathematical modeling in biology is becoming the increasingly common method of scientific analysis widely used to achieve other sciences, including cybernetics and mechanics. It is an excellent tool for understanding the evolutionary and genetic effects of complex processes, the development of which is difficult to predict analytically. The presence of dozens of complex customized software packages for the simulation is currently modeling an affordable option for researchers in many fields. (5)

It is increasingly used in science, math, and cybernetic methods, and as a result of their synthesis with biology, there are new areas of research, such as synergetics, computer sciences, biometrics, etc. A variety of biological objects and phenomena are led to the fact that for their quantitative description from the outset are involved the submission of various mathematical disciplines. (6) At the same time, depending on the nature and properties of the investigated processes for modeling, there selected a unit, discrete or continuous mathematics. (7)

The main advantage of the method of modeling is the ability to study the degree of variability of the system under the influence of individual factors and determining the fullness of related variables. (8)

There are exacerbated the problems of industrial pollution complexes for which the maximum permissible sanitary norms still do not meet the modern requirements. An important task of science is currently to forecast changes in ecological systems under the influence of natural and anthropogenic factors. (9)

This problem becomes sharper in Kazakhstan. The interest in the increasing production capacity of the oil and gas industry led to a severe human impact on the environment and became a global problem with a big emergency. For the main companies of the Republic, the annual emissions amount is more than 135 thousand tons. An urgent issue is the utilization of associated gas in oil and gas fields where they are flared. Every year a growing number of complaints and fines which are currently in comparison with 2001st has increased 5 times.

For the implementation of environmental protection measures, the national company plans to spend more than 1.8 bln. tenge annually. However, this is not always accompanied by a meaningful, purposeful work to create a favorable natural environment protection management system. It takes a scientific approach to the solving of these problems.

In connection with the noted above, the impact of pollution on human health (Table 1) needs to be addressed with the help of mathematical modeling. (10)

Table 1. The Impact of Pollution on Human Health

Pollutants	Sources	Pathological Effect on Human Body
Aldehydes	Thermal decomposition of fats, oil or glycerol	Irritate nasal and respiratory tract
Ammonia	Chemical processes-dye making, explosives, fertilizers	Inflame upper respiratory passages
Arsenic	Processes involving	Break down a red cell in blood jaundice
Carbon monoxide	Gasoline motor exhausts, burning of coal	Reduce O_2 carrying capacity of blood
Chlorine	Bleaching cotton and other chemical processes	Attack entire respiratory tract and mucous membrane of eyes, cause pulmonary oedema
Hydrogen cyanides	Fumigation blast furnaces, metal plating	Interfere with nerve cells, produce dry throat, indistinct vision, headache
Hydrogen fluorides	Glass etching, fertilizers production	Irritate and corrode all body passages
Hydrogen sulphides	Refineries and chemical industries bituminous fuels	Smell like rotten eggs, cause nausea, irritate eyes and throat
Nitrogen oxides	Motor vehicles exhaust soft coal	Inhibit ciliary action of so that soot and dust penetrate far into the lungs
Phosgene (carbon chloride ($COCl_2$))	Chemical and dye manufacturing	Induce coughing, irritation, and sometimes fatal pulmonary oedema
Sulphur	Coal and oil combustion incinerator	Causes chest constriction, headache, vomiting, and death from respiratory-ailments
Suspended particles (ash, soot, smoke)	Incinerator, almost any type of manufacturing	Cause emphysema, eye irritation, and possibly cancer

2 Materials and Methods

To assess the impact of the environment on public health, the authors used mathematical and statistical models of 4 types: two models for numeric variables and two models for non-numeric variables. (11-17)

2.1 Models for numeric variables

There were distinguished the set of territories – S_1, S_2, ..., S_l, the set of environmental factors – X_1, X_2, ..., X_p, the set of parameters describing the incidence – y_1, y_2, ..., y_m, the gender and age groups of the population – U_1, U_2, ..., U_q, successive intervals of the time (typically, a calendar month) – t=1,2, ..., n. Determined y_i (U_c, Sdt) – as the value of the incidence rate y_i for the group of the population U_c in the territory Sd in the time interval t; X^y (Sdt) – the average value of factor X^y in the territory Sd in the time interval t. The factors X_1, X_2, ..., X_p are corresponding to the characteristics of air pollution with dust, nitrogen dioxide, etc. The indicators y_1, y_2, ..., y_m are representing the characteristics of the health of the population formed in a special way:

- Incidence;
- Mortality, etc.

The groups U_1, U_2, ..., U_q were determined by gender, age, a region of residence, professional affiliations, etc.

Dependence analysis was carried out in stages in an interactive man-machine mode. (2) Each step was realized by the scheme:

1. Fixes the only group U;

2. Fixes the only indicator y_i and the set of the factors X_1, X_2, ..., X_p – the part or all of a set of the controllable factors;

3. Fixes a subset of the areas and a subset of the time period;

4. From the database, the files are generated by the given group of indicator factors, areas and time periods;

5. Forms the correlation field for each pair of the plurality of variables X_1, X_2, ..., X_p, y_i,

where the Pearson correlation coefficient is calculated according to the formula:

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 (y_i - \bar{y})^2}} \quad (1)$$

where x, $\bar{y}$ – the selective arithmetic means, n – a sample size;

6. Builds the linear regression equations, where the coefficients and settings are measured:

$$y_i\ (USt) = a_0'(U) + \sum_{y=1}^{p} a_y'(U) X_y(S't) + \varepsilon_i(U_1 S_1 t) \quad (2)$$

2.2 Models for non-numeric variables

Let us consider measures of connection for two variables. The authors are entering designations with two outputs for the variables A and B having respectively *i* and *j* levels of the categories, where *fml* – is the frequency of occurrence of both categories *Am* and *Bl.*

f – is the general result of all considered cases or mathematically:

$$f_2 = \sum_y f_r j_1 f_0 k = \sum f_k j_1 f_{00} = \sum_r f_n = \sum_k f_{on} = \sum_r \sum_k f_n k \quad (3)$$

In contingency tables (LxJ) for the determination of connection and independence it is necessary:

- In the case of the variable's independence, the following ratio should be:

$$\frac{f_i j}{f_0 j} \approx \frac{f_n}{f_{00}} \quad \text{for all } i,j. \quad (4)$$

Designating P_{ij}, there is the probability that a randomly selected individual enters the section (ij), just get the condition of independence, namely, if A and B are independent, then $P_{ij} =$

$$P_{i0}\ P_0 J,\ i = 1,2, \ldots, I;\ j=1,2, \ldots, J. \quad (5)$$

The evaluation P_{ij} answers l_{ij}:

$$l_{ij} = \frac{f_{i0} f_{0j}}{f_{00}} \quad (6)$$

Hence, for the criterion X^2 there is the following calculation:

$$X^2 = \sum_I \sum_J \frac{\left(f_{ij} - l_{ij}\right)^2}{l_{ij}} \quad (7)$$

with (i-1)x(j-1) including the degrees of freedom for independence check.

The distribution X^2 only approximately corresponds to the X^2 placement, but it well works for f i J>3. There are following measures of connection which based on X_2:

Cramer's V and Chuprov's T. (18)

$$V=\left\{\frac{X^2}{f_{00}x\min\left[(i-1)(j-1)\right]}\right\}^{j^2}; \qquad T=\left\{\frac{X^2 f_{00}V}{\sqrt{\left[(i-1)(j-1)\right]}}\right\}^{j^2} \quad (8)$$

From the other measures, - Goodman and Kruscal:

$$\tau = \frac{\sum_i \sum_j \left[\left(f_{00}f_{ij} - f_{0j}\right)^2 S_{i0}\right]}{f_{00}\left(f_{00}{}^2 \sum_j f^{2}{}_{oj}\right)} \quad (9)$$

the measures λ_b , λ_a and λ_i .

$$\lambda_b = \frac{\sum_j f_{im} - f_{0m}}{\overline{\begin{matrix} i=1 \\ f_{00} - f_{0m} \end{matrix}}}, \quad (10)$$

where f_{im} – is a maximum input in the *i*-line, f_{0m} – the highest of the results in columns.

3 Results and Discussion

The analysis of contingency tables with more than two inputs is complicated and very cumbersome, so in practice it almost never used. (19)

To evaluate and analyze the impact of social and health conditions of the population on the frequency of uptake of medical care in outpatient facilities, there are Sxr contingency tables, where r – the number of categories received the response of variable; S – the number of values taken by the factor variable.

To test the hypothesis of independence (not to influence socio-hygienic factors on the uptake), there used statistics with degrees of freedom:

$$X^2 c(r-1)(S-1); \quad X^2 = \sum_{j=1}^{r}\sum_{i=1}^{S} \frac{\left(K_{ij} - l_{ij}\right)^2}{l_{ij}} \quad (11)$$

where nij – the actual frequency of contingency tables; lij – the theoretically expected frequencies under the conditions of signs of independence.

To measure the force of connection, the authors used the following coefficients:

$$P=\sqrt{\frac{x^2}{N}}, \text{contingency } C=\sqrt{\frac{x^2}{x^2+N}}, \quad (12)$$

also, Cramer's V, Ksendal's τ , and Stewart's $\tau_{\tilde{n}}$.

To determine the significance of the influence of certain social factors on the incidence rate, there were applied the log-linear models for contingency tables.

Since the exact probability collectively known, (20) it stays to use the observed sections frequency as their ratings. As a result of what is extracted from the model, there can be found a reasonable explanation with the help of the differences in the observed frequencies of sections. (21) The model can be integrated regarding the probability of sections which, of course, are obliged to be between 0 and 1. It implies that the easiest way to build the model is not to work with probabilities, but with some functions of probabilities which are not restricted and have their minimum value - and the maximum one +.

For dichotomizing factors at which probabilities of categories consist 1 and 2 are accordingly equal to P and (1-P), it is possible to work potentiating both parts, having got rid of l n and get $l=\frac{P}{1\square P}$ or, allowing relatively P $P=\frac{1}{1+l^k}$. The function X is known as the "logit" or the predominance of logarithms. (22)

Consider some models for the 2x2 table.

Suppose, there is a 2x2 table for categorized variables A and B, and authors want to test the hypothesis:

1) A_1 is more common than A_2;

2) B_1 is more common than B_2;

3) The combinations A_1B_2 and A_2B_1 are more common, than would be expected if the variables A and B are independent.

Now there is a need for the mathematical method that allows quantitatively compare the relative importance of these three effects, and identify cases in which the effects should be recognized as real and when to assign them random deviations. (11-16) This method involves the use of models, recorded relatively natural logarithms $U_{\bar{i}}$ of the probability of sections P_{ij} .

Consider the model $U_{\bar{i}}$ lcmI, loge from P_{ij}

$$U_{ij} = M + \lambda_i^A \lambda_{ij}^B \text{ , where M – is a middle part,}$$

$$\sum_i \lambda_i^A = \sum_j \lambda_{ij}^B = \sum_i \lambda_{ij}^{AB} = \sum_j \lambda_{ij}^{AB} = 0 \quad (13)$$

If the model has as many parameters as sections, it is called saturated. (1)

Restrictions (2) have the form (in this case):

$$\lambda_r^A = -\lambda_i^B \text{ ;} \qquad \lambda_r^B = -\lambda_i^B \text{ ;} \qquad \lambda_2^{AB} = -\lambda_{21}^{AB} = \lambda_n^{AB}$$

Enter the simplification and sum both parts of (1) I, AB

$$\sum_i U_{ij} = \sum_i M + \sum_i \lambda_i^A + \sum_i \lambda_j^B + \sum_i \lambda_j^{AB} \quad (14)$$

Taking into account (2) shall have:

$$Ixv_{ij} = IxM + O + \lambda_y^B + O \quad (15)$$

Summing over all observations will get:

$$Ijv_{...} = IjM + O + \lambda + O \quad (16)$$

Consequently, M=v, substituting it in (3), will find:

$$\lambda_i^A = v_{io} - v_{io}\lambda_j^B - v_{ij}\lambda_{ij}^{AB} = v_{ij} - v_{ij} - v_i - v_{ij} + v_n \quad (17)$$

Using (4) it is possible to interpret X as an additive (or a decrease), connected to the category of factor A and in comparison, with the common average. Padding light on the equation (4), concerning the tables:

$$\lambda_i^A = \frac{v_1 + v_{12} - v_{21} - v_{22}}{4} = \frac{1}{4}\sum \log O\left(\frac{P_{ij}}{P_2 j}\right);$$

$$\lambda_i^B = \frac{v_{11} - v_{12} + v_{21} - v_{22}}{4} = \frac{1}{4}\sum \log e\left(\frac{P_i j}{P_2 j}\right); \quad (18)$$

$$\lambda_i^{AB} = \frac{v_{11} - v_{12} - v_{21} + v_{22}}{4} = \frac{1}{4}\sum \log e\left(\frac{P_{11}P_{22}}{P_1 P_2}\right).$$

The two-dimensional model or the table with two inputs was considered above, and the authors need to define a mode of operation in case of many-dimensional tables.

The task consists of choosing one or several rather prime models from all variety.

The saturated model is used in the article. When was selecting the saturated model, the authors estimated the value of all which can be imagined to include in the appropriate simple model. Some of the values can be close to 0 that will indicate their small probability. Then at the choice of the unsaturated model, it is possible to be guided by the aspiration to include in it, first of all, those which significantly differ from 0.

Two simple methods were used in the building of an unsaturated model:

a) Switching method, which is that at each step is introduced into the model is the most important;

b) Elimination method, the essence of which is that at each step of the model excludes the least important.

The introduction of an additional parameter in the model may result in its improvement. One method or any combination of them can necessarily lead to the best single model. (23)

3.1 Software problem

For the implementation of the described algorithms of the issue, the application program package of the tasks SAS-82,4 is used. For data handling and simulation, the EUNCAT procedure processing categorical variables were used.

In each equation in the first stage, the process without additional options is used; in the last step, it used with FRF Q, X, PREDICT options.

4 Theoretical and Practical Implications

The impact of air pollution on human health can be direct or indirect. Directly related to the effect on the human body of particles and gasses inhaled with the air. Most of these contaminants cause irritation of the respiratory tract, reduced resistance to airborne infections (remember the regular flu epidemic in the larger cities, where, along with a high frequency of contacts between people, as shown by many studies, resistance to infection in the majority of the population is reduced). Also, increase the likelihood of cancer and disorders of the hereditary system which leads to an increase in the frequency of malformations and the general deterioration of the condition of the offspring.

Many contaminants have both carcinogenic (cancer-causing) and mutagenic (causing increased frequency of mutations, including violations, leading to deformities) properties, because their mechanism of action is associated with violations of the structure of DNA or cellular mechanisms of realization of genetic information. These properties are as radioactive pollution, and many chemicals organic nature - products of incomplete combustion of fuel, pesticides used for plant protection in agriculture, many organic synthesis intermediates, is partially lost in the production process.

The mediated effect, i.e. effect through the soil, vegetation and water, because of the same substance into the body of animals and humans, not only via the respiratory tract but also in food and water. In this area of their influence can significantly expand. For example, pesticides preserved vegetables and fruits in dangerous quantities, affect not only the rural population but also to the inhabitants of the cities, eating these products.

The danger of the uncontrolled use of pesticides has increased and from the products of their metabolism in the soil are sometimes more toxic, than drugs used on fields.

Clean air, preventing ingress into the anthropogenic air pollution - one of the most important tasks, the solution of which is necessary to improve the ecological state of the planet and each country.

Mathematical modeling is particularly important for the analysis of biological processes which increasingly give failures under the influence of anthropogenic factors. (24) This approach to the modeled process is widely used in ecology, population genetics, where with the help of models in the form of differential equations described as the behavior of individual populations and relationships in much more complex systems. (25)

The complexity of the biological processes and describing the behavior of mathematical models inevitably leads to the use of computer technology. (26) Computers are increasingly used not only for data processing and refinement of model parameters but also for the production of informatics experiment in many cases designed to replace expensive natural experiment. (27) Therefore, further development of mathematical modeling in biology is seen in the way of the application of modern computational mathematics as a tool for the preparation of highly qualified specialists, build content models, accumulation, and storage of information received as a result of the study of these models. (28)

The use of such models in practice can contribute to improving the strategic biosphere and prevention of adverse biological processes at an early stage of their existence. For example, tracking the dynamics of life expectancy, or the appearance of immunity to pathogens some medicines. (29)

5 Conclusion

Problems of safety and control quality of the environment give rise to a broad class of challenges associated with the search for optimal solutions in the preparation of economic projects that are related to the impact on the environment as well as the planning of environmental measures requiring emission management of existing industrial facilities, taking into account features of the hydrometeorological regime and sanitary restrictions and socio-economic nature. (30) In this regard, the methods of environmental quality improving are becoming increasingly important in the practice of management and can be attributed to these methods:

- Reconstruction and improvement of existing production lines, ensuring the reduction of emissions of impurities and harmful waste;
- Development and implementation of low-waste (closed) processes that provide widespread use of all components and minimum flow releases to the environment. (31)

Selection of management methods (of the most useful from the “environmental” and “industrial” criteria) is a challenge of which solution is hardly possible without the use of a is only approximately corresponded mathematical modeling method. (32)

Currently, due to the increased capabilities of computer maintenance, the method of mathematical modeling of environmental processes is one of the most promising for incorporating technical features of the load on the environment that let to consider the sharpness of the ecological situation in the territory, depending on the incidence of the resident population. (19)

The results of this simulation can be used when making decisions in the fields of ecology, health, medicine industry, investment planning, urban development and others. (33)

Although there is no direct link between the concepts of "ecology" and "investment", they nonetheless are complementary factors. (34) Businesses need to carry out investments with a constant eye on the environment. (35)

Total environmental degradation, the need to accurately forecast and make operational decisions on overcoming the consequences of pollution, require the creation of particular mathematical models which reflect the assessment of the degree of air pollution. (36) The successful solution of the tasks of the forecast is based on the use of mathematical models. (37)

Of course, the development of mathematical patterns in connection with the marginal incidence used to solve a variety of problems, including issues that related to the preparation of environmental measures, the health risk assessment of population which has a great scientific and practical importance. (38)

Analysis of the simulation results shows that the procedural decision of the enterprise and contemporary emission sources environmental characteristics of air only for some contaminants may be in the range of normative values. In general, there is a significant impact on the change in the level of pollution of the atmosphere of the city and on public health. (39)

The constructed mathematical models used to describe the processes of distribution of pollutants in the numerical models. (40-42) It makes it possible to estimate pollution levels at the points of the region which can be used to form the air basin quality criterion. (43)

In this article the authors have implemented the following:

- The methods of processing and analysis of research materials;
- Development of mathematical and statistical models of the influence of the environment on public health.

The paper identified the possibility of mathematical modeling assessment of the impact of harmful emissions into the atmosphere of the industrial region on the health of the population (Table 2).

Table 2. Major Industrial Sources of Air Pollution

Industry	**Major air pollutants**
Thermal power plants	NO_2, N_2O, SO_2, particulates
Steel industries	Smoke, particulates, CO, fluoride
Petroleum refineries	SO_2, smoke, particulates
Metal smelters	SO_2, NO_2, N_2O, smoke, particulates
Fertilizer plants	SO_2, NO_2, N_2O, NH_3, fluoride
Acid plants	SO_2, NO_2, N_2O
Cement plants	SO_2, smoke, particulates
Soap and detergent plants	Particulates, odour
Paper mills	SO_2, particulates, odour

The mathematical model can be a precise tool for determining the influence of industry on the environment, analysis, and assessment of anthropogenic impacts on the ecological condition of the air basin industrial region. (44)

The developed mathematical model can be used by industry to address environmental issues effectively.

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Primary Paper Section: B

Secondary Paper Section: BA, BB, BC

G AGRICULTURE

GA	AGRICULTURAL ECONOMICS
GB	AGRICULTURAL MACHINES AND CONSTRUCTION
GC	PLANT GROWING, CROP ROTATION
GD	FERTILIZATION, IRRIGATION, SOIL TREATMENT
GE	PLANT CULTIVATION
GF	DISEASES, PESTS, WEEDS AND PLANT PROTECTION
GG	ZOOTECHNICS
GH	NUTRITION OF FARM ANIMALS
GI	FARM ANIMAL BREEDING AND FARM ANIMAL PEDIGREE
GJ	BDISEDAISES AND ANIMAL VERMIN, VETERINARY MEDICINE
GK	FORESTRY
GL	FISHERY
GM	FOOD INDUSTRY

MEAT AND DAIRY PRODUCTIVITY OF JABE KAZAKH HORSES OF DIFFERENT FACTORY LINES

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Abstract: Productive horse breeding in Kazakhstan has now practically formed an independent branch of livestock faced by specific objectives - production of horsemeat and koumiss. This industry requires scientific and practical solutions to many issues including those related to the problem of increasing the productivity of animals.
The successful solution to this problem, to a large extent is dependent on the increase in efficiency of breeding due to the wide introduction in practice of the achievements of population genetics, to improve the methods of selection and recruitment, identification and implementation in the production of genetic potential of productivity and breeding qualities of horses, with further improvement of existing and developing new species, types and lines.

Keywords: Jabe horse breeding, line, meat, carcass, milk, lactation.

1 Introduction

Currently, the improvement of the Kazakh horses such as the toad is carried out by pure breeding. It creates a new type of factory with three factory lines Bracelet, Zadornov, and Pamir, corresponding to modern requirements of breeding horses' productive directions.

Extreme importance has been played by the Kazakh horse type of foal by folk selection over many generations for the Jabe horse breeding in productive directions. These horses occupy the largest share in the structure of the rocks used for the production which is 34.5% of the total number of horses in the country. They are very valuable for the adaptation to habitat conditions, endurance, meat, and milk quality. Only one summer grazing 2.5 colts reach a live weight of 370 kg, which ensures highly efficient production of their meat.

Research and practice for conducting productive horse breeding industry show that at present, the most desirable horse of new plant types and lines with intensive growth, preserves the adaptability for the year-round maintenance of a herd that combines earliness with great stature, tends to give heavy carcasses with a uniform fat content in the carcass watering. Breeding of a new type in Seletinsky factory and factory lines Bracelet, Zadornov and Pamirs in the breeding farms of Kazakhstan will enhance the competitiveness of horse meat, which is the actual problem, especially in a market economy.

The purpose and objective of the research. The purpose of research is to improve the genetic potential productivity of Kazakh horses with high stallions of the new Seletinsky type and factory lines Bracelet, Zadornov, the Pamirs, the rationale breeding and genetic selection of parameters and selection at improving Kazakh horses.

The objectives of the study included:

- Establishing breeding and genetic parameters of selected features Seletinsky factory type Kazakh horses;
- The study of the relationship and the degree of variability of selected traits;
- Clarification of the various selection options used in the selection process;
- Study of meat and milk production factory horses of Seletinsky type and factory lines.

Scientific novelty of research. For the first time in the conditions of a steppe zone of the north-east of Kazakhstan to the year-round grazing without changing the content of the technology, there is the possibility of a significant increase in meat and milk production of Kazakh horses such as the foal through the use of highly productive genotypes and their wider replication.

Practical significance. The use of highly productive stallions-producers of the newly created factory and factory lines of Kazakh horses, such as toads with high genetic potential, contributes to further economic strengthening of productive horse breeding based on the qualitative improvement of local herd horses, and aimed to improve the efficiency of breeding herd and greenback horse breeding with higher productive and adaptive qualities.

2 Materials and Methods

The article examines the meat and milk productivity of Jabe Kazakh horses such as foal of different lines, which are the standard for a herd of horses. They are extremely valuable for fitness, endurance, meat, and milk quality. With the lowest cost of labor and resources in a pasture content of 2.5 years of age, they produce cheap meat - horse meat. With the same carcass weight, they reach 210-230 kg, slaughter yield - 57%. Kazakh mares of high type foal milk, average milk yield of 15,5-16,2 l and milking for 105 days of lactation equals 1623-1701 liters.

Research and development work to improve the breeding and productive qualities of Jabe horses was conducted at the farm of Seletinsky Irtysh district of Pavlodar region (now stud Altai Karpykov, Saidaliev-Sartoka). An important element of this work was to develop a method to create a new type of Seletinsky factory and factory lines of Bracelet, Zadornov, Pamir, which was launched in the 1970-1975 period of the last century. In this period, the former state farm Seletinsky imported colts and fillies of the outstanding genealogical lines Berkut, Zaur, writer of Mugalzharsky stud Aktobe region. From imported stallions, new genealogical lines were laid in Bracelet, Zadornov, the Pamirs, which are the most typical representatives of the Kazakh horses.

At the initial stage of creating the Seletinsky factory type (1975-1985), a massive selection by origin and typicality, measurements of body weight, conformation, adaptation to the conditions of a herd of content and quality of the offspring was performed. A selected group of breeding mare stallions was selected from Mugalzharsky stud with identified genotypes outstanding stallions and mares with laying lines and uterine families.

In the second phase of work (1986-1996), continued selection of high-horses, was fought against in order to secure the homogeneous selection of economically useful traits, as well as heterogeneous selection to correct some of the deficiencies identified in the selection process.

In the third phase (1997-2008), highly productive factory line was created. Zadornov, Pamir meat, meat-and-milk type and serial type of seletinsky Kazakh horses. The Intellectual Property Committee on the Rights of the Ministry of Justice of the Republic of Kazakhstan dated 29.03.2013 was issued patents for № 288, 289, 286, 287 as the selection achievements in the industry for productive horse breeding.

To study the efficiency of the Kazakh horse meat in different factory lines, controlling the slaughter carried out on 2.5-year-old colts at slaughter houses stud farm "Altai Karpykov Saydaly-Sartoka" VNIIKonevodstva the procedure, and in accordance with the technological instructions adopted in the meat industry. (1)

Quality of carcass evaluated for the development of muscle tissue, the presence on the surface of fat (watering), and the thickness of fat on the abdominal wall. Also studied: the ratio

between the mass of meat (flesh) and the bones in the carcasses and cuts; the ratio of individual cuts in the carcasses. (2)

For a more objective assessment of the marketability of the meat, cutting horse carcasses on the scheme adopted for the state trading network in Kazakhstan PCT 725-72 was held. For the manufacture of delicious products from the national crest of neck fat produced stings. A part with abdominal muscle and fat was used for the manufacture of kazi, and the last false ribs with a layer of flesh and fat of the finished product - telshik. Cutting from the outside of the spinal lumbar used for the manufacture of a sur. The top layer of muscle tissue with fat from the hips of the curtain was to manufacture products zhaya. Muscle tissue and the other cuts the fat used for the production of sausage products - shuzhuk.

The milk yield of linear and nonlinear mares was calculated taking into account the milk suckled foal at night, under the I.A. Saygin's formnula. (3)

All experimental data were processed by the method of biometrics by N.A. Plohinsky. (4)

Pavlodar region, where horses are bred for Kazakh type of foal, is located in the north-eastern part of Kazakhstan and occupies 124,700 square kilometers. In the north it borders with Omsk, in the north-east - with Russia Altai Territory, in the south - East Kazakhstan and Karaganda, in the west - Akmola and Kokshetau region.

Water resources of the region are made up of surface flow of rivers and lakes, groundwater. The total number of rivers and streams is more than 120, which are placed unevenly on the field. Stagnant lakes are typical for the region. It accumulates runoff falling rivers and temporary streams which is 68% of the 1,200 salt lakes. The volume of annual runoffs is made up of the transit flow of the Irtysh River to 28.9 billion. M3, river runoff and ephemeral streams in 300 million. M3 and local runoff 722 million. M3.

The agroclimatic against Pavlodar region is divided into three zones: moderately-arid, arid and dry.

The territory of the stud farm "Altai Karpykov, Saidaliev-Sartoka" Irtysh area is located in the temperate arid zone. The amount of rainfall during the year is 260-310 mm. During the warm season, fall 220-245 mm, and the period of intense vegetation (May-July) of 120-140 mm. The frost-free period of 3.5 months. The height of the snow cover at the end of the winter of 20-25 cm.

The soil cover of Irtysh area - a plain with numerous hollows and deep, rolling hills and manes. Within the valley, plains are allocated small rivers (Selety, Olenty, Shiderty) and the valley of the Irtysh River. The soil consists mainly of sand with layers of sandy loam, loam, and clay. In the northern part of the common carbonate loess loam. They are characterized by a high content of silt particles, and some carbonates containing sulfuric acid and chlorides. On the left bank of the Irtysh there Paleogene and Neogene clays, characterized by carbonate content and soil salinity.

The vegetation cover of the Irtysh region is grass-spreading steppes, which are the richest on the growth of grass in the Pavlodar region. The soil surface is covered with vegetation at 90-70%. Here, common birch and aspen-birch forests.

The overwhelming importance in the grassy cover covers cereals and forb-grass association (wheat grass, foxtail, brome, meadow phlomis, burnet pharmacy, spark vulgaris, etc.). The bed of the Irtysh River is bordered by thickets of shrubby willows. On the banks of oxbow lakes and streams are common sedge and reeds at the marsh and meadow-bog soils.

Climatic conditions of Pavlodar region - a sharp continental with long and cold winter (5-5,5 months), hot summers and short (3 months). The average annual temperature of 1°C to 3°C. The warmest month is July, the average temperature of which ranges from 20-22°C.

The winter period is characterized by a predominance of cloudy and cold weather. It begins with the first decade of November and lasts until the first decade of April. The coldest month - January, the average temperature is minus 17-19°C. For the winter months are characterized by great instability of temperature on some days there may be deviations from the norm in the 8-11°C in one direction or another. Sometimes the temperature may drop to -40°C, and even up to 45 and minus 49°C.

The number of days with frost below -20°C for 70-80 year, from minus to 30°C (extreme cold) and lower in very cold winters can reach 25-30 days.

Snow cover appears in the last ten days of October, at the beginning of November. Approximately on the 10-15th of November produced steady snow | yukrov, which lasts until early April. The number of days with snow cover is 130-155 days.

In winter, the prevailing winds are of the western and southwestern departments. The number of days with drifting snow in the winter can reach 30-35degrees. As a rule, a snowstorm in the winter there is strong and protracted - up to 3-5 days.

By the spring months include April-May. And sometimes in May is a transition month from spring to summer.

May and June are the driest months of the year. The amount of rainfall in June is 40-60 mm, the temperature ranges from 17 to 19°C.

The summer season lasts from June to August. The hottest month - July, the average temperature is 20-22°C. Maximum precipitation occurs in winter. In June 20-50 mm fall in July - 25-60 mm and August - 25-45 mm. Precipitation in the summer showers is in nature. The number of days with precipitation equal to 9-12 per month, of which more than 5 mm precipitation 1-3 days.

By the autumn months should include September and October. September is colder than August 8-9°C, October is colder than September 10-1, the average temperature in September is 12-14°C, October - 2-4°C.

The first frost in the air, there are on average in the second half of September. Autumn rainfall is much less than in the summer. In September falls 15-30 mm, 15-25 mm in October. Rainfall is subject to large fluctuations. In some years, they may be almost absent, sometimes fall to 80-100 mm per month.

3 Results and Discussion

In conditions of extensive horse breeding, Kazakh horse did improve a little and changed under the influence of interbreeding with improving breeds. An important link in the breeding work with Jabe horses such as the foal was the development of breeding methods to improve breeding and productive qualities in the conditions of year-round pasture content at pure breeding.

The main method of improving animal at pure breeding is the method for breeding lines, which was first used to create Orlov trotter breed horses, as well as in the practice of thoroughbred horse breeding.

Since the mid 50-ies of the last century, the term "meat breeding" as a developing horse-breeding sub-sector has strongly entered into everyday life. During this period, many scholar's livestock raised the question not only of improving the productivity of meat of horses, but also the creation of specialized breeds and types.

So, Y.N. Barmintsev writes about the need to organize the work on the removal of specialized meat breeds, which must adapt to

the conditions of a herd as the rational use of pastures in unproductive deserts and semi-deserts and in conditions of profitable meat horse breeding. (5)

Selection and breeding of Kazakh horses such as the foal in the former state farm "Seletinsky" Irtysh district of Pavlodar region were launched in 1970. Local Kazakh horse which existed in the economy characterized by low growth; wide exterior is typical of steppe horses. Height mares on average amounted to 136.5 cm. Starting with the 1970-1971-ies to improve breeding and productive qualities of the purchased breeding fillies and colts of Mugalzharsky stud Aktobe region, where the best horse's toad population was concentrated and available in Kazakhstan. At the initial stage of selection and breeding work (1970-1975), the mass selection was used. It was based on the following criteria: measurements, body type, body weight, adaptability. Since the vast majority of mares and young stock were installed without origin, the selection for this trait began to lead since 1971, after the importation of breeding colts and fillies of the Aktobe region. During this period, along with a massive selection of existing and individual selection. The selection of animals led by a complex of symptoms in different animals with lower body weight and poor adaptability to a herd of content. As a result of breeding work by 1993 thoroughbred mare Kazakh horses such as the toad had larger measurements (see 140-147-175-18) and live weight of 405 kg.

In 1993, on the basis of the former state farm "Seletinsky" organized farm "Altai Karpykov, Saidaliev-Sartoka", which focuses on the main breeding group of mares (196 goals) and 21 head of purebred stallions of Kazakh horses.

In the subsequent (1993-2009) work with the horses on the type of foal breeding farm "Altai Karpykov, Saidaliev-Sartoka" began to pay special attention to the selection of breeding pairs based on their phenotype and genotype. Selection of mares to stallions was aimed at consolidating wide and massive physique, high adaptability to pasture maintenance and development of such advantages as higher growth and body weight. To consolidate these desirable traits to the best stallions, the best mares were chosen.

During the period of breeding, work on the farm with the Kazakh horses such as toad achieved some success. This can be seen in Table. 1 making the average data toad adult horses of the original group and the new factory Seletinsky type.

Table 1. Measurements of Body Weight and the Type of Toad Horses of the Original Group and the Type of Plant Seletinsky

The measurements and live weight	Indicators	The initial group			Seletinsky factory a type
		1970	1993	2009	2013
Stallions					
Headcount	N	24	21	47	63
Height, cm	$\mathbf{X \pm m}_x$	139,1±0,61	143,4±0,53	145,2±0,49	145,9±0,57
	Cv	2,16	1,69	2,31	3,10
	Td	—	5,3	6,1	8,2
oblique length torso cm	$\mathbf{X \pm m}_x$	145,3±0,69	149,6±0,71	151,5±0,64	154,2±0,62
	Cv	2,33	2,17	2,89	3,19
	Td	—	4,3	9,7	10,0
chest girth, cm	$\mathbf{X \pm m}_x$	172,6±0,77	177,1±0,68	184,3±0,75	185,8±0,69
	Cv	2,18	1,76	2,79	2,95
	Td	—	4,4	10,9	12,8
metacarpus, cm	$\mathbf{X \pm m}_x$	18,5±0,23	19,1±0,21	19,5±0,19	19,7±0,12
	Cv	6,11	5,03	6,67	4,82
	Td	—	2,0	3,3	5,0
live weight, кg	$\mathbf{X \pm m}_x$	412,6±3,6	435,2±3,1	461,4±2,6	511,3±4,6
	Cv	4,27	3,26	3,86	7,20
	Td	—	4,76	10,99	16,9
Mares					
Headcount	N	280	196	375	920
Height, cm	$\mathbf{X \pm m}_x$	136,5±0,47	140,3±0,51	143,1±0,39	144,2±0,42
	Cv	5,76	5,09	5,28	8,83
	Td	—	5,5	10,8	12,2
oblique length torso cm	$\mathbf{X \pm m}_x$	141,1±0,58	147,7±0,62	149,3±0,48	151,6±0,50
	Cv	6,87	5,88	6,22	10,00
	Td	—	7,8	10,9	13,6
chest, cm	$\mathbf{X \pm m}_x$	171,2±0,61	175,4±0,59	180,2±0,42	182,6±0,57
	Cv	5,96	4,71	4,51	9,47
	Td	—	4,9	12,2	13,7
metacarpus, cm	$\mathbf{X \pm m}_x$	17,5±0,219	18,1±0,20	18,5±0,17	18,7±0,06
	Cv	18,7	15,47	17,78	9,73
	Td	—	2,1	3,8	6,0
live weight, kg	$\mathbf{X \pm m}_x$	380,4±3,4	405,8±2,7	447,1±3,8	468,3±3,02
	Cv	4,95	9,31	16,45	19,56
	Td	—	5,85	13,08	19,3

As can be seen from Table 1, the mare Seletinsky factory type exceed the original group of 1970 with height at the withers by 7.7 cm, Group 2009 by 1.1 cm, oblique body length of 10.5 and 2.3 cm, chest circumference of 11.4 and 2.4 cm, and body weight of 87.9 and 21.2 kg. In stallions Seletinsky factory type height at the withers increased by 6.8 and 0.7 cm, oblique body length of 8.9 and 2.7 cm, chest girth of 13.2 and 1.5 cm, live weight of 98.7 and 49.9 kg respectively. According to measurements and body

weight all the difference in performance as the stallions and mares statistically significant.

It should be noted that the value of the coefficient of variation in the animals of all groups higher on live weight and girth measurements of the pastern. The high variability of these features creates more favorable conditions for further selection and breeding work, increasing its efficiency.

The above material shows that the current stock of stallions and mares in Seletinsky factory type of Kazakh horse stud farm "Altai Karpykov, Saidaliev-Sartoka" differs from the original group of horses the best forms of meat and high body weight. Finally, pure breeding horses of Kazakh foal type allows you to save the gene pool of horses and is an important event, not only now, but also for further work in the future.

The stud farm established three factory lines Kazakh horse's toad from the descendants of prominent stallions Bracelet 13-74, 51-76 and Pamir Zadornov 127-78 which provided worthy successors to the 4th generation, a significant part of them has a specific phenotypic and genetic similarity to ancestors. Low volatility in a number of measurements in the offspring indicates their prepotent fathers (Table 2).

Table 2. The Measurements and Live Weight of Adult Stallions and Mares of Different Lines of Kazakh Horses Toad

Indicators	Stallions			Mares		
	$X \pm m_x$	Cv	Class I standard	$X \pm m_x$	Cv	Class I standard
Bracelet Line 13-74						
Headcount	11	-	-	53	-	-
Height, cm	145,1±0,8	0,43	143	143,6±0,23	1,16	141
oblique length torso cm	151,7±0,27	0,59	148	149,3±0,42	2,05	147
chest, cm	184,9±0,37	0,66	177	182,1±0,51	2,04	176
metacarpus, cm	19,7±0,08	1,32	19	18,5±0,15	5,89	18
live weight, kg	471,0±1,69	1,19	430	453,8±4,37	7,01	415
Mass index	154,4	-	147,3	153,3	-	148,2
Zadornov Line 51-76						
Headcount	8	-	-	50	-	-
Height, cm	144,9±0,29	0,57	143	143,2±0,37	1,82	141
oblique length torso cm	151,2±0,41	0,77	148	150,4±0,46	2,16	147
chest, cm	187,7±0,41	0,62	177	184,7±0,49	1,87	176
metacarpus,cm	19,7±0,09	1,37	19	18,7±0,13	4,92	18
live weight, kg	484,9±2,43	1,42	430	463,6±3,77	5,75	415
massiveness index	159,5	-	147,3	157,7	-	148,2
Pamir Line 127-78						
Headcount	11	-	-	73	-	-
Height, cm	144,7±0,24	0,54	143	142,3±0,21	1,26	141
oblique length torso cm	150,1±0,37	0,81	148	148,1±0,42	2,42	147
chest, cm	181,6±0,34	0,62	177	178,7±0,51	2,43	176
metacarpus, cm	19,3±0,07	1,29	19	18,4±0,09	4,18	18
live weight, kg	462,4±2,24	1,61	430	437,6±2,38	4,64	415
Mass index	152,6	-	147,3	151,9	-	148,2

As can be seen from Table 2, the linear measurements on animals and live weight exceed the requirements of the development of the standard of Kazakh horse foal.

Horse line bracelet and Zadornov differ from pronounced forms of meat and have an elongated body and chest. Massive index of horses these lines is quite high: 154.4 and 159.5, and 153.3 respectively, mares and 157.7

Stallions and mares Pamir line are of a lighter weight type and are characterized by high dairy, they have well-developed mammary veins and are cupped udder with flat nipples. The average daily milking mare line of Pamir equals 16.2 kg, milk yield and 105 days of lactation was 1701.0 kg. They excel in the milk of mare lines of bracelets and Zadornov at 208.95 and 269.85 kg.

The most consistent results are variable (Cv) from stallions on all lines and observed on the height at the withers (0.43; 0.57; 0.54), oblique body length (0.59; 0.77; 0.81) and chest (0.66; 0.62; 0.62). In line mares observed the same trend.

Higher volatility as in stallions and mares have been on the circumference of the pastern and the live weight, which is the basis for conducting effective selection for these characters in the further selection and breeding work.

The main features which held selection and breeding work with Kazakh horses such as foal are the type, exterior, measurements, body weight, adaptability to a herd of content, milking mares and offspring quality, which differ varying degrees of phenotypic diversity (Table 3).

Table 3. Variation of Selected Features such as Horses Toad

Genotype	floor	n	Height		Length of body		Girth				Live weight	
							breast		pastern			
			б	C_v	б	C_v	б	C_v	б	C_v	б	C_v
Seletinsky serial type	land.	63	4,52	3,10	4,92	3,10	5,48	2,95	0,95	4,82	36,81	7,20
	cob.	920	12,73	8,83	15,16	10,0	17,29	9,47	1,82	9,73	91,60	19,56
Bracelet line	land.	11	0,63	0,43	0,90	0,59	1,22	0,66	0,26	1,32	1,32	1,19
	cob.	53	1,67	1,16	3,06	2,05	3,71	2,04	1,09	5,89	31,80	7,01
Zadornov line	land.	8	0,83	0,57	1,16	0,77	1,16	0,62	0,27	1,37	6,89	1,42
	cob.	50	2,61	1,82	3,25	2,16	3,46	1,87	0,92	4,92	26,65	5,75
Pamir line	land.	11	0,79	0,54	1,22	0,81	1,12	0,62	0,25	1,29	7,45	1,61
	cob.	73	1,79	1,26	3,59	2,42	4,35	2,43	0,77	4,18	20,32	4,64

As can be seen from Table 3, the highest variability was observed in body weight, which is equal to 7.20 at the stallions and mares 19.56, then metacarpus - respectively 4.82 and 9.73. According to measurements of the height at the withers, oblique body length and chest girth characterized by more stable performance variability in stallions Seletinsky plant type 3.1; 3.19 and 2.95 and 3.83 respectively in mares; 10.00; 9.47.

Between the linear animals, there are some differences in variability indices. Height at the withers with higher volatility (0.57; 1.82) was observed in animals of Zadornov, and on the metacarpus and the live weight on higher levels of variability were mares line Bracelet (5.89; 7.01). By oblique body length and chest girth, high variability observed in mares Pamir line compared with animals from other lines (2.42 and 2.43). The above material shows that in Seletinsky factory style and selection on body weight, bony, body length and chest girth give positive results in the breeding work to improve these symptoms.

A correlation between signs, providing the productivity of farm animals are of great importance in breeding. The theoretical basis of this section is a selection of the doctrine of a self-governing body as an integrated system, the relationship, and interdependence of all its parts.

Selecting on any one feature, increasing the specific productivity of animals, we always call the variability of other features.

High body weight and meat productivity of Kazakh horses such as foal, has the following main features: height at the withers, body length, chest girth, cannon bone girth, exterior, style, and massive physique. By themselves, these signs are complex inheritance and are in a various interdependent relationship as a sign of total body weight, and with each other.

We studied the correlative relationship between the basic measurements and live weight of horses.

Table 4. Coefficients of Correlations Between Soundings and Live Weight

correlated signs	Stallions, n=13	mares, n=217	Colts 2.5 years, n=65	Filly 2.5 years, n=57
Height - live weight	0,135±0,184	0,168±0,066	0,509±0,108	0,497±0,117
Bias length of the torso - live weight	0,211±0,181	0,293±0,066	0,602±0,101	0,518±0,115
Bust - live weight	0,329±0,175	0,337±0,060	0,714±0,088	0,617±0,106
Metacarpus - live weight	0,343±0,174	0,351±0,059	0,764±0,081	0,752±0,088

As can be seen from Table 4, there is a positive correlation between all the soundings and body weight in all age and gender groups, but the value of these bonds varies. The greatest correlation with body weight is the chest girth and cannon bone girth, then oblique body length and height at the withers. Therefore, the selection of horses on live weight was selected primarily for chest girth and cannon bone girth.

The study of the correlation of basic economic beneficial signs in mares (Table 5) shows a degree of linear supplies leading to different associated symptoms. This pattern is set as a result of the analysis of the relationship of 4 variants of the following features: body weight, height at the withers, slanting body length, chest girth, cannon bone girth.

Table 5. The Correlation Coefficient Between Soundings and Live Weight of Linear Mares

correlated signs	Coefficient correlation r±mr	Criterion reliability tr	value likelihood P
Bracelet Line 13-74 (n=53)			
height at the withers - live weight	0,203±0,137	1,48	0,90
Length of body - live weight	0,331±0,132	2,51	0,95
chest girth - live weight	0,462±0,124	3,71	0,999
metacarpus - live weight	0,485±0,122	3,93	0,999
Zadornov Line 51-76 (n=50)			

height at the withers - live weight	0,216±0,141	1,55	0,90
Length of body - live weight	0,327±0,136	2,41	0,95
chest girth - live weight	0,458±0,128	3,56	0,999
metacarpus - live weight	0,461±0,127	3,58	0,999
Pamir Line 127-78 (n=73)			
height at the withers – live weight	0,193±0,116	1,66	0,90
Length of body - live weight	0,312±0,113	2,77	0,99
chest girth - live weight	0,367±0,110	3,25	0,999
metacarpus - live weight	0,405±0,108	3,71	0,999

The stud farm “Altai Kapryk, Saidaliev-Sartoka” results of intra-line uniform (homogeneous) matching horses with a maximum severity of selected traits and mating of stallions from the mares, from which the value of signs expressed to a lesser extent in line within (diverse and heterogeneous selection), show that the studied traits in the lines are best manifested in the offspring of homogeneous selection of their parents than from the heterogeneous. Thus, depending on the severity of the linear characteristics, productivity resulting progeny was greatest in the line where the respective symptoms are of selected leading (Table 6).

Table 6. Productivity Daughters (30 months old) Line Stallions with Different Selection Options

Indicators	Uniform selection	diverse selection
Bracelet Line 13-74		
Headcount	25	21
Height, cm	139,2	136,4
the length of the body, cm	141,7	137,5
chest girth, cm	162,8	160,2
metacarpus, cm	17,3	17,1
live weight, kg	353,6	340,4
Zadornov Line 51-76		
Headcount	30	27
height at the withers, cm	140,3	138,2
Length of body, cm	142,4	139,3
chest girth, cm	167,1	164,7
metacarpus, cm	17,5	17,5
live weight, kg	367,2	358,2
Pamir Line 127-78		
Headcount	40	33
Height, cm	136,8	136,1
Length of body, cm	137,9	136,6
chest girth, cm	160,7	158,3
metacarpus, cm	17,1	16,8
live weight, kg	349,0	338,7

So, when choosing a homogeneous parents’ live weight, daughter stallions from the line of Zadornov are allocated, whose superiority on this basis, as compared with peers from other lines, ranging from 13.6 to 18.2 kg, i.e. up to 3.7 and 5.0%, and chest girth with a difference of 2.6 and 3.8%.

Comparison of body weight and measurements of the offspring with a uniform and diverse selection shows that the differences between them in the study lines were uneven. Thus, the filly from the selection of parents in the line of

Zadornov was superior to peers mating with each other by live weight of 9.0 kg or 2.5%. The Bracelet line exceeding this indicator former over the latter is 13.2 kg, in line Pamir -10.3 kg, respectively, or 3.7 and 3.0%.

Analysis of the data characterizing the daughters of linear zherebtsov-manufacturers obtained in different variants of selection for chest girth shows that the selection of uniform rates was higher among fillies’ line of bracelets and Zadornov, who surpassed the contemporaries of Pamir lines 1.3 and 6.4 cm, and 1.3 and 4.0%.

Indicators of linear measurements in the offspring of homogeneous selection were higher than their peers from the heterogeneous selection. In line Bracelet: height at the withers by 2.8 cm (2.1%), oblique body length of 4.2 cm (3.1%), chest girth of 2.6 cm (1.6%), in Zadornov line respectively 2.1; 3.1 and 2.4 cm, or 1.5; 2.2 and 1.4%.

Thus, to explore options for selecting the type of foal Kazakh horses of different lines on the main economic-useful signs, indicate that a highly productive offspring obtained by a uniform selection of parents with a maximum (within the line) expression of selected features. In order to further improve the Kazakh foal type horses with linear breeding, as well as to better secure the progeny of selected attributes, it is appropriate to apply a substantially homogeneous selection in the corresponding lines in the first place on the body weight, chest and oblique trunk length.

As a result of the control of slaughter colts, different factory lines found that the carcass weight of the non-linear colt inferior animal in Bracelet line at 29.8 kg (15.9%), Zadornov line at 39.0 kg (20.8%) and the Pamir line 10 3 kg (5.5%).

Table 7. Results of the Control of Slaughter Colts

lines	n	Slaughter live weight, kg	Weight carcass kg	Slaughter yield, %	td
Bracelet 13-74	10	384,5±2,8	217,6±2,1	56,6±0,2	17,7
Zadornov 51-76	12	395,2±2,2	226,8±1,8	57,4±0,3	14,7
Pamir 127-78	10	365,6±2,3	198,1±1,8	54,2±0,1	10,7
Nonlinear	15	356,3±2,4	187,8±1,9	52,7±0,1	-
Average	47	374,2±2,5	206,3±1,9	55,0±0,2	-

An indicator of slaughter output from nonlinear colts was relatively lower than that of linear animals and averaged 52.7%. At colts' line, Bracelet and Zadornov slaughter yield amounted to 56.6 and 57.4%. Horse line Pamirs on slaughter yields of inferior animals in bracelet line and Zadornov in comparison with nonlinear animals they slaughter yields above 1.5% (the difference between authentic td = 10,7).

F. Popescu (5) notes that the yield of lean meat in horses is 45-50%, while the well-fed animals are up to 65%.

Studies by M. Tyny (6) and S. Kaninski S. (7) found that at slaughter horses with a live weight of 333 kg slaughter yield was 58.4%, and in horses with a live weight of 545 kg - 60.2%.

In the study of the morphological composition of each bran and the whole carcass was determined by the ratio of trimmed meat and bones. (8) The results are shown in Table 8.

Table 8. Morphological Composition of Carcasses of Horses of Various Lines (n 3 head)

lines	Average carcass weight, kg	The composition of the carcass			
		pulp		bones	
		kg	%	Kg	%
Bracelet 13-74	216,3	176,8	81,7	39,5	18,3
Zadornov 51 -76	227,1	187,3	82,5	39,8	17,5
Pamir 127-78	197,6	159,9	80,9	37,7	19,1
Nonlinear	188,2	149,8	79,6	38,4	20,4

The data show that the morphological composition of carcasses of horses of various lines was not the same. The yield of pulp in the line of horse carcasses of Zadornov 37.5 kg (25.0%), line Bracelet 27.0 kg (18.0%) and 10.1 lines Pamir kg (6.7%) compared with the above nonlinear animals. It should be noted that the relative content of bones in the carcasses of linear horses was lower than that of the nonlinear animals. Thus, 1 kg of pulp in bone obtained in Bracelet line 4.5 kg, 4.7 kg in Zadornov line, 4.2 kg in Pamirs line, whereas the nonlinear - 3.9 kg, was respectively superior at 15.4; 7.7 and 20.5% in favor of the linear horses.

In determining the ratio of high-quality fabrics in different lines of horse carcass, it was found that the yield of pulp in certain grades is not the same. The highest yield of linear and nonlinear horses was observed in the I and the II grade, and the fewest in the III grade. Nonlinear horse pulp output in the I grade inferior animals of perky line at 20.2 kg (31.2%) from the line Bracelet 13.3 kg (20.5%), from the Pamir line 5.7 kg (8, 8%), at the output of pulp in kazy, respectively, 45.7; 29.5 and 10.7%. At the exit of pulp grades II and III, like linear and nonlinear horses with large differences were observed.

The largest bone content in all groups of horses contained in the II grade meat from 39.1 to 40.4%, then in the I grade of 34.4 to 37.0% and III grade of 17.7 to 19.0%. The bran kazy bone content was from 6.1 to 7.3%.

As you know, horse meat produces different foods. Some national product as kazi, map, stings, zhaya, telshik, and shuzhuk sur-is considered to be delicacies. They have a high nutritional value and good taste.

F. Popescu (5) indicates that the horse meat has the advantage over other meat animals is that it does not contain transmitters of intramuscular diseases.

Dairy efficiency of mares in different lines are determined monthly during the three and a half months of lactation. Studies have shown that the type of toad Kazakh mares in different lines have unequal milking. (9-10) Higher milk production with pasture conditions of detention had a uterine line from the Pamirs. Then, in descending order are nonlinear, animal mare line bracelet and finally the mare line Zadornov (Table 9).

Table 9. Dairy Kazakh Mares Type Toad Different Lines (L)

The live weight of the mares, kg	Actual milk yield		milkiness		
	per day	105 days of lactation	per day	105 days of lactation	100 kg of live weight
Bracelet line (n=5)					
450,0±3,5	5,92±0,17	621,6±5,22	14,21±0,35	1492,05±22,6	332
Zadornov line (n=5)					
461,4±3,8	5,68±0,15	596,4±4,92	13,63±0,31	1431,15±20,3	310
Pamir line (n=7)					
436,0±2,4	6,75±0,19	708,7±4,50	16,20±0,43	1701,0±28,3	390
Nonlinear line(n=8)					
428,7±2,1	6,44±0,11	676,2±3,87	15,46±0,37	1623,3±25,7	379

The data show that in 105 days of lactation milking of mare's line Pamir was 1701.0 L, nonlinear mares - 1623.3 l, l Bangle line 1492.05 and 1431.15 l line Zadornov.

Milk yield obtained from mare's line Pamir was 708.7 liters, nonlinear horses 676.2 L, 621.6 Bracelet line l and line Zadornov 596.4 liters. Uda mares Pamir line exceeds 4.8% or 32.5 liters than the nonlinear mares, by 18.8% or 112.3 liters than in mare's line Zadornov and by 14.0% or 87.1 liters than in mares Bracelet line. According to the index of milk production (per 100 kg of live weight), mare's high rates were also in mares line Pamir (390 kg) and nonlinear queens (379 kg) and virtually identical in mares line Bracelet (332 kg) and the line Zadornov (310 kg).

Linear milking mares over 105 days were far uneven. Higher productivity mare showed the 2-3 month of lactation, milk yield and then gradually decreased, and more sharply towards the end of lactation (Table 10).

Table 10. Changes in Milk Production Kazakh Mares Type Toad Different Lines Lactation Months (L)

indicators of milking	The month of lactation			
	June II	July III	August IV	September V
Bracelet line				
per day	14,40±0,31	15,17±0,23	14,16±0,27	13,10±0,26
per month	432,0±5,08	470,22±7,20	438,90±5,24	170,36±3,36
Zadornov line				
per day	13,78±0,26	14,45±0,32	13,63±0,27	12,53±0,29
per month	413,28±7,74	447,90±4,93	422,60±4,98	162,86±2,07
Pamir line				
per day	16,42±0,33	17,48±0,35	16,35±0,32	14,57±0,28
per month	492,70±4,12	542,06±5,50	506,97±5,02	189,43±3,39
Nonlinear line				
per day	16,17±0,29	16,74±0,25	15,36±0,27	13,61±0,23
per month	485,10±4,08	518,95±3,96	476,16±4,86	177,05±3,12

The data shows that the highest average daily milk yield in the second month of lactation were mares of Pamir line (16.42 liters). Then for nonlinear mares (16.17 liters) in mares' bracelets and Zadornov, the figures were 14.40 and 13.78 liters respectively. In recent months, the lowest average daily lactation milk yields were, line Zadornov - 12.53 L line Bracelet - 13.10, for nonlinear mares - 13.61 and mares line Pamir - 14.57 liters.

Thus, seasonal milking mares at stud due to the selection of meat and dairy other than meat animals significantly increased milk production of dairy mares.

4 Conclusion

In the North-east of Kazakhstan, at the stud farm, "Altai Karpykov, Saidaliev-Sartoka" as a result of many years of breeding work with Kazakh horses such as the foal, with year-round grazing by pure-breeding targeted selection and selection, a new Seletinsky factory type of Kazakh horses was created. The live weight of stallions 511.3 kg, mares - 468.3 kg, perfectly adapted to the harsh conditions of a steppe zone of Pavlodar region.

As a result, extensive use of stallions such as the foal imported from Mugalzharsky stud Aktobe region with a uniform method of selection for the maximum manifestation of selected features using inbreeding received a horse with high productive qualities and tribal merits and created three new factory lines; bracelet, Zadornov, and Pamir.

There are positive and significant correlations between body weight and height at the withers (0,193-0,216), body weight and oblique trunk length (0,312-0,331), body weight and chest girth (0,367-0,462), body weight and girth pastern (0,405-0,485) which indicate the possibility of selected bidders on these grounds. However, it is first necessary to conduct selection on metacarpus and chest girth.

Meat efficiency of linear horses characterized by higher values in comparison with nonlinear animals. Slaughter output from nonlinear colts was 52.7%, while the colts line bracelet and Pamir were respectively 56.6; 57.4 and 54.2%. By weight of linear carcass and linear colt, it does not exceed 29.8 (15.9%) 39.0 (20.8%) and 10.3 (5.5%), respectively. (11)

The morphological composition of horses' carcasses of various lines was not the same. The yield of pulp in line colts' carcasses was higher by 37.5 (25.0%) 27.0 (18.0%) and 10.1 (6.7%) compared with nonlinear colt, and the relative content of bone in carcasses for linear horses was lower than that of the nonlinear animals. Thus, 1 kg of pulp in bone obtained Bracelet line 4.5, Zadornov lines 4.7 and lines Pamirs 4.2 kg, whereas the nonlinear horses this figure was 3.9 kg.

In the context of seasonal koumiss farm economy "Altai Karpykov, Saidaliev-Sartoka" Dairy Kazakh mares type toad different lines are not the same. A more productive line of the uterus is the Pamirs (1701.0 L) and linear mare (1623.3 L) when compared with the animals from the line Bracelet (1492.05 L) and Zadornov (1431.15 liters). The difference between the compared lines is statistically significant. Index milking mares of Pamir line amounted to 390 kg in the nonlinear ewes - 379 kg, in mares' line of bracelets and Zadornov, were respectively 332 and 310 kg.

5 Offers production

In the harsh environment of the steppe zone of Pavlodar region with year-round grazing breeding work with Kazakh foals, it should be conducted in the direction of propagation of the new factory of Seletinsky type that exceeds local horses for fitness, endurance, meat, and milk quality. With the lowest cost of labor and resources, they produce cheap meat and mare's milk.

In order to further consolidate Seletinsky factory type horses, their productive and breeding qualities necessary to carry out an in-depth selection of a straight-line dilution should be improved with homogeneous and heterogeneous methods of selection based on productive and qualitative characteristics.

To increase the production of horsemeat and koumiss wider practice of breeding horses line bracelet are recommended. They are the Zadornov and the Pamirs in the north-eastern and northern Kazakhstan.

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THE CREATION OF THE BESTAU FACTORY TYPE OF THE KAZAKH DHZABE HORSE BREED AND A LINEAR BREEDING AS A KAZAKH HORSE BREED PRODUCTIVITY INCREASING METHOD IN THE NORTH EAST KAZAKHSTAN CONDITIONS

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Abstract: According to the Kazakh and English scientists' collective researches, the Kazakh horse breed has been existed about ten thousand years ago on the modern Kazakhstan territory and is one of the most ancient horse breeds in the world. According to international experts it is the only one breed in the world that has a wild horse gene, in favor of this, although indirectly, is illustrated the fact that in the Kazakh breed modern spawn the animals which color suit reminds old tarpan ancestors – mousey, dun, with dark or light belt on the back, having some zebra coloring on the limbs, may meet.

Keywords: horse breed, linear breeding, Bestau factory, Dhzabe horse, feed conditions.

1 Introduction

The relevance of the topic. The centuries-old natural selection under the severe climate and feed conditions influence, by the extensive horse-breeding in conducting the herd, and the artificial selection, on the most desirable features, as applied to the nomadic household horse were the main factors of the Kazakh horse formation. Their especially valued dignity was a high year-round pasture chiseled content fitness, excellent accruing and forage qualities, good fertility, the young animals exit on each hundreds of mares not less than 80-90%, not infrequently to 100% by the stud breeding method. The high biological stallion stud instinct did not allow cover close by blood uteruses (the mother, the sister, the daughter), that prevented from the inbreeding-depression, finally from the breed degeneration in total. The conditions of the horse-breeding in the herd did not change during many centuries, though the Kazakh horse breed survived without significant changes. On the Kazakh horse breed base a Kustanay riding-harness, Mugalzhar, Kushum meat, and dairy breeds were created, a Kabinsk Kazakh meat horse type, according to experts, does not have analogs in the world by the productivity. Undoubtedly, the Kazakh horse breed possesses a world gene pool and can serve as the other animal breed improver by adaptive qualities, the fertility, the productivity, the endurance. Until yet the record by the range of the daily run under the saddle for a distance of 354 km, set by the Adayev Kazakh breed horse in 1956 is still intact. Describing the Kazakh horse breed advantages in details, we hope that we will draw the attention of other regions and countries horse-breeders for the collective scientific work.

The constant stable demand for horses inside the country and on the foreign markets stimulated the horse breeding, that always took the first place among all animal husbandry industries by the importance.

From the ancient times, the horses on the Kazakhstan territory were breed in a herd-chiseled way, it means that all year animals were in the open air, in the cold and in the heat, being satisfied with the pasture feed only, and in the winter time doing the thirst with the snow. It was the most economical way that allows growing a cheap and unpretentious horse.

The horse-breeding in the herd as the way of the horse breeding and rearing to XXI century set into a well-used technology. More than a one century experience. The only thing is that this technology gave the failures in the time of "dzhuts" when the horse could not get the feed on the winter pasture because of the very deep (50 cm) dense snow or the icy crust on the snow.

In the productive horse-breeding of Kazakhstan, the important role occupies the Dzhabe Kazakh horse breed. These horses constitute 34,5% in the structure of the other productive direction breeds. The animal development degree of the dzhabe is an index of the productive horse-breeding in Kazakhstan. Though the condition and conductive breeding–tribal work with the Kazakh Dzhabe horse breed meet the highest requirements.

The successful decision of productive horse-breeding problems depends largely on the breeding work efficiency increasing at the expense of the introduction in practice the last achievements of the population genetics, the selection methods improving, the potential productivity identification and horses' tribal qualities. One of the key tasks in this direction is the scientific justified breeding methods development of the new lines, families and factory types in the Kazakh nature creation, capable in steppe- and semi-steppe zone conditions with year-round pasture maintenance give cheap and ecologically clean horseflesh and koumiss, is getting quite relevant not only in Kazakhstan, but in all regions of the world with similar natural and climatic conditions and the herd horses breeding method.

The research key and tasks. In actual work there was made a methods development of the Kazakh fabric Dzhabe horses creation and the fabric lines, the breeding-genetic selection parameters grounding on different levels of the Kazakh nature improvement.

The research objective was:

- a scientific grounding, the methods development of the new Bestau fabric type and three stallion lines of the Kazakh Zhabe horse creation;
- research of effective selection methods and their use by new fabric type and lines creation;
- research of the created type and lines horse meat productivity;
- a definition of the Kazakh new type zhabe horses breeding economic efficiency.

A scientific novelty lies in the fact that in Kazakhstan's north-east conditions with year-round pasture maintenance, without the key maintenance technology change, there were produced more zhabe horse production at the expense of a desirable genotype allotment and further larger high genetic material using in breeding.

2 Materials and Methods

The improvement work of Kazakh zhabe horse breed tribal and productive qualities was conducted on "Akzhar-Ondiris" stud farm in Mayskiy rayon of Pavlodar oblast in 1975. The work was conducted under the guidance of professor B.K. Sadykov, associate professor M.G. Dadebayev, household specialist T.S. Asanbayev etc.

The main task was the methods development of the fabric type lines creation in the horse breeding. The work began on the Akshiman tribal state stud farm in Mayskiy rayon of Pavlodar oblast numbering at that time about 5 thousand horse heads of the local breed. Currently, it is "Akzhar-Ondiris" stud farm that grows the Kazakh zhabe breed. Tribal stallions and mares from "Mugalzhar", "Taldyk", "Kulandin" stud farms and other tribal households, among them were representatives of the outstanding Zaur fabric line (born in 1929), stallions Zontik (Umbrella) 140-

70 and Zov (Call) 113-75 from Mugalzhar stud farm in Aktobe oblast and a stallion called Asem-151-76. Those stallions laid the foundation for new genealogical lines of stallions known as Zontik (Umbrella) 140-70, Zov (Call) 113-75, Asem-151-76, which were the most typical zhabe horse representatives.

2.1 Breed lines and tribal work with them

By genuine breeding, the linear method is largely used. The line is a high productive group of animal generations, originating from one outstanding ancestor, having similar exterior and productivity hereditary particularities, steadfastly transferring these qualities by inheritance.

By the linear breeding are applied:

1. Homogeneous selection – a pairing of the same type animals, which possess similar heredity and belonging to the same line (related pairing) or similar by type representatives of different lines;
2. Heterogeneous selection – a different lines representative combination, that differ by type and heredity. Such combination enriches the line with new useful qualities, increase the vitality and the efficiency of representatives.

The important element in the tribal work with Kazakh horses like zhabe is the selection method development for increasing tribal and productive qualities in pasture maintenance conditions. In this regard, the tribal work organization with zhabe horses, the selection work efficiency increasing and the valuable animals breeding, which can give the cheapest, the most ecologically clean, treatment-prophylactic horseflesh and a koumiss in steppe and semidesert zone conditions with year-round pasture maintenance, is getting special actuality.

The modern selection group of TOO “Akzhar-Ondiris” stud farm has appropriate genealogical structure – three created again fabric lines of stallions known as Zontik (Umbrella) 140-70; Zov (Call) 113-75; Asem 151-76.

The tribal and productive qualities of the Kazakh zhabe horses research was carried out by individual appraising and weighing data, the definition of horses’ quality content and class – according to “Instruction of the local horses’ breed appraising”.

The main goal of the organization and selection-tribal work in household conducting is the preservation, the improving and the reproduction of the best individuals derived from the breeding linear method in round-year pasture maintenance conditions. Keep valuable biological qualities of water, increase the living mass, the fertility, meat, and dairy productivity quality, grow high-productive and high-class youth for replenishment productive content and tribal realization.

A new Kazakh Bestau fabric zhabe horse breed created on the base of three linear stallions (Zontik (Umbrella) 140-70, Zov (Call) 113-75, Asem 151-76) by means of purposeful selection, by genuine breeding, during four generations.

The initial material was elite stallions and mares of the Kazakh zhabe horse breed from the Akshiman tribal-state farm, Akzhar tribal stud farm, taken between 1975-1985 from Mugalzhar, Taldyk, and Kulandin stud farms and other tribal households.

Stallions Zontik (Umbrella) 140-70 and Zov (Call) 113-75, of Zaur fabric line, born in 1929, and Asem 151-76 were kept in herds as producers for quite a long time. A stallion Zontik (Umbrella) 140-70 was delivered in a former Akshiman state farm in 1973 and at the age of 17 in 1987 he was removed from the stud and replaced by a younger stallion. Zontik (Umbrella) 140-70 made over 200 foals, which undoubtedly were the region's horse livestock improvers. Currently a stallion-producer Zapal (Fuse) 11-03 (the herd’s nickname Tapal) deserves attention, surveys: 146,0-156,0-187,0-20,0, living weight 521,0 kg. This stallion is the repeated winner of the Republican breeding animals contest.

Fabric line’s development scheme, created by Zontik (Umbrella) 140-70

Zontik (Umbrella) 140-70 Zalet 16-76-Zlat-17-81

Zavet 20-76 - Zatir 2-82 - Zamir 13-89 Zapal 11-03

Zenit 15-80 Zvon 3-90-55-99 (Kaldy Kula)

Fabric line's development scheme, created by Zov (Call) 113-75

Zov (Call) 113-75 Zakor 19-80 - Zatir 22-89 (Chapay)

Zubr 2-82 - Zakir 77 - Zapoi 90 - Zov II 99-04 (Slon)

Zamer 101-83 - Zubok 35-91 - Zamir 112-99

Fabric line’s development scheme, created by Asem 151-76

Asem 151-76 Asyl 12-82 - Ampir 3-90 - Atar 10-02

Aral 6-84 - Arka-mol 5-94 - Arasha 15-03

Airkulak 9-88 - Aktas 20-97 - Aygyr-zhiren 18-06

A fabric type breeding methodical feature was that it had a phased character depending on the main task, set in each phase.

In the first creation phase (1975-1985), a mess breeding by the origin and the typicality, surveys and the living mass, the exterior, the fitness to the herd conditions maintenance and the posterity quality practiced. Outstanding stallion and mare genotypes for lines' and uterus families’ backing were revealed.

In the second work phase (1986-1996), a selection of highly productive animals for an economic signs’ fixing continued, partially a heterogeneous selection for the correction of certain exterior drawbacks, revealed during the selection.

In the third phase (1997-2013) high productive lines of Zontik (Umbrella) 140-70, Zov (Call) 113-75 and Asem 151-76 stallion, of meat and dairy productivity directions, and the Bestau Kazakh zhabe horse fabric type. The line and fabric type standards, that exceed minimal instruction requirements of the local horses boning, were developed, a genotypic and phenotypic variability of selected signs was defined, their hereditability and repeatability.

In the fourth phase, from 2013 until the present, work on the herd structure improvement, the live mass increasing, the mare milkiness, and the herd maintenance fitness is conducted.

Bestau fabric type animals differ Kazakh zhabe horses massive with a high live mass and a meat forms severity, a harmonic physique, a hard backbone, a great stallion instinct (there are about 30 mares in one stallion), a high fertility (90%) and a milkiness (for one lactation the average milk productivity constitutes 2300-2500 kg of milk).

It has high accumulation and adaptive qualities in year-round pasture maintenance conditions. The main color suit is bay, red and dun.

A stud farm’s breeding work further provides:

1. The increasing of high productive stallions and mares’ strength, received from a line method breeding.
2. The effectuation of an order pairing selection with the aim of high productive animals’ valued quality fixing.
3. The research of phenotypic and genotypic variability, heredity, a main selection signs correlation by purebred breeding and the definition of genetic population parameters using importance, the creation of the new type of the breed with the regard to this breeding zone.
4. The research of different selection methods efficiency, providing the breeding impact.
5. The research of a lines compatibility character and their evolution pattern.

In the process of a new fabric type creation, there were developed creation lines standards and a type itself, that exceed instruction requirements of boning on a reliable value.

Main parameters of the Bestau horses' fabric type were developed, line and non-line horses' productive qualities were studied, the young animals' growth and development, on which a young animals' development scale was developed.

With the aim of a line and non-line horses' meat productivity research, there was conducted a control slaughter of 2,5 years old stallions and adult defective animals on a household's slaughter station by the method of a stud farm's research institute and in accordance with technology instructions, accepted in the meat industry.

The carcass quality was assessed by muscle tissue development, a body fat on the surface and a fat thickness on an abdominal wall. Moreover, there were studied: a correspondence between a meat mass and bones in a carcass.

All experimental data were processed by Plokhinsky N.A. method.

2.2 A natural and climatic characteristic of the household

TOO AF "Akzhar-Ondiris" in Mayskiy rayon of Pavlodar oblast was organized in 2002 on the base of former Akzhar and Akshiman state farms' households and on the south is bordered with Karaganda oblast, on the South-East with Bayanaul rayon. In the household, a common land use area constitutes 180336 hectares. Of them,180336 hectares of agricultural lands, including:

1. Arable lands – 2076 hectares.
2. Haymakings – 20000 hectares.
3. Pastures – 158260 hectares.

A distance to the oblast's center is 120 km.

An agricultural company "Akzhar-Ondiris" is a diversified household. Along with a horse-breeding industry, in the household, they breed a Kazakh half-coarse wool sheep's breed, a Mountain Altaic down goats' breed, which in this breeding conditions revealed high adaptive qualities and equal high fertility. Delivered in 2006 to the number of 600 heads, currently, constitutes around 4 thousand heads.

The particularity of this region's climate is its sharp continentality, demonstrated in big yearly temperature fluctuations and relatively in small quantities precipitation. The enterprise territory belongs to a moderate warm arid agro-climate region by a heat availability, moisture availability and an unprotected period duration. According to Pavlodar meteorological station an average monthly temperature of the warmest month, July, is +35°C, and the coldest month, January, is -45,8°C.

A frost-free period duration constitutes 50-70 days, a vegetative period – 120-130 days (from 5 May to 20 September). According to long data, the annual precipitation does not exceed 203 millimeters, including a snow reserve – 67 millimeters. The biggest wind speed is observed in May up to 10 meters per second. The depth of soil freezing up to 10 centimeters occurs in the first decade of October, and the thawing – at the end of June on 90-150 centimeters. With the beginning of the soil plastic state (ripeness), it's necessary to start presowing processing (in the average from 10-15 of May) and a cereals sowing. It's recommended to finish the cereals sowing not later than 5 May, and the planting seedlings of vegetables – not later tha 20 June. The average date of the pasture beginning is the third decade of May (25 May), the end – last days of September. The average duration of the stall period constitutes 240 days, in particular, years – 250-255 days.

2.3 The vegetation and the soil cover

The main vegetation in a household is a hillock, thorn slopes on chestnut soils. Fescue, feather-sagebrush-fescue, caragana-fescue and feather grass vegetative associations are spread here.

Tops of Kalmak-Kyrgan mountains are covered with outcrops of rocks, here in crevices the Cossack junipers, the bloodroot and honeysuckle bushes can be met. In the valleys of rivers and in the low hillock descents meadow chestnut soils exist, sagebrush-fescue and terraced-fescue vegetation are growing from them.

From weed plants, the most spread is an oat weed, a sow thistle, tall tumble mustard, lamb's quarters, a wormwood etc.

On the household territory soils have been developed on soil-forming substances of the next origin:

1. Eluvial diluvian gravelly dryers;
2. Ancient eluvial sediment;
3. Tertiary clays and its resediment products;
4. Lake sediments.

The main part of the household territory is located in a chestnut soils' subzone in light-chestnut subzone a minor part of the territory is located. A nominal border between these two subzones goes by Tunduk river.

From the land using characteristic it's seen that TOO "Akzhar-Ondiris" concerns an animal livestock direction, that is based on the natural feed land use. Exclusively a pasture method of the horses' maintenance is practiced in the household and the maximal long maintenance in the pasture conditions of a small cattle (sheep and goats).

2.4 A breed direction

TOO Akzhar-Ondiris is occupied in horse breeding of zhabe type, which has certain demand inside rayon and oblast households, and also outside as a local Kazakh horse improver.

The stud farm's main task is breeding high-class stallions and mares of the Kazakh zhabe breed, which have stable heredity and high environment adaptability. As for 01.01.2016, in TOO Akzhar-Ondiris were 1927 horses, including stallions-producers – 60 heads, mares – 869 heads.

Table 1. Breed and Class Content of Stud Farm's Horses

Sex and age group of horses	Breed	Total	By classes		
			elite	I class	II class
Stallions-producers	Kazakh zhabe	60	60	-	-
Mares	Kazakh zhabe	869	347	434	88

The mare share in a horse herd's structure constitutes 45,1%, that completely responds zootechnical normative.

3 Results and Discussion

In the extensive herd horse breeding's conditions, the Kazakh horse improved himself and changed a little under the crossing influence with improving breeds. The important element in a breeding work with Kazakh zhabe horse was the development of breeding methods for increasing breed and productive qualities in year-round pasture maintenance conditions by purebred breeding.

The main animal improving method by purebred breeding is the method of breeding by lines, first applied for the Orel trotted horse's creation, and also in purebred stud farm's practice.

Beginning from the mid 50's, the concept of "meat horse breeding" as developing horse breeding sub-sector firmly entered in the parlance. In this period many scientists-zootechnicians raise the question not only about the horse meat productivity increasing but about the specialized breeds and types creation.

Thereby, Y.N. Barmintsev writes about the necessary to organize the work of the specialized meat breeds raising, which surely need to be adapted to herd conditions, as the rational using of marginal pastures deserts and semi-deserts – is an indispensable condition of meat horse breeding profitability. For such work, he recommends the Kazakh zhabe horse.

During the breeding work period in the household with Kazakh zhabe horses, some progress has been made. It can be judged (Table 2), compiling an average data of adult zhabe horses and a new Bestau fabric type.

Table 2. Surveys and a Live Mass of Zhabe Horses and a New Bestau Fabric Type

Surveys and live weight	Indexes	Initial group	Bestau fabric type
		1970	2015
1	2	3	4
Stallions-producers			
Amount, heads	n	17	43
Height at withers, cm	M±m	138,3±0,61	145,3±0,49
	Cv	2,16	2,31
	td	–	6,1
Slanting length of trunk, cm	M± m	145,0±0,69	153,6±0,64
	Cv	2,33	2,89
	td	–	9,7
Chest girth, cm	M±m	173,6±0,77	183,7±0,75
	Cv	2,18	2,79
	td	–	10,9
Girth of metacarpus, cm	M±m	18,4±0,23	19,8,0±0,19
	Cv	6,11	6,67
	td	–	3,3
Live weight, kg	M± m	410,6±3,6	473,3±2,6
	Cv	4,27	3,86
	td	–	10,99
Mares			
amount, heads	n	168	347
Height at withers, cm	M±m	136,5±0,47	143,1±0,39
	Cv	5,76	5,28
	td	–	10,8
Continuation of Table # 2			
Slanting length of trunk, cm	M± m	143,0±0,58	150,0±0,48
	Cv	6,87	6,22
	td	–	10,9
Chest girth, cm	M±m	171,2±0,61	180,2±0,42
	Cv	5,96	4,51
	td	–	12,2
Girth of metacarpus, cm	M±m	17,5±0,19	18,5±0,17
	Cv	18,17	17,78
	td	–	3,8
Live weight, kg	M± m	390,4±3,4	458,1±3,8
	Cv	14,95	16,45
	td	–	13,08

As it can be seen from the Table 2, Bestau fabric type stallions exceed the initial group mares of 1970 by the height at withers on 7,0 cm, a slanting length of a trunk on 8,6 cm, a chest girth on 10,1 cm and by a live weight on 62,7 kg. Mares of Bestau fabric type increased the height at withers on 6,6 cm, a slanting length of a trunk on 7,0, a chest girth on 9,0 cm, a live weight on 68,1 kg. By surveys and live weight, all indexes are statically accurate.

It should be noticed that the vibration coefficient value of all animal groups is much bigger by live weight and by a girth of the metacarpus. High variability of these signs creates favorable conditions in further breeding work, by increasing its efficiency.

From cited materials it's seen, that the modern stallion and mare livestock of Bestau Kazakh zhabe fabric type horses from "Akzhar Ondiris" stud farm differs from the initial horse group with better meat forms and high live weight. Finally, purebred Kazakh zhabe horses breeding allow save a powerful gene pool of these horses, and will allow use as a herd horses of the world improver by such qualities as productive dairy and meat horse breeding typicality, a fitness to year-round pasture maintenance, reproductive and other qualities.

3.1 A horse meat productivity of zhabe type's different lines

Horse meat qualities are judged by live weight indexes, animals' surveys, and also by physique, calculated with a justification of surveys. As is known, these indexes do not give the full characteristic of the horse meat productivity. In this regard, for an objective assessment of the animal productivity, it's appropriate to use slaughter mass and slaughter exit indexes.

To establish a horse meat productivity of different lines in December 2013 on the "Akzhar-Ondiris" stud farm's slaughter station there was conducted a slaughter of autumn grazier 2,5-years old studs.

Animals, specific for each line with close live weight indexes to the average data by lines were selected for control slaughters.

The control stallion slaughter data is presented in Table 3.

Table 3. The Control Stallion Slaughter's Results

Lines	n	Pre-slaughter live weight, kg	Carcass weight, kg	Slaughter exit, %
Zontik (Umbrella) 140-70	6	387,5 ± 2,8	217,6±2,1	56,1±0,2
Zov (Call) 115-75	7	396,2±2,2	226,8±1,8	57,2±0,3
Asema 151-76	7	368,6±2,3	199,8±1,8	54,2+0,1
Nonlinear	10	357,3± 2,4	187,8±1,9	52,7±0,1
average	30	377,4±2,5	208,0±1,9	55,0±0,2

As it's seen from the Table 3 data, by the carcass weight nonlinear stallions gave way to the Zontik (Umbrella) animal line on 29,8 kg, to Zov (Call) line on 39,0 kg and Asem line on 12 kg.

The index of the slaughter exit by nonlinear studs was relatively lower, than by linear animals and in the average constituted 52,7%, while by Zontik (Umbrella) and Zov (Call) stud line the slaughter exit equaled 56,1 and 57,2%. The Asem line horses by the slaughter exit gave way Zontik (Umbrella) and Zov (Call) animal line, but in comparison with nonlinear animals, their slaughter exit was higher on 1,5 % (the difference is reliable td = 10,7).

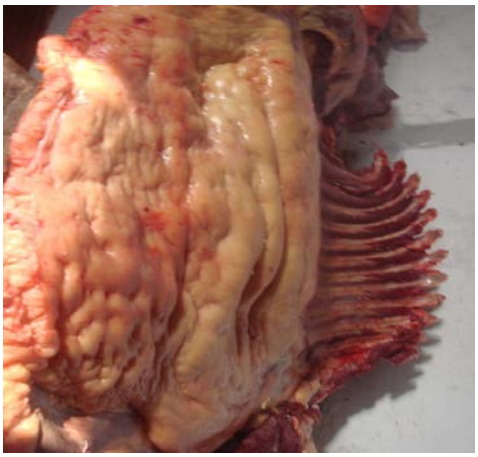

Figure 1. A Fatty Watering of Linear Studs' Rib Part

Figure 2. A Fat of Linear Studs

A market demand on high-quality horse meat causes the necessary of getting carcasses with a big meat exit, an equable fat distribution between muscles and inside the muscles, with thick rib abdominal fat layer for making "kazy", a relatively small specific gravity of bones and tendons in the carcass. So, the morphologic content research is an important index of the carcasses' assessment.

During the morphologic content research in each cut and in general, the correspondence of the veined meat and bones was determined by the carcass. In Table 4 the research results are revealed.

Table 4. A Carcass's Morphological Content of Different Lines Horses (n = 3 heads)

Lines	Average carcass weight, kg	Carcass content			
		Meat		Bones	
		Kg	%	kg	%
Zontik (Umbrella) 140-70	217,6	177,8	81,7	39,8	18,3
Zov (Call) 113-75	226,8	187,6	82,7	39,2	17,3
Asem 151-76	199,8	160,8	80,5	39,0	19,5
Nonlinear	187,8	149,8	79,8	38,0	20,2

Table 4 demonstrates the difference in the various horse lines carcasses' morphological content

The meat output in horse carcasses of Zontik (Umbrella) line on 28,0 kg, Zov (Call) line on 37,8 kg and Asem on 11 kg higher in comparison with nonlinear animals.

Moreover, the bones' content in carcasses of linear horses is lower than in nonlinear animals.

The production of mares' marketable milk (koumiss) in the household

To produce necessary production each household waste certain resources in their production, that determines a product's cost price.

Table 5. A Cost Price of the Herd Horse Breeding Production

TOO Akzhar-Ondiris

Expenditures	2014	2015	± to 2014
1	2	3	4
Material costs	57450	68174	+10724
Stern	31500	37380	+5880
Fuel	635	895	+260
Petroleum products	1165	1840	+675
Additional parts and materials	1020	1700	+680
Payment for services and works	29100	34532	+5432
Salary	50000	50000	0
Profit	550	580	+30
Depreciation	3055	2950	-105
Others	2245	2460	+215
Total	176720	200961	+24241

During the horse breeding production's analysis, a cost price is observed, as the animal breeding production is costly, many factors are presented here, including the livestock increasing, but it doesn't mean that the production of this industry is economically ineffective. The production's cost price level significantly depends on the production technology. The intensive technologies introduction of the animals' growing allows increasing the production volume with simultaneous decrease of labor inputs and material resources per production unit.

The kumiss is a fermented milk drink from the mare milk, obtained in the result of the fermented milk and alcohol fermentation by means of Bulgarian and acidophil bacillus and yeasts. The drink is frothy, of a whitish color, with a pleasant taste, refreshing, sour-sweet. A kumiss is recognized as a useful restorative remedy.

There are 869 horse uteruses in the household, daily 70 mares are milked. 350 liters of marketable kumiss is being received every day. The average kumiss market price in the region varies between 500 tenges per liter. In the household, mares are milked for 5 months, with 5 liters yield of milk per day.

70 heads x 5 liters = 350 l./per day

350 l. x 500 tenges = 175.000 thousand tenges/per day

175.000 thousand tenges x 30 days = 5.250.000 tenges/per month

5.250.000 thousand tenges x 5 month = 26.250.000 tenges

Only for the kumiss realization, in the mares lactation period, TOO "Akzhar-Ondiris" gets 26.250.000 tenges. With that, the household realizes breeding young animals in the amount of 100 heads annually. The average price of the realized breeding young animals by the region constitutes 200.000 thousand tenges.

In total proceeds from products of the herd horse breeding constitutes 26.250.000 from the kumiss realization and 20.000.000 from the breeding young animals' sale, the total constitutes 46.250.000 thousand tenges.

Table 6. The Strength Structure of TOO "Akzhar-Ondiris" Workers

Workers	Amount
Constant workers	13
Horse-breeders	11
Other workers	5
Leadership	3
Specialists	3
In total:	35

The analysis of the supply of labor resources. In public production development and its efficiency increasing the main role is played by labor resources. Exactly labor resources are the main production element and the main production power. As it's seen from Table 7 labor resources are distributed evenly, all workers succeed with their work's volume.

Table 7. Features of Groups

Indicators	2015
Total gross output, thousand tenges	46.250.000
The number of workers	35
Gross output per 1 worker, thousand tenges	1.321.428,5

The gross output is an indicator that characterizes in monetary terms a total production volume of particular enterprises, unities, branches, national economy etc. On the assumption of Table 7, the conclusion can be made that the gross output per 1 worker constitutes 1.321.428,5 tenges, that evidence about the high productivity per 1 worker.

3.2 The herd horses' grazing technology in the "Akzhar Ondiris" stud farm

In market conditions, meat animal breeding is one of the agricultural production resources, based on natural feed lands in different natural economic regions of the country. In each region there are districts with more effective and accessible methods of the agricultural animals breeding, at the core defined with the feed base state, it means feed volumes and structure, feeding types and systems, the animals' maintenance. It's especially important for agricultural formations with different forms of ownership formed again. Their available capabilities are due to the most maximal using of natural feed lands, especially that are difficult to access for other livestock. Considering such conditions, one of the animal breeding's high profitable industries, having actual value, is the herd horse breeding, the most adopted and receiving different forms of the pasture system feeding and maintenance. So, in new economic conditions, from the variety of urgent tasks relevant to the horse breeding industry, is the explanation and the revealing of facts, which influence on the herd horses amount state, including feeding and maintenance systems in different natural economic regions of Pavlodar oblast. Long since the horse breeding as an industry is developing with the herd horse breeding method throughout the oblast. Significant experience of the horse growing is accumulated here. Different horse livestock is kept in various regions of the oblast because of the natural economic conditions' diversity.

In arable farming regions (Zhelezinsk, Irtysh, Kachir, Uspensk), the number of horses reaches about 30 thousand heads. In the households of this region, such as TOO "Lugansk", "MKHK "Mayak", OPKH "Irtyshskoe", KKH "Akkain", KKH "Musin" and others, two maintenance systems are applied: stable – for the working horses' maintenance, and cultural-herd – for the fabric breeds and breed horses' maintenance. So, in households of these regions, three main feeding types are used, first: hay – fodder with succulent feed-stuff, second: hay – a straw – fodder with grain-growing waste additives, third: pasture-hay – with grain-growing additives. With favorable weather conditions, herds are kept on pastures with fescue-wormwood and herbage-cereal grass year-round, with close proximity to the source of watering and settlements. In the winter period, they create assurance reserves of coarse feed 10-15 hundredweights and a grain-growing 3 hundredweights based on one animal head.

Forms of the herd horse breeding conducting depend on the natural pasture lands' area, the breed content, adaptive qualities of breeding horses to region's natural-climatic and feeding conditions. (14)

In households of central, southwest and south regions of the oblast, on Baynaul, Maysk, Liabezhinsk, Ekibastuzsk regions' territory, which have large pasture lands and where the number of horses is over 44 thousand heads, own particularities of horses' maintenance and feeding are working. In the agricultural lands' structure, 98,6% are in natural pastures and natural haymakings. The year-round pasture extensive form of the meat herd horse breeding obtained greater prominence here.

The growth of the horse livestock in the republic, in particular in Pavlodar oblast, is caused, first of all, by the production cheapness and increasing market horse demand, a high nutritious kumiss, main economic profit sources from horses rearing on natural pasture feeding lands. Herewith, there are revealed some features, inherent to the extensive form of the herd horse breeding, in form of the horses' herd annual migration on the seasonal spring and autumn pastures, migration destinations from settlements could constitute from several dozen to hundred kilometers one-way (for example TOO "Akzhar-Ondiris", Mayskiy district). Another feature is that the distribution elements and the grazing order of particular parts of pasture by year's seasons, considering the relief, the botanic content and an area's vegetation cover quality are applied. The grass, used on cereal-wormwood-saltwort pastures is presented by different varieties of herbage, including a Kochia, a eurotia, saltwort, a biyurgun, wormwood, Russian wild rye, a ceratocarpus arenarius, a feather grass, a camphor-fume, a goosefoot, a calligonum. In general, plants with dissected and omitted leaves, discarded in the summer period. They consist of 100 kg of a dry feed 40-50 units and 8-10 kg of proteins, about 6,3-9,0 MJ of the exchange energy, many salts, and sucrose, vitamins. The productivity of such pastures during the summer constitutes 2,4 – 3,7 hundredweight/hectare, with grass edibility to 85%. In winter most of these grasses are well saved under the snow and are willingly eaten by horses. In spring they have a capability of the early regrowth for using, and in autumn – supply a fast fattening on them. During the summer period, the live weight of horses can increase by 20% and more. Such soil-feeding capacity of natural pasture lands with the rotation grazing using in arid steppe and semi-desert conditions create the cattle breeding capability of sheep and horses to a larger scale. The established extensive conducting system, based on animals' biological features and natural feeding conditions, allows decreasing well labor inputs on a service, a fodder preparation, a production cost in zone's households. (15-16)

Extensive territories of winter and summer pastures favor the development of this industry especially in the arid steppe and semi-desert part of southwest and south districts of the region. With that a social-economic side of a horse rearing high profitability in comparison with other kinds of agricultural animals must be noticed, considering the horse meat costs in herd horse breeding districts 1,5 times lower of the mutton cost, twice lower of the beef cost. (17)

Large perspectives of the breeding work in the productive horse breeding are conditioned with the realization of horses' gene pool potential biological capabilities in reaching high productivity indexes.

Main selective attributes in the productive horse breeding are horse's typicality, its live weight, a milk productivity level, that is closely connected with high adaptive qualities in the herd maintenance conditions.

In modern conditions the increasing of the dairy and meat horse breeding efficiency is conducted in two ways: a) the increasing of productive qualities through breeding; b) the industry

intensification – the improving of horses' feeding and maintenance conditions, and applying the newest technology of the mechanization and automation in the horse breeding production recycling. From young horses' skins fashionable sheepskin coats, elegant boots, hats from different colored leather flaps and wall mats, used for reupholstering furniture can be produced.

Female cosmetics, that have rejuvenating attributes because of essential amino acids content, are produced from the mare's milk. Various bioremediations are produced from the blood and the serum. The developing of this technology will allow managers to increase more the house breeding industry's profitability and the region's economics in general.

Concerning the breeding work content of the region's horse breeding, some liveliness is observed here. The breeding animal livestock (9107 heads) with regard to common horse livestock of the oblast constitutes 6,4%, the minimal index, that provides a successful improvement of horse breeds, is 7-10% of breeding animals from the total amount. Currently, 8 breeding households were created in the oblast, including 2 stud farms of the Kazakh zhabe horses rearing. One of those households is TOO "Akzhar-Ondiris", established on the basis of two households (Akshiman (5 thousand) and Akzhar (2 thousand), which had about 7 thousand heads of the Kazakh horse breed at the time.

Scientifically justified breeding work on these households is conducting since 1980. In 2008 the commission of the Ministry of the agriculture in Kazakhstan the agricultural enterprise TOO "Akzhar-Ondiris" was established as a stud farm of the Kazakh zhabe horses breeding.

Initially, the breeding work with horses in the household was conducted on the bases of the massive animals' reproduction, with good meat forms. The improvement took a course of the purposeful reproduction, the fitness to the year-round pasture maintenance and the stallions and mares' qualitative progenies, and the strict sorting of worst mares by these criteria.

The annual horse valuation by selective attributes complex contributed to the correct selection.

In this way, the breeding work with zhabe horses in the TOO "Akzhar-Ondiris" household was directed on the high-class animals revealing and breeding, steadfastly transferring the qualities to the progeny. In the horses' maintenance technology particular receptions of the cultural herd method were introduced: such as the young animals' volume in spring at one-year-old age, the preparation of stallions-producers to the coupling. Special attention was given to the reproduction and the young animals growing.

On the condition of the young animals' fatness after the wintering, their adaptability to the pasture maintenance was defined, the young animals of weak fatness were rejected and transferred into the fattening group.

In uteruses groups, only developed mares were transferred, without visible vices and drawbacks. Mares, which strongly decreased the fatness, and did not withstand winter pasture, were not allowed to the breeding.

For the normal growing and development of the young animals', the producer's consist preparation to the reproduction, the state and correct using of pastures plays an important role.

For the more rational using of pastures, during the year, the pasture rotation map is compiled in the household. Climatic conditions, the relief, the herbage's vegetation particularities are considered by seasons of the year.

At the core of the pasture division into seasonal, lies the herbage's edibility by horses, their phenology by seasons of the year. The best spring pastures for the herd horses in this zone are ephemeral-cereals (in April) and fescue-feather grass (in May, June). After the snow convergence and the beginning of the herbage's vegetation, the herds are grazed on the elevated areas of the steppe relief and the south mountain slopes of Kalmak-Kyrgan. With the regrowth of the fescue of the grass, herds are moved on plains or on the northern hillsides, they are grazed there until the beginning of the parching. In this period the spring fattening or the horses' grazier is conducted (50-60 days).

After the herbage's parching, herds are moved in lower reaches, where the herbage's vegetation is not completed.

In the middle or at the end of the summer herds are grazed on cereals and mixed herbs areas unsuitable for the haymaking, usually deep hollows, nearly source areas etc. This period of the autumn fattening continues until the cold period and the snow fall until December. The best pasture feed during the autumn fattening is considered the black sagebrush.

Cereal-sagebrush-saltwort lands' areas, not used in another season of the year, are allotted for winter pastures. All these arrays are inspected from the autumn, determined their fodder, constitute the route and using scheme with the reckoning that the last area was the closest to the early spring pastures, to the beginning of the mares' foaling time.

Winter pastures need to satisfy the following requirements:

1. They need to have enough area, productivity, and the pasture herbages' assortment. Depending on the productivity per a mare with a stallion, beginning from the middle of the December until the middle of the March, over 16-20 hectares of the pasture area is required

2. The productivity of pasture areas needs to be more than 3-3,5 hundredweight/hectare of dry weight.

3. On winter pastures it's desirable to have natural or artificial calms, for shielding herds during blizzards and snowstorms.

4 Conclusion

4.1 The novelty and prospects of the work

Scientific-based breeding work with the Kazakh breed in the region of North-East Kazakhstan, namely with breed horses in TOO "Akzhar-Ondiris", provides the receiving of following results:

1. The increasing of the elite individual's number of high productive fabric lines;
2. The bookmark of new lines and families and on their basis the creating of the fundamentally new domestic productive type of the Kazakh horses;
3. Preservation and reproduction of the gene pool of the Kazakh breed of year-round pasture contents cultivated in extreme conditions.
4. Cultivation of highly productive young stock for replenishment of reproductive composition of breeding horse farms and realization on a tribe with the purpose of increase of breeding and productive qualities of local herd horses.
5. Using the best male representatives, designed to transform the valuable hereditary qualities of the ancestor and its successors into the dignity of the largest possible number of animals.

Figure 3. Mares and Stallions used for Breeding 3 Lines and the New Bestau Fabric Type of Kazakh Horses and Their Modern Representatives

Figure 4. The Ancestor of the Line Stallion Zontik (Umbrella) 140-70 (Weighing)

Figure 5. The Continuer of the Zontik (Umbrella) Line 140-70 the Stallion Manufacturer Zapal 11-03 (Tapal) (146.0-156.0-187.0-20.0) - 521kg

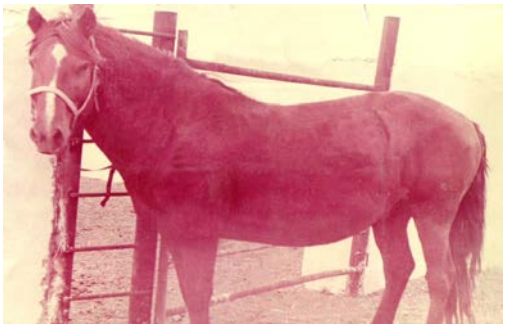

Figure 6. Line Continuer Zov (Call) 113-75 Stallion Manufacturer Zov II 99-04

(148.0-158.0-200.0-20.0) - 600 kg. Winner of the Republican Contest of Breeding Animals 2006, 2008, 2011

(147.0-156.0-193.0-20.0) - 540kg

Figure 7. The Ancestor of the Line Stallion Producer Asem 151-76 (147.0-156.0-193.0-20.0) - 540kg

Figure 8. Mares of the Kulageki Bestau Fabric Type Vity

Figure 9. The line Continuer Asem, the Stallion-producer Aset No. 5-08, the Stud of Young Fillers of the Bestau Fabric Type

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THE INFLUENCE OF NOVOALTAYSK BREED OF HORSES IN THE DEVELOPMENT OF PRODUCTIVE HORSE BREEDING IN THE NORTH-EAST OF KAZAKHSTAN

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Abstract: Relatively high demand and the market price for horse meat ensure the profitability of a herd of horse breeding for meat, promote the financial interest of farmers in the development of the livestock industry. The low cost of prices of horse meat compared to other meats is due to the fact that herd horses are kept on year-round horse herd feed without any capital expenditure on their maintenance.

Keywords: horses, Novoaltaysk breed, development, productive horse breeding, horse meat.

1 Introduction

Specific conditions for breeding horses require high adaptability to climate and feeding conditions. In this regard, the mother herds are taken to complete mares of local breeds. However, it is well known that the local breed of horses is different and as a rule, they are short in stature and have a relatively small body weight.

In order to further and more accelerate development of horse breeding in the conditions of market economy, special attention must be given to the herd of tebenevochnomu horses as the main provider of dietary, therapeutic and preventive meat and koumiss. It is necessary to expand research work to find new technologies for the production of horse breeding and to increase the profitability of horse breeding. Along with effective methods of increasing meat productivity as a purebred breeding, an important means of improving the meat quality of animals is a method of cross-breeding and the need to pay special attention to the selection of breeds not only with a pronounced effect of heterosis, but the maximum preservation of the adaptive qualities and genotype of local horses.

To meet these growing demands in recent years, environmentally friendly and health care products of horse breeding – Mare's milk and horse meat, not only in Kazakhstan but also in European countries (Germany, France, etc.) is becoming an urgent task to increase the number of highly productive animals and on their basis, creation of new productive lines and types of Kazakh horse breed.

1.1 The purpose and objectives of the research

The aim of this work is to improve milk and meat productivity of Kazakh horses crossing local Kazakh mares with stallions such as toad Novoaltaysk breed.

In accordance with the intended purpose was defined the following tasks of research:

- to study the chemical and biochemical composition of meat of young hybrids and Kazakh horses;
- describe the breeding and genetic selection parameters of toad purebred and young hybrids;
- set the milk productivity of mares;
- to identify the economic efficiency of rearing.

Scientific novelty of the work. For the first time in the conditions not only in the north-east of Kazakhstan and the CIS but based on the requirements of today's market economy before us, it raised the question of how we can quickly and effectively improve the meat quality of local horses, while maintaining the maximum adaptability of Tabun horse to feeding content.

Practical significance. The possibility and effectiveness of cross-breeding stallions Novoaltaysk breed with females Kazakh breed type toad is to create highly productive herds of horses and increase the production of high-quality production of horse breeding in the north-eastern region of the country

2 Materials and Methods

The main research and production studies were conducted in the farm “Turar”, Ekibastuz district of Pavlodar region. The farm is located in the dry zone of North-Eastern region of the country with a sharply continental climate characterized by, dryness of spring and summer, high summer and harsh winter temperatures which are insufficient and inconsistent over the years considering the amount of precipitation and significant wind activity throughout the year.

The object of research was young Novoaltaysk x Kazakh hybrids and pure-bred, young Kazakh horse breeds such as the toad local selection.

3 Results and Discussion

Meat productivity of Kazakh horses and their crosses with different breeds studied for a long time. J.N. Barmintsev, I.N. Nechaev (1) studied the development of myasnosti horses under Betpak Dalin experimental station of animal husbandry in experiments with horses of the type of toad. A. Imangaliev (2) studied the meat quality of the Adaev type in Guryev region. V.Z. Borkum (1964) studied the economic efficiency of production of foals for meat purposes. J.N. Barmintsev, G.A. Grushevsky, L.K. Volkov (3) found that 8-month crossbred foals x and the Kazakh Soviet heavy draft breed weighed 322 kg. Carcass Weight amounted to 173.3 kg, internal and subcutaneous fat 3.8 kg. A.E. Zhumagulov found that foals draft-Kazakh Kazakh hybrids were superior to their peers in live weight by 15.85 kg. A.A. Khamitov (4) studied the productive performance of heavy-Kazakh hybrids in the conditions of high mountains of Eastern Kazakhstan. A.T. Turabaev (5) studied the meat productivity of kulandinskogo intrabreed type Mugalzhar breeds in comparison with local Kazakh breed of horses. G.V. Sizonov (6) studied the meat productivity and morphological composition of meat of horses of different breeds and hybrids.

In the experiments conducted by the All-Union Scientific Research Institute of horse breeding farms in the Aktobe region, Kazakh Mare at the age of 4.5 years had a live weight of 395 kg, and mare hybrids obtained by crossing with stallions of improving breeds and grown in normal herd conditions at the same age had weight: hybrids from Lithuanian draught stallions breed – 458 kg, Vladimir – 497, Soviet heavy draft – 484, the Russian heavy draft – 490 kg, Latvian draught – 473, Tory – 453 kg.

The given examples show that the Kazakh horses and their hybrids in different climatic and grazing regions of Kazakhstan have high meat productivity. However, all these hybrids of the first generation are recommended to breed "in itself" for the acquisition of uterine herds and the accumulation of hybrids of higher generations, inevitably leads to a loss of the adaptive qualities of year-round grazing horse content and overall profitability of the industry.

Based on the experience of the leading scholars of the breeders of the Republic and the CIS countries, to improve the meat quality of the Kazakh breed of horses, not repeating the past step in this direction, we stopped at Novoaltaysk breed of horses, as a Brightener and only local Kazakh breeds to be better suited to the task than other breeds of horses. (7-8)

This is because, firstly, it's an opportunity for the manifestation of the heterosis effect due to the difference of genotypes and secondly, the closeness of their qualitative characteristics as suited to year-round horse herd content, very high instinct, fecundity and so on. Third, the increase in live weight of experimental horses was associated with a significant percentage of the blood at the heavy draft breeds.

Already the first indicators that our experiments have produced encouraging results in which the meat quality of the experimental population was judged not only on live weight, build indexes on computed basis of measurements, but to gain an objective assessment of meat productivity of animals supplemented for full performance and to yield characteristics of myasnosti slaughter weight and slaughter yield. As P.N. Kuleshov (9) noted, "the Basis for a correct evaluation of beef cattle is the exact definition of deadweight, i.e. the weight of meat and fat and then..." calculating the deadweight of the living – is the surest way to evaluate beef cattle".

To determine the meat productivity of Kazakh Novoaltaysk x hybrids compared to purebred Kazakh type toad in KKH "Turar" we have made the bottom 3 heads of young stallions hybrids and 3 heads of young stallions Kazakh type like a toad at the age of 6 and 18 months grown under the pasture horse content.

The slaughter made at a meat processing plant in Ekibastuz LLP "IPC Ekibastuz". To study the morphological composition of meat, we were butchering young animals according to the scheme adopted by the Republican standard PCT No. 725-72: 1 – Kazi, 2 – pressed, 3 – dorsal portion of 4 – back, 5 – shoulder, 6 – shank, 7 – desperately, 8 – shank front, 9 – shank back. The first-grade includes the dorsal portion and the rear portion. The second grade will take the blade portion and the shank. The third grade will carry desperately and knuckles. Outside varieties are distinguished Kazi and stings.

At slaughter, horses were separated from the carcass's front legs at the carpal joint and hind legs at the hock.

After cooling, the carcasses made the cut on the variety. Line cuts of the dorsal part of the first-grade passes – between the 6th and 7th ribs, back – between 17 and 18 ribs. The Line is cut at the rear of the carcass belonging to the first class – between 17 and 18 ribs, back of the knee joint. The Line is cut and the blade part of the second-class passes – between the 2nd and 3rd cervical vertebrae and in the back, between the 6th and 7th ribs. The Shank with respect to the second class is separated at the knee joint, the lower part of the bottom – across the tibia 2 cm above the Achilles tendon. The upper half of the tibia enters the shank.

Lines cut off desperately relating to the third class, passes between the occipital bone and the first cervical vertebra, the posterior border of the desperate cut is between the 2nd and 3rd cervical vertebrae. The front of the shank is separated by the line through the middle of the ulna and radius, the Shin part of the lower half of the elbow and the lower half of the radial bone and wrist. The shank is separated across the back of the tibia at the level of 2 cm above the Achilles tendon. The rear shank includes the lower half of the tibia and hock.

Figure 1. Diagram of Cut Carcasses of Horse (PCT of Kazakh SSR 725-72)

1 - Kazi; 2 - pressed; 3 - dorsal; 4 - back; 5 - blade section;
6 - shank; 7 - desperately; 8 - the shank front; 9 - shank back

Table 1. Meat Quality of Young Horses of Different Genotypes (colt, n=3)

Experimental Group	Age of Slaughter, months.	cutting indicators kg								
		Slaughter live weight			Carcass weight			Slaughter yield, %		
Biometrics		M±m	σ	Sv	M±m	σ	Sv	M±m	σ	Sv
Control (KT)	6	183,7±2,12	3,6	2,0	102,0±1,64	2,8	2,7	55,5±0,28	0,5	0,9
	18	293,6±7,70	13,2	4,5	154,6±3,80	6,2	4,0	52,7±0,23	0,4	0,7
Experienced (NA x KT)	6	202,0±5,50	9,5	4,7	113,14±3,69	6,4	5,6	56,0±0,57	1,0	1,7
	18	371,9±18,60	32,3	8,7	194,7±9,5	16,4	8,5	52,3±0,15	0,2	0,5

From Table 1 it is seen that the pre-slaughter weight of the crossbred calves is much superior to that of purebred calves of the Kazakh toad. So, the difference in 6 months was 18.3 kg and at the age of 18 months – 78.3 kg (P>0.99), which is probably due to the influence of paternal inheritance factors.

At the control, slaughtering of young stallions was determined by the carcass yield. He stood at 6-month foals hybrids – 56,0%, the same young toad – 55,6%, at the age of 18 months hybrids – 52,3%, the toad –52.7%. At 6-months of age on slaughter yield hybrids, there is a slight advantage of 0.5%, rather than the young toad. At 18 months of age, the Kazakh youngsters ahead of hybrids was 0.4%. In General, the difference in both cases is negligible.

After cooling, each produced carcasses weighing and trimming cuts. For each cut, by weighing on the electronic scales determined by the weight of flesh, bone, and fat, based on the

weight data calculated percentage for each experimental group of animals (Table 2).

Table 2. Morphological Composition of Carcasses of Young Horses of Different Genotypes (colt, n=3)

Experimental group	Age of Slaughter, months.	cutting indicators, kg								
		Mass of pulp			Bone Mass			Mass of fat		
Biometrics		M±m	Sv	Yield, %	M±m	Sv	Yield, %	M±m	Sv	Yield, %
Control (KT)	6 85,0±1,6	85,0±1,6	3,3	83,3	14,4±0,03	0,4	14,1	2,6±0,03	2,3	2,5
	18 127,6±3,3	127,6±3,3	4,5	82,5	21,3±0,05	0,4	13,7	5,7±0,34	10, 4	3,6
Experienced (NA x KT)	6	94,7±3,4	6,2	83,7	15,8±0,3	3,1	14,0	2,6±0,01	0,9	2,3
	18	163,2±7,7	8,2	83,8	25,6±1,6	10,7	13,1	5,9±0,27	8,1	3,0

The level of Fat has, morphological structure of carcass slaughter output, as can be seen from tables 1-2 the percentage of significant differences between groups of animals with different genotypes are observed, which confirms the identity of formation of quality of meat at this age. But the development of mass carcasses of crossbred young and purebred is superior to the toad 6 months of age is 11.1 kg, the pulp weight 9.7 kg (P>0,99), at 18 months of age on the carcass weight to 40.1 kg, the mass of the pulp at 35.6 kg (P>0,999).

Thus, a higher slaughter weight and carcass weight had a half-breed animals or hybrids of the first generation in the manifestation of heterosis that occurs in crosses of different breeds, with different gene pool. In addition, herd horse's ability to fat deposition describes their adaptive qualities to withstand the harsh conditions of feeding. In our experience, the yield of fat hybrids and Kazakh youngsters are absolutely identical, which confirms that the high adaptive qualities of hybrids are not inferior to the toad.

The research results already at this stage, provide material for conclusions about the appropriateness of the use of delivery and Novoaltaysk stallions to improve the meat quality of Kazakh horses. Moreover, horses of Novoaltaysk breed with exceptional adaptation, adaptive qualities to the horse herd content is not inferior to the Kazakh breed, at the same time significantly superior to the last in live weight which can be used in absorption of crossing to the third generation, accumulating the positive qualities in the descendants, then to produce a backcrossed hybrids with elite stallions toad, hybrids breed "in itself", and on the basis of the results obtained to participate in the creation of new, specialized lines and types of Kazakh breed of the meat direction of productivity.

It is important that the creation of new specialized lines and types of meat of horses first requires determining what proportion of krovnosti to breed hybrids "in itself". The noteworthy experience of creating cabin meat type of Kazakh horse breed has been proven by the order of the Ministry of agriculture No. 178 dated 15.11.95 year in terms of year-round grazing horse content in the Alpine zone of Eastern Kazakhstan (1200-3000 m above sea level). Genetic potential stallions for live weight 650 kg, mares – 530 kg, slaughter yield is 54-57%, fruitfulness of 85-90%. Unfortunately, this type remained only in KKH "Azamat" EKR and on 01.01.06 city numbered only 195 goals, of which 68 mares. (10)

Cabin type of Kazakh breed was created using simple cross-breeding of the Kazakh mares with stallions of Soviet heavy draft breed and for backcrossed hybrids, ½ blood with the representatives of the Kazakh breed and the resulting hybrids ¼ blood bred "in itself". In the first phase of work, along with the breeding of hybrids "in itself", it was decided to continue the crossing with stallions of the purebred Soviet heavy draft breed with the aim of increasing the number of hybrids from which the selection was made. But the increase of krovnosti Soviet heavy horses of the Kazakh breed greatly weakened adaptive quality of offspring.

In our experiment, the increase of krovnosti horses Novoaltaysk breed in Kazakh breed is not a threat and you can accumulate positive signs even unto the third and to the fourth generations, to make a rigorous selection of hybrids of the best qualitative characteristics. Then apply backcrossing hybrids with stallions Kazakh breed type toad with the most pronounced characteristics, conformation, and meat quality. This will work in the future.

In this direction, we have already laid. For these purposes, the number of yearlings who have successfully passed the first test of the winter pasture tebenevochnoy (2008-2009 g), selected 6 colts with the most severe symptoms of meat, good conformation, well able "to keep the body" in the period of underfeeding pasture.

It is well known that all of the exterior-constitutional peculiarities of horses that are formed in the process of growth and development are based on a definite hereditary condition of existence. In horses bred for the growth and development of young animals, along with genotypes great influence of par atypical factors. Animals feed on pasture all year-round while in certain seasons of the year, they do not fully satisfy the need for nutrients and that greatly affect their future growth and development. Considering this factor, the above 6 goals crossbred of young stallions, in the most unfavorable of the growing seasons of the year (winter), will be taken under special control and feeding.

Currently, in KKH "Turar", there are 96 goals crossbred calves ½ krovnosti, including 38 of the colts and 58 fillies which is the backbone of the breeding group. In the future, hybrids of the second generation are envisaged to breed "in itself", with the aim of creating new productive lines, meat and milk type of the Kazakh breed of horses.

Figure 1. Mixed Young 7 Months Before Slaughter

Figure 2. Mixed Young 18 Months of Age

Figure 3. HCV Distribution by Genotype

Figure 4. Deboning Carcasses of Young Animals

3.1 Chemical and biochemical composition of meat of young horses

One of the important indicators that give an idea of the nutritional value of meat is its chemical composition, which does not remain constant in the process of individual development of animals and is closely related to the level of feeding, maintenance, age, and fatness.

Horse meat contains a significant amount of nitrogen-containing substances, with reduced intramuscular fat. Based on this, already in the nineteenth century, physicians believed that horse meat is a dietary product and recommended in the treatment of several diseases. In 1869, in the article "Horse, its present and its future value as breeding material in the economic life of the Russian people", Arkhangelsk was written, "the Preservation of human life should be put ahead of preserving prejudice. For horse meat should be viewed as a precious and cheap medicine."

As a result of studies conducted on the carcasses of the horses from the stables of content by Professor Wolvertem in 1933, it was concluded that horse meat contains on average 74.2% of water, 21.6% protein, 2.5% fat and 1.0% ash.

Unlike horses from the stables of contents, herd horses during spring and especially autumn feeding accumulate in the body a significant amount of fat. So, according to P.S. Drogin, meat even 6-month foals of Yakut breed contain 15.66% of fat, protein 20.87%. (11)

According J.N. Barmintseva, I.N. Nechaeva, N.P. Andreev, Kazakh horse meat contains 70% water, 24.6% protein, 4.7% fat, 0,93% ash; Kazakh heavy draft hybrids meat contains 70.5% water, 25.9% of protein, 3.1% fat, and 1.05% of ash; the meat 6-month foals of Kazakh breed has an average of 66.97% water, 18.32% protein, 13.3% fat, and 0.80% of ash.

In the example shown in table 3, the data shows that with age, the amount of water in the carcass of young horses as toad and hybrids is reduced, the amount of fat increases.

Table 3. Chemical Composition of individual parts of the carcasses of young horses

Indicator	Part of the carcass											
	Shoulder				Rib				Rear			
	KT		NA x KT		KT		NA x KT		KT		NA x KT	
	6 month	18 month	6 month	18 month	6 month	18 month	6 month	18 month	6 month	18 month	6 month	18 month
Moisture, %	74,8	74,1	74,9	73,2	50,0	45,9	50,8	46,3	66,6	64,3	70,0	67,8
Protein, %	20,0	20,5	21,3	24,0	16,1	14,0	17,2	16,2	17,3	17,5	20,2	23,1
Fat, %	2,2	3,3	2,0	3,0	33,2	40,2	32,0	39,7	14,0	16,2	10,1	14,0
Ash, %	1,1	1,02	1,5	1,3	0,08	0,07	0,9	0,8	0,93	0,85	0,9	0,8
Kcal/kg	998	1117	1032	1230	3632	4178	3568	4221	1952	2158	1721	2188

The water content of the average meat hybrids exceeds meat toad in 6-month age by 1.45%, in 18 months by 0.98%, protein content of meat hybrids is richer than the meat of the Kazakh toad, so in 6 months by 1.76%, at 18 months of age by 3.76%.

The fat content of meat of hybrids is slightly lower to the meat of the Kazakh toad, in 6 months by 1.74%, in 18 months by 0.98%. The ash content of meat of hybrids exceeds the toad in 6-month age – 0.39%, at 18 months of age by 0.32%.

Kazakh youngsters at 6 months of age, the caloric content of meat is higher than in the hybrids by 87 kcal, but in the 18 month of age, it is lower than the hybrids by 62 calories. This appears to be due to the fact that more mature young hybrids have greater muscle mass and protein content, which affects the caloric value of meat.

Currently, accumulated considerable information on the nutritional and biological value of horse meat. Evaluation of General chemistry analysis (water, protein, fat, ash) is an insufficient indicator of the biological value of meat, so in our studies, along with the chemical composition of meat, we conducted an analysis on the content in meat of crossbreed and calves toad of some essential (tryptophan) and non-essential (hydroxyproline) amino acids.

It is known that muscle tissue includes sarcoplasmic proteins of the myofibrils, which are complete and contain all the essential amino acids. The connective tissue proteins contain some essential amino acids, particularly tryptophan, which plays a significant role in the biochemical processes of the body, helps induce natural sleep, reduce pain sensitivity, act as a natural antidepressant, helps relieve anxiety and tension, reduces some symptoms of biochemical disturbances in the body and prevents the development of alcoholism.

At the same time, 14% of the proteins of the connective tissue accounts for hydroxyproline amino acid which is not present in the complete protein. The selection of these amino acids is determined by the fact that tryptophan is an essential amino acid present in all muscle proteins at a pretty constant quantity and hydroxyproline – the constant component which is characteristic for defective food with respect to proteins of connective tissues. Therefore, hydroxyproline can be considered as a kind of label detection collagenous proteins in tissues. Collagen is the major component of connective tissue that is part of cartilage, tendons, ligaments, bones, teeth, blood vessels, and up to 25% of the total protein mass of the body, essential for joints and ligaments. Thus, connective tissue unites the various organs and tissues of the body. Therefore, from metabolic processes in the connective tissue, will depend on the processes of adaptation and stability of organs and systems. One of the main indicators of the metabolism of collagen is hydroxyproline contents.

Therefore, based on the above stated, the content of proteins in meat identifies tryptophan and defective - for hydroxyproline. The ratio of tryptophan to hydroxyproline is called protein quality indicator (B. K. P.) and characterizes the usefulness of the proteins in the meat, being one of the criteria of its quality.

The study of proteins shows that their amino acid composition varies with species, age, individual parts of the carcass of the animal.

B.N. Gutin (1976-1977) in the experiments with thoroughbred breeds gives examples of the high content of B. K. P. meat in the range of 6.7 to 7.7; P. Rabaev (1973) in experiments with the Kazakh breed of the type of toad and kushumskaya breed bred to Registered stud, shows the protein quality index in kushumskaya rocks in front of the carcasses to 4.94-5.50; backs – 5.64-6.36; respectively, the toad of 5.75-5.50; 6.11-6.20. According to the All-Union Scientific Research Institute of the meat industry in the meat of young horses, it is – 4.5-7.7 mg per 1 g of protein nitrogen.

In our experience with the Novoaltaysk x Kazakh mixed-breed and purebred toad, B. K. P. to hybrids – of 6.72, toad – of 6.39 mg/g.

Studies of VNIIMP found relatively high correlation between the content in the meat of hydroxyproline and its stiffness (r=0.66). Meat containing large amounts of connective tissue has a lower nutritional value. The results of our research, presented in Table 4 shows that B.K.P. hybrids are not inferior to the toad, to some extent even superior (0.33 mg/1 g protein nitrogen) and that characterizes the quality of the meat

Horse fat in their chemical composition and associated biological values are significantly different from fat of other species of farm animals (cattle, sheep, and pigs). They have a high iodine value, low-melting, rich in vital fatty acids and vitamin A.

Table 4. Characteristics of Quality Protein and Fat Meat 18-month-old Calves

Breed	Quality indicators				
	Protein			Fat	
	Tryptophan	Hydroxyproline	B. K. P.	Melting point, °C	Iodine number
KT	100.4	15.7	6.39	31.8	92.3
NA x KT	110.3	16.4	6.72	31.2	92.6

Earlier studies of the Kazakh horses and their hybrids under conditions of herd keeping showed fat hybrids on the biological value of fat yield to the local horses and of the toad. P.S. Friendess, who studied the constant characteristics of fat young Yakut horses and their crosses with the Russian heavy truck, provides data on the iodine content of the Yakut foals – 86.5, hybrids – 84.0, melting point fats respectively to 24.6°C and 27.6°C. (11)

Studies conducted on the underbrush Kazakh horses (N. In. Analina he touched upon the use of K. D.) had a melting point of the fat 30.9°C, iodine number of 98.2.

In our experience, a significant difference in the melting temperature and iodine number are observed (Table 4).

The melting point of the fat in the Kazakh youngsters is above hybrids by 0.6°C and is 31.8, hybrids of 31.2°C. Iodine number from toad amounts to 92.3, 92.6 percent of the hybrids. As we can see the significant difference in these indicators is not detected, which again shows the similarity of the biological characteristics of the two breeds.

3.2 Selection and genetic parameters for the selection of hybrids

The relationship of breeding traits has great importance in the improvement of productive qualities of animals and are often directed towards selection according to the same basis, one can enhance and negatively affect others at the same time. Numerous studies have found that the degree and character of correlation of breeding characteristics specific to individual breeds and groups of animals.

In the meat herd horse breeding, such studies are quite rare.

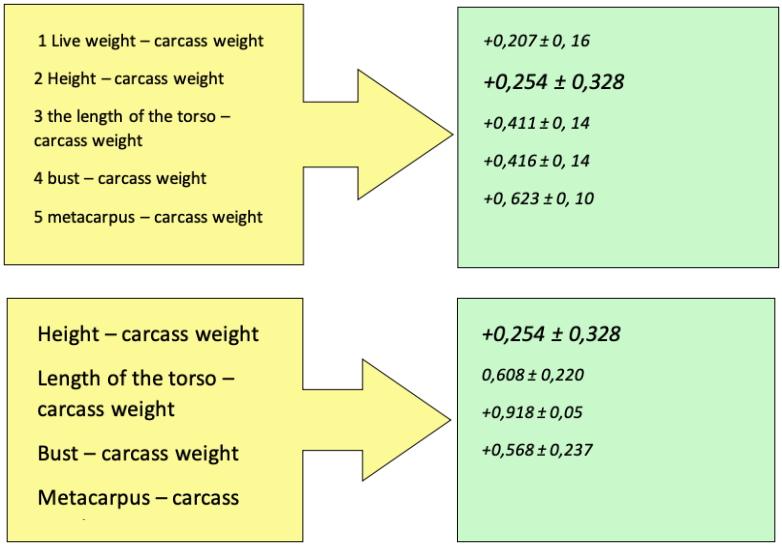
When selecting meat herd horses, the main features are live weight, growth and development of the body in length and width, development of the backbone. Based on this, we have conducted studies to elucidate patterns and relationships between the basic measurements and live weight of experimental animals, describing the growth and development of horses.

The results revealed a positive correlation between live weight and basic measurements of horses as the height at withers, body length, chest girth, and metacarpus. The highest correlation between the metacarpus and live weight, and the smallest between the height at withers and live weight. Thus, we were entitled to expect that the selection of young animals with the above measurements, the positive impact on the increase of their live weight.

The most productive and most effective selection expected by metacarpus, chest girth and body length, which amounted to the values given in Table 5.

Table 5. Correlation Between Body Measurements and Live Weight Herd Horses

The relationship of measurements	The correlation coefficient, x
1 the height at the withers – live weight	*+0,207 ± 0,16*
2 body Length – live weight	*+0,411 ± 0,14*
3 chest Girth, live weight	*+0,416 ± 0,14*
4 metacarpus – live weight	*+0, 623 ± 0,10*



As can be seen from the calculations made, there is a positive correlation between the basic measurements and live weight in 18-month-old crossbred calves. The highest positive correlation coefficient (+x) is observed between the measurements of the metacarpus and live weight, and the smallest correlation coefficient between the measurements of height at withers and live weight. The selection has virtually no effect on the selection at a height at the withers.

According to N. Anasini, (12) it is impossible to fully agree on the need for the selection of meat of horses only the magnitude of the metacarpus. The correlation coefficients of the metacarpus with the live weight varies greatly depending on the size and nature of the sample and statistical processing. Much more stable correlation is observed between the magnitude of the metacarpus and bone mass in the carcass. Breeding objectives are to improve the meat yield of pulp and the greatest possible reduction of the relative weight of the bones in the carcass, with the prerequisite of preserving the proportionality of tissue in the body and strength of constitution animals.

When breeding horses, the aim is improving meat quality and emphasis should be placed on creating intrabreed meat type. Since the main purpose of the breeding beef herd of horses is horse meat production, is of great interest to establish correlations between measurements, live weight, and carcass, which is the “proper” meat. Establishing such links will allow you to judge how effective it is to possibly select animals by one or other characteristics with the aim of obtaining the greatest amount of horse meat (Table 6).

Table 6. Correlation Between Body Measurements and Carcass Weight of Horses

The relationship of measurements	The correlation coefficient, x
1 Live weight – carcass weight	*+0,99 ± 0,004*
2 Height – carcass weight	*+0,25 ± 0,328*
3 the length of the torso – carcass weight	*+0,61 ± 0,220*
4 bust – carcass weight	*+0,91 ± 0,053*
5 metacarpus – carcass weight	*+0,56 ± 0,237*

As you can see, there is a positive relationship between all measurements, live weight, and carcass weight. The highest degree of confidence between the live weight - carcass weight and chest girth - carcass weight. High is also a correlation between the oblique body length - weight carcasses and metacarpus - carcass weight.

Thus, we can conclude that the selection of an increase in body weight can increase the yield of meat. This pattern is inherent in other breeds, which is confirmed by data slaughter Novoaltaysk x Kazakh first-generation hybrids and purebred Kazakh toad (Table 7).

Table 7. The Degree of Variability Contingency (Correlation) Guinea Young Horses at 18 Months of Age

The relationship of measurements	Breed	
	The toad (KT)	Hybrids (NA x KT)
Live weight – carcass weight	*0,99±0,004*	*0,99±0,001*
Height – weight carcasses	*0,25±0,30*	*0,66±0,28*
The length of the torso – carcass weight	*0,61±0,22*	*0,76±0,18*
Chest – carcass weight	*0,91±0,51*	*0,87±0,10*
Metacarpus – carcass weight	*0,56±0,24*	*0,69±0,23*

In practice of meat and horse breeding stallions made in the process of growth and development of a preliminary assessment at the age of 1.5; 2.5; 5.5 years and finally the accumulation of data on the quality of the offspring, it is important to have criteria for early prediction of their productivity, of which the main feature is the live weight. In this regard, we determined the correlation between the live weight of young stallions in 6-months and 18 months of age. The live weight of stallion toad at 6 and 18 months – 0.75±0.05; hybrids – 0.76±0.07. The foals grown in the horse herd at the steppe zone of Pavlodar region set a high degree of repeatability of live weight.

According to I.N. Nechaev, (13) with increasing age periods, the rate of recurrence is reduced, which is explained by the strong influence of their para typical factors of growth and development.

Therefore, identifying the predictive value of the increased live weight of young animals at the age of 6 and 18 months.

3.3 Milk yield of Kazakh and Novoaltaysk mares

The horses in Kazakhstan is not only meat but also dairy animals. Drinks made from mare's milk (kumis) is a drink not only in Kazakhstan. Among the features that characterize the economic value of the horse population, considerable importance is the milk production of mares.

The milk of mares contains more lactose and has a specific composition of protein and fat, very rich in vitamin C (ascorbic acid), has a unique set of mineral salts, trace elements, vitamins, and enzymes. Milk of mares has 1.3-1.5 times more milk sugar than in cow milk, which creates favorable conditions for lactic acid and alcoholic fermentation during processing in the Mare. Fat in Mare's milk is less than in cows, but its advantage is that it inhibits the development of TB bacteria, while they vigorously develop into fat cow's milk.

One liter of Mare's milk contains about 20 grams of protein, i.e. about as much as it is contained in 100 g of beef of average fatness. The milk of Kazakh mares on average contains sugar – 6.43%, fat – 1.82%, protein – 2.12%.

Features of Mare's milk also have vitamin and mineral composition. The total number of minerals in Mare's milk is 2 times less than in cow, but it has much more calcium, essential for the normal functioning of the nervous system and strengthen the bone tissue. Furthermore, calcium affects mineral metabolism in patients with tuberculosis and calcium salts promotes healing of tuberculous lesions.

Mare's milk is rich in fat-soluble (A, D, E) and water-soluble (C, group B, etc.) vitamins. A liter of Mare's milk contains on average the daily needs of an adult for vitamin C (70-100 mg), 1.5-2L – vitamin A (1.5 mg), and 100 g – vitamin B12. According to the content, vitamin C (ascorbic acid) is among the products of animal origin which the mare takes the first place. Vitamin C is used as a means of active chemoprevention of cancer, gives the body resistance to cancer.

Vitamin A delays the aging process and decay of the body. In one liter of Mare's milk, it contains 125 to 300 μg/L. Vitamin E has a preventive and curative property in atherosclerosis due to its ability to lower cholesterol in the blood.

The composition of Mare's milk contains antibiotic nisin which inhibits the development of the Tubercle Bacillus, therefore is used for the treatment of pulmonary tuberculosis. Possessing antibiotic properties, like penicillin, streptomycin kills putrefactive bacteria and E. coli or prevents them from multiplying. Before antibiotics, koumiss was the only means of treatment and prevention of pulmonary tuberculosis.

KKH "Turar" is also engaged in the milking and sale of koumiss through outlets in the city of Ekibastuz. Since 2007, 20 mechanized milking horses of Kazakh breed type toad were produced. Previously, the milking of mares in the farm is not practiced, and the domestication of mechanical milking of herd of wild horses was a complex process. To tame mares for milking, in the first three days, animals at several times during 1-1.5 hours are kept in the machines split, then released and let them with foals. On 4-5th day try to carry out hand milking when the electric motor is on in order that the Mare get used to the noise, and only on the 6th day, put the teat cups on the nipples for the first time

The first time, a separate mare had to be fixed on the back of the left leg, and the other was enough to hang on a rope around his neck or keep an eye on the level of the raised hand. After 10-12 days, the Mare began to get used to the new environment.

Observations have shown that a calm horse gets used faster to the noise of the engine of the milking machines and to the process of mechanical milking than animals with a more excitable nervous system.

The farm is set corresponding to the daily routine and milking interval.

A kind of Koumiss is prepared using the national fermented milk product "skin" made from cow's or goat's milk. Sourdough is specially prepared, held until signs of alcoholic fermentation, followed by low doses several times a day, add in fresh and mix thoroughly. After 6-9 days, koumiss leaven is ready.

Thus, prepared this way, Mare enjoys sufficient demand among the population.

Rationally organized koumiss is an important source of farm incomes. In this regard, we are also interested in imported milk from Novoaltaysk mares in comparison with Kazakh females. The study of the milk yield of Kazakh and Novoaltaysk x hybrids is not yet possible at this stage of the study, because its age is not possible. The study of milk yield of Novoaltaysk mares is of both scientific and practical interest since on the basis of these data it is possible to carry out an objective assessment of them as productive animals that are used as improvers of Kazakh horses. In this regard, the task was to indirectly examine the milk of Novoaltaysk mares breed imported to the farm "Turar" compared to mare's toad of the farm.

The research was conducted on the basis of the live weight of the experimental foals at birth, in months, since at this age the weight gain is due to the mother's milk. (According I.M. Goraczkowski, on the basis of the performed experiments with heavy-Kazakh hybrids, (14) the milk of mares in the first month of lactation was not significantly different from milk yield of mares, evaluated by the method of control milking). Calculation

of milk yield was carried out on the basis of milking accepted in horse breeding, consumption of 10 liters of milk per 1 kg gain in live weight of the foal. In 1937-1939, Professor V.P. Dobrinin in the study of milk yield of the horses adopted a method of weighing horses, they were asked to judge the milk yield of mares in body weight gain of foals in the first 1.5-2 months after birth, on the assumption that 1 kg of weight gain during this period foals use 10 liters of mother's milk. Growth of foals is determined by 5 milking Novoaltaysk mares and 5 mares of the Kazakh breed of toad. These data are shown in Table 8.

Table 8. Milking of Mares (n=5)

	foal Weight, kg		Gain for 30 days, kg	The average increase for a month, g	Allocated milk*/day
	At birth	In months of age			
Kazakh mares toad					
M±m	43,8	80,3	36,5	1,22	12,2
σ	45,0	78,8	33,8	1,13	11,3
sv	42,3	80,0	37,7	1,26	12,6
	45,0	77,7	32,7	1,09	10,9
	42,9	82,2	39,3	1,31	13,1
	43,8±0,54	79,8±0,75	36,0±1,21	1,2±0,04	12,0±0,40
	1,2	1,7	2,7	0,09	0,90
	2,8	2,1	7,6	7,5	7,5
Mares Novoaltaysk breed					
M±m	44,5	92,7	48,2	1,60	16,0
σ	44,0	88,3	44,3	1,48	14,8
sv	43,7	95,0	51,3	1,71	17,1
	43,8	85,4	41,6	1,39	13,9
	46,5	95,3	48,8	1,63	16,3
	44,5±0,52	91,3±1,9	46,8±1,7	1,56±0,05	15,6±0,56
	1,1	4,3	3,8	0,12	1,2
	2,6	4,7	8,2	8,1	8,1

Milk yield of mares in each breed varies widely, that is characterized by a high individual variability, which gives many opportunities to guide the selection. The study of milk yield of the experimental mares on the gain in live weight of the foal in the first months (1.2-2) of life show that the milk of mares of Novoaltaysk breed is higher than milk yield of Kazakh breed and an average of 15.6±0,56L, the Kazakh mares – 12.0±0,40 L.

In dairy breeding, the amount of milk per every 100 kg of body weight of a Mare is calculated, the so-called index of milk production, because the more milk an animal produces per unit of its mass, the better it pays to feed. Particularly important is the determination of the index of milk production on farms, where the practice of stables or stables-grazing horses and bearing of the high cost of feeding and maintenance of livestock.

According to M.S. Mironenko, A.M. Allegrina, O.I. Krasnova, M.K. Akhtaeva, P.V. Cherepanova, T.V. Ammosov, (15) the level of milk production of horses for the first 5 months of lactation did not significantly change (Table 9).

Table 9. Level of Milk Production of Mares of Different Breeds by Months of Lactation with Herd Content

Breed	Milk yield by month of lactation, l					Researchers
	1st	2nd	3rd	4th	5th	
Novoaltaysk	543	522	501	483	444	M. Mironenko
Kyrgyz	360	390	411	396	360	M. Mironenko
Logiska	375	393	352	245	152	A. Allauzen
Garbarska	376	394	334	286	216	M. Tokhtaev
Bashkir	386	381	351	280	208	O. Krasnova
Kazakh	480	480	460	430	370	V. Cherepanova
Yakut	369	322	328	288	236	T. Ammosova
Draft-Kazakh hybrids	530	540	530	510	420	V. Cherepanova

From Table 9 it follows that in mares during the first three months of lactation the milk yield is kept approximately at the same level, and only the fourth month it is observed a slight decrease. The level of milk production of mares in late lactation has not been studied, as almost everywhere milking mares stop in September, with the end of the koumiss season.

However, it is known that pregnant mare's lactation is considered to last 7-9 months and breastfeeding lasts more than a year, but the level of milk production in late lactation is low. To characterize milk productivity of mares on their daily milk yield, live weight was calculated and conditional indices of milk production for the 5 months of lactation are given in Table 10.

Table 10. Indices of Milk Yield of Mares, n = 5

Breed mare	Avg. live weight, kg	Avg. milking, L	Conventional milk*, L	Index of milk yield
Kazakh toad	412	12.0	1800	436.86
Novoaltaysk	493	15.6	2340	474.60

Note: *during 5 months of lactation

According to J.N. Barmintseva, (16) B.R. Akimbekova, (17) A. E. Zhumagulova, M. Omarova, A. A. Khamitova (18) the horses of the Kazakh breed toad, Bashkir, Novoaltaysk, heavy-Kazakh hybrids, index of milk production equal 560-680; Soviet and Russian heavy 410-440, the mares of trotting and horse breeds 260-400. In our current indicator, index of milk yield of hybrids is slightly higher than in mare's toad but has no significant difference. In General, hybrids have a higher yield which of course affects the intensity of the growth and development of young stock.

Milk yield of mares depends on many factors, one of which is breed. I. M. Goraczkowski, A.M. Atanasova (19) wrote that the daily milk yield of Kazakh mares varies from 10 to 20.5L and hybrids with a heavy-duty from 15 to 27.5 L.

V.N. Frankincense, L.P. Markushin, M. Sinitsin (20) working with mares of Soviet heavy draft breed, found their high milk productivity. So, on the first and second month of lactation, the daily milk yield was 18L. 3-4 months – 10L, 7-8 months – 8 L. For the entire 8-month of lactation, milking heavy draft mares ranged from 3500-5000 L.

V. Medvedev, V. Jaworski (21) in experiments on the productivity of mares of Soviet, Russian and Lithuanian heavy draught (n=10; 10; 17) for 8 times, the milking for 210 days of lactation milk yield amounted to respectively species: 2214,8; 2236,3; 2442 L, and the average for a day of 10.54; 10,64; and 11.63L. The absolute value of the milk production of the Russian Mare heavy draft breed is inferior to the Soviet draft, but the index of milk production per 100 kg live weight surpasses the Soviet draft horses. So, the Russian heavy-duty on 100 kg of live weight has 525 liters of milk, the Soviet heavy – 504 L. The Record of the Soviet heavy draft Rowan mares, (the Bard of Rojnica) for 348 days of lactation at the age of 7 years – 6173 L. Record Russian heavy draft mares Cohort – 5338 L. A. Remizov gives the data of the Lithuanian draught Mare AUX Biches, with record milk production in 7007L with the highest daily yield of milk – 31.3L.

All these facts mean that Novoaltaysk breed, having in their blood high genotypic potential of the Soviet, Russian and Lithuanian breeds can be improvers of the Kazakh breed and milk production, which is especially important due to the manifestation of heterosis in Novoaltaysk x Kazakh hybrids grown in Pavlodar region, milk production should manifest itself to an even greater degree than the original species.

3.4 Economic efficiency the results of the experiments

Economic efficiency management of cattle breeding is determined by the degree of competitiveness of their products. In herd horse breeding, these are the production and marketing of environmentally clean, enjoying high customer demand of high-quality diet of horse meat and koumiss.

Practice and horse breeding in our region showed the profitability of the organization even for short-term milking of mares and the production of koumiss. (29) To determine the milk yield of imported mares Novoaltaysk breed we organized 3 milking mares foaled in mid-April 2009. A month after parturition started hand milking. Milking was performed in the period of two months and by the end of the second decade of July, mares with foals are released into the General herd. Milking was performed 7 times, every 2 hours starting from 6 am to 18 PM, then mares with foals until morning was released in the pasture near the stables.

Within two months of milking (15.05 – 17.07.09.), it was necessary in 1278 liters of milk, the average daily milk yield is 7.1L per head per day. Milk of mares after technological processing in a day, koumiss were taken to be sold in retail chains of the city of Ekibastuz. If market sales price of koumiss is 250-300 T/L, the total amount of revenue is amounted to 319.5 thousand Tenge.

At the cost of feed of 310,0 thousand Tenge (hay – 10 thousand/t, bran – 18 THD/t, salt-lick – 3 thousand/ton) transport costs – 40.2 thousand Tenge, for the salary of a dairy farmer – 40.0 thousand Tenge, to Supplement the herd-groom – 20.0 thousand Tenge, the total amount of expenses for production and sale of koumiss was – 127.5 thousand Tenge. Thus, the net income from the sale of koumiss made 188.3 thousand Tenge.

On the basis of experimental data on the milk yield of mares in the period of scientific and economic experience, they estimated the economic efficiency of growing young horses of Kazakh toad (control) and crossbred with the Novoaltaysk breed calves (experience), grown under the same conditions year-round horse herd content. The increase of productive qualities of Kazakh horses Novoaltaysk x hybrids compared to those of purebred Kazakh horses type toad observed not only for meat but also for milk plays an important role in improving the Economics of the industry.

The superiority of the crossbred foals in terms of growth and development, meat quality over their peers from the control group provided higher rates of production in the experimental group (Table 11).

Table 11. Calculation of Economic Efficiency of Rearing Horses, 1 Goal in 18 Months of Age

Age	Live weight		The cost of growing-set, Tenge	The cost price of 1 quintal of live weight, Tenge	Profit, Tenge	Margin, %
	Kg	Cost, Tenge				
Novoaltaysk x Kazakh hybrids						
18	369	28080	7597	7597	67860	241.6
Kazakh type of toad						
18	298	77470	28080	9429	49390	175.9

Calculations show that the cultivation in the period from birth to 18 months of age of the crossbred calves is more profitable compared to cultivation of young growth of Kazakh horses' type toad. The amount of profit from cultivation of hybrids in the experimental group per head is 18,740 Tenge higher compared to the cultivation of young purebred of Kazakh breed type toad. The cost of 1 quintal of live weight gain from the crossbred calves in comparison with the toad is below in 1832 Tenge.

Novoaltaysk-Kazakh hybrids allow you to get more income from the first young head than the young toad. The most profitable for implementation of age management of young cattle for meat is at 6, 9 and 18 months. (30)

To increase the production of horse breeding in Pavlodar region under year-round grazing horse content, it is advisable to mix the local Kazakh mares with stallions of Novoaltaysk breed and to animals with a high meat productivity to ensure the region and in the whole of the Republic of valuable stallions' beef.

Data obtained in the experiments indicate that crossing the Kazakh mares with stallions Novoaltaysk breed greatly influenced the formation of meat productivity of crossbred animals. Revealed the superiority of the crossbred over purebred calves of the Kazakh type of toad, the weight gain, the number of meat and flesh and the index of meat and for adaptive qualities and biochemical composition of meat is not inferior to the toad.

Thus, to increase production and reduce production costs of horse breeding and for high quality, environmentally clean, treatment and prevention of horsemeat and koumiss, it is advisable to grow Novoaltaysk x Kazakh crosses at the first and higher blood composition, in conditions of year-round grazing horse content in the North-Eastern area of Kazakhstan. (31)

Along with the increase in meat productivity in commercial breeding, for improving the economic efficiency of the industry, is of great importance the condition of the breeding work of the farm. (32)

With the increase in reproduction level, breeding horses significantly increased the economic performance and marketability of the industry of horse breeding. In general, the increase in business output of foals per 100 mares causes a significant reduction in the cost of one foal at birth. Therefore, in order to enhance the marketability and economic indicators, it is necessary to pay attention to the increase in business output of foals by reducing idling and aborted ewes, as well as more rational use of breeding stallions.

4 Conclusion

The generalization of the results of the conducted research allows to draw the following conclusions:

1. The best implementations of meat forms of hybrids is affected by a significant increase in measurements of body: the length of the body, respectively, by 4.2 cm and 6.3 cm, chest − 13.2 cm and 11.6 cm higher than their peers in the control group; this, in turn, increases their indices of bone and massiveness, which are important indicators of meat productivity.
2. Young crossbred is characterized by better indicators of control slaughter: at 18 months of age, slaughter weight made 371.9 kg and 293.6 kg (or > at 78.3 kg at P > 0.001) and carcass weight, respectively, 194.7 kg 154.6 kg (or > to 40.1 kg for P > 0,001) than in the control heads of the toad.
3. Morphological composition of carcasses of crossbred calves testifies to their high meat qualities: yield pulp in their 18 months was 35.6 kg more than the toad and totaled 163.2 kg to 127.6 kg (P > 0.01) with no significant difference in the yield of bones and fat. Their meat had an increased content of essential amino acids (tryptophan to 110.3 mg % vs 100.4 mg %), and non-essential amino acids, on the contrary, decreased a little (hydroxyproline to 15.7 against 16.4), which improved protein quality indicator of meat (B. K. P.) - 6.39 against 6.72 mg/g protein nitrogen.
4. In terms of quality of fats in experimental animals revealed no significant difference: the temperature of the melting amounted in hybrids – 31.2°C, in toad – 31.8°C, iodine value of 92.6% and 92.3% respectively.
5. Analysis of biochemical parameters of meat, serum, dynamics of growth and development, assessment of General condition after the first wintering in the horse herd conditions of the region where it's grown confirms the proximity of the biological features of animals and evidence of high adaptive properties of the crossbred calves.
6. There was a positive correlation in hybrids (respectively from toad) between live weight and carcass weight +0.99 (+0.99), height at withers and weight of the carcass of +0.60 (+0.25), body length and carcass weight +0.76 (+0.61), chest girth and carcass weight +0.87 (+0.91) and the metacarpus and carcass weight, up +0.69 (+0.56), which can be used in breeding of young horses with the aim of improving meat productivity.
7. The amount of profit from growing crossbred calves up to 18 months of age is 67.8 thousand Tenge against 49.4 thousand Tenge/head.

5 Suggestions for production

1. Recommend crossing mares with stallions of Novoaltaysk breed type toad. Hybrids have increased vigor of growth, significant meat qualities and high adaptability to year-round grazing horse content.
2. Crossbred animals with well-expressed meat forms, well adapted to year-round grazing horse content need to be used for further selection and breeding work on the creation of local meat-type horses of Kazakh breed.

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EXTERIOR INDICATORS AND MEAT PRODUCTIVITY OF DOMESTIC SHEEP MEAT - SEBACEOUS (EDILBAEV, KAZAKH FAT-TAILED COARSE-WOOLED AND KAZAKH FAT-TAILED SEMI-COARSE-WOOLED) BREEDS

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Abstract: In the modern market economy indicators of productive efficiency, competitiveness for domestic breeds of sheep in accordance with their quality and international standards should be prioritized. Today, sheep farming has shown an intense growth in the livestock industry. This shows that this industry has great potentials. It consists of forage and large areas of natural pastures. Deep phased study of meat and the quality of sheep in domestic breeds is of great importance. This study includes questions involving sheep fattening and development of evidence-based methods and techniques of selection which improves the quality of mutton, wool and sheep skin. This involves biological stability and adaptability of the animal to the environment where it is bred and reproduced. Its breed features its productivity to some extent and this can be seen on exterior indicators.

Keywords: exterior indicators, meat productivity, domestic sheep meat, sebaceous, sheep breeding.

1 Introduction

At the present stage of meat development - greasy sheep breeding is of the greatest economic significance. Its body weight, size, and shape of the tail, the yield of the carcass and more valuable parts of the carcass are also of great economic significance. Therefore, the priority of breeders is to improve breeding and productive qualities of fat-tailed sheep. First of all, these basic economic - valuable traits through a targeted selection and individual selection are maintained and its adaptive qualities in the natural habitat together with its feeding conditions in their breeding area are well understood. The exterior of sheep meat - sebaceous breeds have features that require comprehensive study. Fat-tailed sheep's grown in arid and semi-arid zones are characterized by a strong constitution, strong bones, large size, and long legs.

This article presents the results of the study of 2012 on meat-grease productivity, growth, and development of young domestic sheep breeds that are a fundamental element in raising meat productivity and will help strengthen the economy of sheep farms and reduce the cost of sheep breeding products

2 Materials and Methods

The material for this work was the herd of Edilbaev, Kazakh fat-tailed coarse-wooled and Kazakh fat-tailed semi-coarse-wooled sheep breeds of interbred (zone) type such as "Bayys" experienced like interbreed of Kazakh fat-tailed semi-coarse-wooled sheep breed, approved in 1994 by the Ministry of Agriculture.

Growth and development of the obtained posterity were examined by weighing and taking basic measurements in different age periods. Live weight of the sheep was examined in the following age periods: at birth, at ablactation (3-4 months), at the formulation and when removed from feeding or feeding with bonitation (18 months). Adult sheep - producers are weighed in the spring during bonitation and in the autumn before tupping.

Animals of breed herd are weighed without exception. The animals are weighed in the morning before watering and feeding. The precision of weighing at birth and ablactation - 0.1 kg, in other age periods - 0.5 kg.

For characteristics of body forming, seven key measurements are taken including the need for more detailed study of the exterior - much more measurements are taken. For taking measurements we need a measuring tape, measuring range, and ready-made notebooks to record taken measurements.

The procedure of taking seven basic measurements is further explained. Animals are placed on a smooth surface without bending the legs, back or head. Then measurements are made with appropriate tools.

2.1 Processing of the data is carried out by variation statistics

Meat-sebaceous productivity has been studied by means of control of anima slaughter at the age of four months. Pre-slaughter live weight was identified by individual weight of animals after a 24-hour hunger, the weight of doubled carcass without a fat tail, fat tail mass, visceral fat mass and weight at slaughter, and the output of these products of slaughter. By results of the dissection of chilled carcass without a fat tail, that is, separation of flesh from the bones, morphological composition, and the carcass beefiness coefficient are established.

The morphological composition of carcasses was determined by dissection of separate kinds and cuts with the release of flesh and bones, and then by the total weight of the flesh and the bones in the carcass which was installed. While dissection was done on chilled carcasses their weight was reduced by 200 - 300g.

3 Results and Discussion

The physique and the exterior are an important indicator of breeding and productive qualities of farm animals. Therefore, in practical, serious attention is paid to the accuracy and objectivity in the assessment of the animals on these indicators of breeding.

Table 1. Exterior Body Measurements of Sheep of Desired Type, cm

Kazakh fat-tailed semi-coarse-wooled breed			
Indicators	Age		
	At birth	4 months	18 months
	X± м	X± м	X± м
Number of animals	20	18	16
Height at the shoulder	35,7±0,44	56,8±0,72	59,0±0,64
Height at hips	36,9±0,31	57,5±0,73	60,2±0,71
Chest depth	10,3±0,25	25,9±0,60	31,4±0,31

Chest breadth	8,6±0,15	18,2±0,38	20,3±0,42
Breadth in hook bones	7,7±0,20	18,4±0,32	19,8±0,31
Chest girt	37,4±0,40	70,5±0,88	95,4±1,12
Metacarpus girt	5,12±0,14	7,5±0,15	8,8±0,15
Oblique body length	30,8±0,41	58,6±0,83	69,7±0,74
Kazakh fat-tailed coarse-wooled breed			
Indicators	Age		
	At birth	4 months	18 months
	X± м	X± м	X± м
Number of animals	30	27	24
Height at the shoulder	34,4 ± 0,41	59,6±0,75	72,5±0,81
Height at hips	35,6±0,32	60,0±0,77	73,5±0,82
Chest depth	9,8±0,30	25,4±0,62	30,2±0,54
Chest breadth	8,4±0,14	18,0±0,40	20,8±0,44
Breadth in hook bones	7,9±0,22	19,2±0,35	20,3±0,42
Chest girt	38,2±0,42	71,6±0,90	92,3±1,12
Metacarpus girt	5,7±0,15	7,3±0,19	8,2±0,10
Oblique body length	31,2±0,41	60,6±0,86	75,2±0,86
Edilbayevskaya breed			
Indicators	Age		
	At birth	4 months	18 months
	X± м	X± м	X± м
Number of animals	23	19	15
Height at the shoulder	36,7±0,44	66,0±0,72	74,3±0,23
Height at hips	37,9±0,31	64,4±0,70	74,2±0,29
Chest depth	11,3±0,25	27,9±0,60	33,0±0,16
Chest breadth	9,6±0,15	16,9±0,40	19,7±0,16
Breadth in hook bones	7,7±0,20	16,6±0,35	19,8±0,31
Chest girt	39,4±0,40	74,5±0,92	86,7±0,25
Metacarpus girt	5,2±0,14	7,8±0,16	8,5±0,11
Oblique body length	29,5±0,41	58,1±0,80	74,2±0,30

Table 1 shows the indicators of body measurements of sheep at the desired type at birth, 4 months and 18 months, describing their growth and development. The sheep are owned by the farm “Akbastau”, “Akzhar – Ondiris” LTD, farm “Aimautova”.

Study of exterior features of animals showed that during the growth and development of gimmers from birth to one and a half-year-old age rapid growth is noted in the following measurements: chest depth and girt, breadth in hook bones which increased for the accounting period almost twofold, but lower intensity growth is characterized by subsequent measurements of gimmers: metacarpus girt, height at the shoulder an at hips, which within one and a half year development increased only on 56.1 - 72.7%. Along with this, we noted that in some periods of individual development of gimmers the rank position of growth intensity measurements of body changes. So, if before ablactation at the age of 4 - 4.5 months, the rate of growth breadth of hook bones and chest depth was on the first place, from 4 to 18 months, chest girt over shoulder blades is characterized by the highest increase. On the contrary, the lowest growth rate before ablactation was recorded in the metacarpus, and from 4 to 18 months - breadth in hook bones, height at the shoulder and hips is of high increase.

A more complete and clear idea of the type of body-build of young stock gives a relative comparison to a number of pairs of anatomically related measurements, that is, body-build indexes (Table 2).

Table 2. Indices of Gimmers Body-build, %

Kazakh fat-tailed semi-coarse-wooled breed			
Index	Age		
	At birth	4 months	18 months
Long legs	71,1	54,4	46,8
Length	86,2	103,0	118,1
Blockiness	121,4	120,2	136,9
Proportionality	103,4	103,3	102,0
Bone massiveness	14,6	13,0	14,9
Massiveness	105,0	124,1	161,7
Kazakh fat-tailed coarse-wooled breed			
Index	Age		
	At birth	4 months	18 months
Long legs	71,5	57,3	58,3
Length	90,6	101,6	103,7
Blockiness	122,4	118,1	122,7
Proportionality	103,5	100,6	101,3
Bone massiveness	15,1	12,4	11,3
Massiveness	111,0	120,1	127,3
Edilbay breed			
Index	Age		

	At birth	4 months	18 months
Long legs	69,2	57,7	55,5
Length	80,3	88,0	99,8
Blockiness	133,5	128,2	116,8
Proportionality	103,2	97,6	99,8
Bone massiveness	14,1	11,8	11,4
Massiveness	107,3	112,8	116,6

In gimmers of studied breeds, during the post-uterine period, the depth of the chest grows more intense as opposed to the height and the shoulder, resulting to a decrease in the index of long legs from 69.2 - 71.5 to 46.8 - 58.3%.

Due to the more rapid growth in the body length of the Kazakh fat-tailed semi-coarse-wooled gimmers, the animals become more stretched with advancing age. Because of the intensity of growth of chest breadth and depth during the development from the ablactation period to one and a half year, the girth behind the shoulders increases significantly. This explains the improvement in the compactivity of animals at an older age. Due to the fact that with advancing age the gimmers' cylindrical bones grow less rapidly in diameter than at length, index of bone massiveness with advancing age tends to decrease.

Breeders are required to meet the requirements of the ever-increasing need of the population for meat and the need to produce it at the lowest cost for food and money. This involves getting fast-growing animals at a young age with the meat of the best quality. The main source of meat production becomes rearing young livestock.

In the production of meat, it is necessary to strive for the possibility of a growing animal to increase its body weight at a young age, which is mainly due to the increase in muscle mass. The marketing value of carcass is largely dependent on the development of muscle which is the pulp and because of its taste and nutritional quality is the most important part of the carcass.

This year some of the indicators of meat productivity of 4 months ram of different breeds have been studied. From meat productivity, indicators of lamb body weight before slaughter, weight at slaughter, slaughter yield, the proportion of bones and flesh, the proportion of meat and fat are the most valuable. The results of the control slaughter are shown in Table 3.

Table 3. Slaughter Aspects of 4-monthly Rams of Different Breeds (n = 3 animals)

Breed	Preslaughter live weight	Carcass		Fat tail		Visceral fat		Weight at slaughter	
		kg	%	kg	%	kg	%	kg	%
Edilbayev	40,6	16,7	41,1	2,8	7,0	0,517	1,3	21,0	50,5
Baiys' Kazakh fat-tailed semi-coarse-wooled	38,7	15,8	41,0	2,5	6,5	0,471	1,2	18,7	48,3
Kazakh fat-tailed coarse-wooled	39,5	16,2	41,0	2,6	6,6	0,466	1,2	19,2	48,6

Lambs of different breeds have a fairly high pre-slaughter live weight of 38.7 kg to 40.6 kg. According to the results of the slaughter, carcass weight is 15,8-16,7 kg, the yield of the carcass was an average of 41.0-41.1%. Higher slaughter yields belong to rams of Edilbaev breed - 50.5%.

In practice, the slaughter of animals uses such indicators as "net body weight". To achieve the smallest error in the calculation of indices of slaughter, the contents of the gastrointestinal tract is subtracted from the value of the pre-slaughter live weight, and all calculations are made on the base of the received indicator of body weight (Table 4).

Table 4. Slaughter Aspects of 4-monthly Rams of Different Breeds (n = 3 animals)

Preslaughter live weight, kg	Gastrointestinal tract contents		Live weight at slaughter		Mass of carcass without fat tail		Fat tail mass		Visceral fat mass		Weight at slaughter	
	kg	%	kg	%	kg	%	kg	%	kg	%	kg	%
Edilbayev breed												
40,6	7,0	17,2	33,6	82,8	16,7	49,7	2,8	8,3	0,517	1,5	21,0	62,5
Baiys' Kazakh fat-tailed semi-coarse-wooled breed												
38,7	6,5	16,8	32,2	83,2	15,8	49,1	2,5	7,8	0,471	1,5	18,7	58,1
Kazakh fat-tailed coarse-wooled breed												
39,5	7,0	17,5	32,5	82,5	16,2	49,8	2,6	8,0	0,466	1,4	19,2	59,1

Minus the contents of the gastrointestinal tract, pre-slaughter live weight of lambs decreased by 16,8-17,5%. Carcass yield increased by breeds on 8,1-8,1%, slaughter yield, respectively on 9,8-12,0%. Lambs of all breeds have a different nutritional state, as seen on fat tail yield, and the visceral fat, respectively 7,8-8,3% and 1.4-1.5%.

One of the most important elements of stock breeding with the breed of meat-sebaceous productive direction is an increase in flesh content of muscle tissue fraction, especially in the carcasses of young animals. This problem is by far more difficult and complex than the percentage increase in fat (Table 5).

Table 5. Morphological Composition of Carcasses of 4-monthly Rams of Different Breeds (n = 3 animals)

Breed	Chilled carcass mass without a fat tail, kg	Flesh				Bones		Proportion Meat: Bones: Fat	Beef coefficient
		muscles		fat		kg	%		
		kg	%	kg	%				
Edilbayev breed	16,1	9,3	57,6	2,6	16,3	4,2	26,1	3,6:1,6:1,0	2,8
Baiys Kazakh fat-tailed semi-coarse-wooled breed	15,2	8,7	57,4	2,5	16,2	4,0	26,4	3,5:1,6:1,0	2,8
Kazakh fat-tailed coarse-wooled breed	15,6	8,9	56,8	2,5	15,8	4,2	27,4	3,6:1,7:1,0	2,7

As can be seen from the data presented in Table 5, the yield of edible meat ranges from 72.6% to 73.9%. In terms of the ratio of muscle, fat, bone, and the coefficient beefiness interbreed significant differences were observed.

In the study of meat, the quality of rams pays particular interest to the absolute mass of individual organs. The degree of development of the internal organs of the body is dependent on livelihood. This, therefore, influences the productivity of the animal.

Better development of the internal organs characterizes rams meat-sebaceous different breeds as pets with a more intense occurrence of metabolic processes which further affected the best indicators of their meat production.

Parts of the carcass which consists of the flesh are considered the most valuable and the elucidation of their release is the most important criteria in the evaluation of carcasses of slaughtered lambs. We investigated the proportion of body parts in the carcass of 4 monthly rams of different breeds (Table 6).

Table 6. The Proportion of Body Parts in the Carcasses of 4-monthly Rams of Different Breeds (n = 3 animals)

Indicator			Breed		
			Edilbayev breed	Baiys Kazakh fat-tailed semi-coarse-wooled	Kazakh fat-tailed coarse-wooled
Chilled carcass mass		kg	16,10±0,60	15,20±0,27	15,60±0,28
		%	100,0	100,0	100,0
Fore limbs		kg	2,80±0,15	2,70±0,10	2,80±0,15
		%	17,53	17,90	18,30
Hind legs		kg	4,50±0,10	4,10±0,30	5,50±0,15
		%	28,20	27,12	28,60
Rib		kg	1,70±0,15	1,80±0,01	1,80±0,05
		%	10,63	11,70	11,62
Keel bone		kg	0,70±0,05	0,80±0,05	0,80±0,05
		%	4,60	5,24	5,00
Peritoneum		kg	1,70±0,01	1,80±0,02	1,70±0,10
		%	10,34	11,60	10,62
Central body (neural axis)	neck	kg	3,60±0,01	3,70±0,05	4,10±0,01
		%	22,80	24,20	26,80
	breast	kg	5,70±0,02	5,20±0,20	5,90±0,05
		%	35,20	33,90	34,83
	coupling	kg	5,80±0,15	5,50±0,10	5,00±0,10
		%	35,90	36,30	32,17
	urosacral part	kg	0,98±0,02	0,85±0,03	0,97±0,03
		%	6,10	5,60	6,20
	total (central body)	kg	4,30±0,16	3,90±0,18	3,90±0,13
		%	26,40	25,46	24,80
Trimmings meat		kg	0,37±0,05	0,15±0,04	0,16±0,14
		%	2,30	0,98	1,06

According to our data, a high yield of the most valuable parts of the front and back are characterized lambs of Edilbaev and Kazakh fat-tailed coarse-wooled, 18.3 - 28.6% and 17.53 - 28.20% respectively. According to the yield of the central body, regular interbred differences are not established.

Thus, the results of the slaughter of lambs of different breeds characterize them as the best animals with slaughter qualities; in their meat, there is less fat and a higher yield of the most valuable parts of the carcass.

4 Conclusion

Kazakhstan has large areas of natural pastures with sheep breeding as the leading and most efficient livestock industry. Sheep breeding, especially of meat-sebaceous direction has productivity which allows the use of grasslands and semi-arid zones most effectively.

In the conduct for selection and breeding work with fat-tailed sheep, special attention should be paid to the preservation of physique and improvement of exterior qualities.

It has long been known that the evaluation of the animals on the exterior and determination of their economic value on appearance is important in breeding herds. Animals of different

directions have different forms. E.Ya. Borisenko wrote that “the doctrine of the exterior should be understood as the study of external forms of farm animals in relation to their biological characteristics and economic value, that is, as the doctrine of the evaluation of animals by their appearance.” Many constitutional productive features of fat-tailed sheeps are marked in the works of M.A. Ermekov, A.V. Golodnov, (1) K.U. Medeubekov, (2) A.Ya. Rukhkyan, (3) and others. They noted that the Kazakh fat-tailed sheep are perfectly adapted for climatic and feeding conditions of vast areas of arid steppes, deserts and semi-deserts, harsh winter cold and summer drought and maintained year-round pastures. (2,4-5)

External indicators to some extent can be seen on the physique, that is, biological resistance and adaptation of animals to the environment where they are bred and multiplied, their breed features, as well as productivity.

The exterior of the sheep of meat-sebaceous direction has features that require comprehensive study. Fat-tailed sheep, grown under conditions of desert and semi-desert areas, are characterized with a strong physique, strong bones, large size, and long legs. (6-9)

Study of the growth according to the individual items of the exterior has definite value which together with the weighted data gives a complete characteristic of the biological maturation of the animal. (10)

During the global crisis where food security of the population is given first place, the production of lamb is one of the priorities in increasing the production of meat and meat products. Analyzing modern data and world sheep breeding experience in the present time, it is possible to conclude that the increased efficiency is due to more complete use of meat productivity of sheep. (11-12)

The ever-increasing population in the world and increase of the need of the population in meat and the need of meat production with the lowest cost requires breeders to get hasty large animals which at their young age provide the meat of the best quality. (13) Meat quality of farm animals, including sheep, to a large extent, is determined by a system of growing, slaughter age and breed characteristics. (3-5)

Efficiency and profitability of sheep breeding in market conditions is established by the study of growth, development, and productivity of meat in the young stock of fat-tailed meat-sebaceous breeds of Kazakhstan.

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INFLUENCE OF THE CONDITIONS OF SOIL NUTRITION AND MINERAL FERTILIZERS ON THE PRODUCTIVITY AND QUALITY OF CHICKPEA BEANS

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Abstract: The results of the researches carried out in the period from 2003 to 2007 are provided on the dark chestnut easy margalitic soils of Northern Kazakhstan for the study of soil nutrition and mineral fertilizers influence on the productivity and quality of chickpea. According to the results, the lack of moisture, heat and basic nutrients in the soil significantly affect the growth and development of chickpea. Basic nutrients are the main obstacle in the conditions of Northern Kazakhstan. The tests have shown that nitrogen and phosphorus fertilizers affected differently the forming chickpea yield according to the initial state of nitrogen and phosphorus in the soil. The applied fertilizers stimulated the intensive development of the vegetative mass and the root system, which is particularly important in dry years with high moisture scarcity in the soil in Northern Kazakhstan. Depending on the set edaphoclimatic conditions and the applied doses, phosphorus fertilizers increased the productivity of chickpea to 63.9%, but nitrogen ones – to 70%. In various years the best result was provided by various doses of the applied fertilizers. Thus, in 2003 the highest yield gain of chickpea was achieved when 90 kg of a rate of application was applied, in 2004 and 2005 – from 150 kg of a rate of application, in 2006 – from 210 kg, whereas in 2007 – from R120. The same relates to nitrogen fertilizers. The ratio of phosphorus to nitrogen in the soil is a major factor for the efficiency of phosphorus and nitrogen fertilizers. Phosphorus and nitrogen are produced by the applied fertilizers. The applied nitrogen fertilizers have significantly affected protein content by an average of 4%, whereas phosphorus fertilizers reinforced the production of fat and fiber. Nitrogen fertilizers almost did not affect the formation of fats, whereas phosphorus fertilizers – the albumen production.

Keywords: Chickpea, Nitrogen fertilizers, Phosphorus fertilizers, Dark chestnut soils, Productivity, Beans quality.

1 Introduction

Chickpea is one of the most important leguminous crops. This is a valuable food and feed crop rich in proteins and vitamins (A, C, B1, B2, C, RR, D). Chickpea is a relatively cheap source of protein nutrition. (1) Leguminous plants are unique according to their protein content. There is 1.5-3.0 times more protein in their seeds, than in the cereal crops. Leguminous plants are prominent with high accessibility. The proteins of leguminous plants are complete and have high quality. (2, 3) The researches by Behnoush Rasaei (4) have shown that chickpea proteins consist of such key amino acids as tryptophan, lysine, arginine and others, which are contained no less in peas, lentils, and legume.

In chickpea seeds, the protein content ranges from 13 to 30%, the fat content – from 4.1 to 7.2; nitrogen-free extractable substances – from 47 to 60; starch – from 48 to 61; crude fiber – from 2.4 to 12.2; ash – from 2.3 to 5.0; calcium – 0.255; phosphorus – 0.561%. (5-14)

A prevailing share of proteins is made by chickpea due to the atmospheric nitrogen being absorbed. Deeply penetrating the soil, the roots of chickpea improve the nitrogen balance of it and contribute to the increase in productivity of the crop rotation. (15-17) All leguminous crops are good forerunners for winter and spring crops. (18)

Chickpea is a culture which is relatively not strict to the soil compared to other leguminous crops. (19) It grows well, ranging from sand dunes in the Thal of Pakistan to sandy clay (Northern India), up to deep black cotton soils (central India, West Asia, and the Ethiopian highlands), as well as on sandy clays and light loams. (20) The reaction of the soil solution should be neutral or alkalescent. (21, 22) According to Mahler et al. (23), the optimum value of ph environment for chickpea should vary from 5.7 to 7.2.

The advantages of the chickpea should also include its high technology. Seeds do not lay, and grain does not crumble. (24) Zavyalova (25) notes that chickpea can be used as a green manure.

The world areas of chickpea are about 10 million hectares. The major producing countries are India (68 %), Turkey (11 %), and Pakistan (8 %). (26) Chickpea is mostly (90%) grown in rainfed conditions, as well as in semi-arid and arid regions. (27)

The cultivated areas of chickpea in Kazakhstan are 50.9 thousand hectares (0.5%) (according to the statistical agency of the Ministry of Agriculture).

Despite its drought resistance, high food, and feed value, it has not been widely spread in Kazakhstan, mainly due to its low productivity and insufficient knowledge.

In Kazakhstan, a lot of papers is devoted to the culture of chickpea. (25, 28-36) Here the main attention was paid to the issues of biology and technology of chickpea cultivation. However, soil nutrition and chickpea fertilizer, as a crucial method to improve its productivity and quality, have been insufficiently studied.

It is only known that regarding the conditions of mineral nutrition, chickpea is less strict to the soil, compared to other leguminous crops.

The conditions of nitrogenous nutrition largely affect the growth and development of plants. In the case of normal nitrogenous nutrition, plants form strong stems and leaves with bright green color. The plants grow and cluster intensively. Reproductive bodies are better formed and developed. Synthesis of protein substances is increased. A living ability of a body remains longer. The growth is accelerated and leaf senescence is slightly slower.

The yield is greatly increased, and its quality improves with normal phosphorous nutrition. Phosphorus improves winter resistance of plants, as well as accelerates their development and ripening. (37)

The optimal phosphorous nutrition contributes to the development of the plant root system. The latter more intensively branches and deeper penetrates into the soil. Due to that the nutrients and moisture get to the plants. That is particularly important for arid conditions. (38)

Saxena (39), Korbut (40), Bodnar (8), Vanifatiev (41-43), Vinokurov (35), Pereira Stamford (44), Jiang (45), Sarir (46), Schulze (47), and Islam (48) note the positive reaction of chickpea both for the seeding application of phosphorus fertilizers and the main application of nitrogen and phosphorus fertilizers, and complete mineral fertilizer (NPK). We also observed the positive influence of biological fertilizers, seed treatment with nitrogen, zinc sulfate and molybdenum on the productivity of chickpea. (34, 40, 44, 49-53)

However, these studies do not reveal the peculiarities of a crop's mineral nutrition and do not allow to develop a scientifically based fertilizer system of chickpea, according to the level of soil fertility, agronomic and other conditions.

The solution of these issues is relevant at the current stage. Due to that chickpea can take its rightful place in the diversification of a grain production in Kazakhstan.

Given these issues are insufficiently studied in northern Kazakhstan, we aim to study the influence of the conditions of soil nutrition and mineral fertilizer on the productivity and quality of chickpea in the conditions of dark chestnut soils in northern Kazakhstan.

2 Materials and Methods

Study Site: The researches were carried out in 2003-2007 in Akmola region of Tselinograd district at farming enterprise "Aktyk" JSC, which is located in a dry steppe area of Northern Kazakhstan. An amount of precipitation and temperature conditions of the research year are shown in the figures 1-2.

The experiment design: The soil is dark chestnut and carbonated. The mechanical composition is easy margalitic soil. The capacity of a humus horizon (An + B1) is 42-44 cm, the content of humus in an arable layer (0-20 cm) is 2.89 - 3.28%, pH – 7.8-8.0, the amount of absorbed bases is 21.0-22.0 mg-eq/100 g of a soil, a content of nitrogen nitrate – 9.1-12.0 mg/kg of a soil (in the layer 0-40 cm – 5.8-10.6); phosphorus – 7.6-24 mg/kg, potassium – 42.0-52.0 mg/100 g of a soil.

Application of treatment: In order to study the conditions of chickpea mineral nutrition and to control the dynamics of the nutrients before a crop, according to the main options from nonadjacent repetitions, the soil samples from 5 points on a site were selected to a depth 40 cm, each 20 cm to determine the main fertility factors: humus, pH, Ca2 + , Mg 2 +, N-NO3, P2O5, K2O and moisture.

In the selected samples the following was determined: soil moisture by weight method (GOST 28168-89), ammonia nitrogen – with a Nessler's reagent (GOST 26489-85), nitrate nitrogen – at the ionomer "EV-74", and by phenoldisulfonic method according to Grandval-Lyazh (GOST 26951-86), labile phosphorus and potassium from one extract – according to Machigin (GOST 26205-91), humus – according to Tyurin-Kononova (GOST 26213-91), absorbed Ca2 +, Mg2 + – by tyrilonometric method (GOST 26487-85), a pH water extract – by ionometric method (GOST 26483-85).

In order to control the dynamics of moisture and nutritional elements before sowing, soil samples were selected at the control every 20 cm to a depth of 1 meter at the stages of branching, blooming and after the cleaning of chickpea. Plant samples (to 20 plants) from 10 points were selected for the main development and cleaning stages to determine the accumulation of a dry substance in plants and to consider the yield structure.

In the phytochemistry laboratory by the project leadership team of Research and development center of grain farming named after A. I. Barayev of Ministry of Agriculture of the Republic of Kazakhstan, a fiber was determined by Kirchner and Ganek method (GOST 13496.2-84), fat – with a nonfat residue (GOST 13496.15-85), and ash content of seeds was determined as well (GOST 13496.16-75).

Ammonium nitrate (34.6% rate of application) was used as nitrogen fertilizers. Ammophos was from phosphorus-containing fertilizers (46% P2O5, 11-12% N). In autumn, amorphous was superficially applied. Then there was a dump processing to a depth of 18-20 cm, with a view to an equal embedding of fertilizers. In spring, nitrogen fertilizers were applied for preplanting cultivation. In spring, the moisture closure (BIG-3) and the preplant treatment of the soil with a cultivator (Op-8) were carried out at the depth of 6-7 cm. The sowings were carried out with seeding-machines SZS-2.1. The breed "Jubilee" was sown calculated as 0.7 million of fertile seeds per hectare.

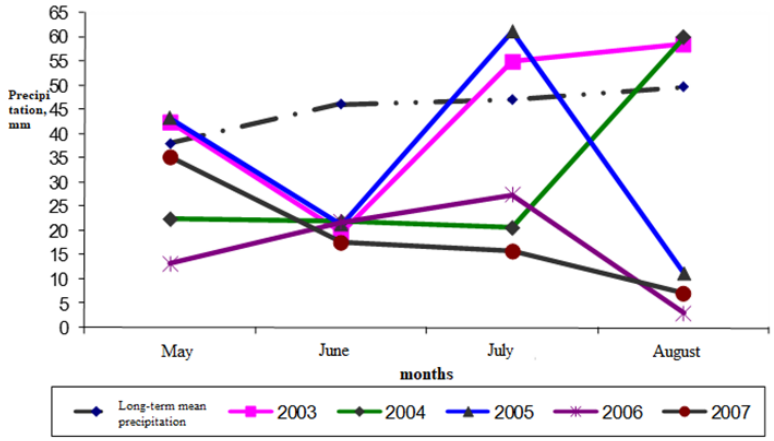

Figure 1. Amount and Distribution of Precipitation during Vegetation Period

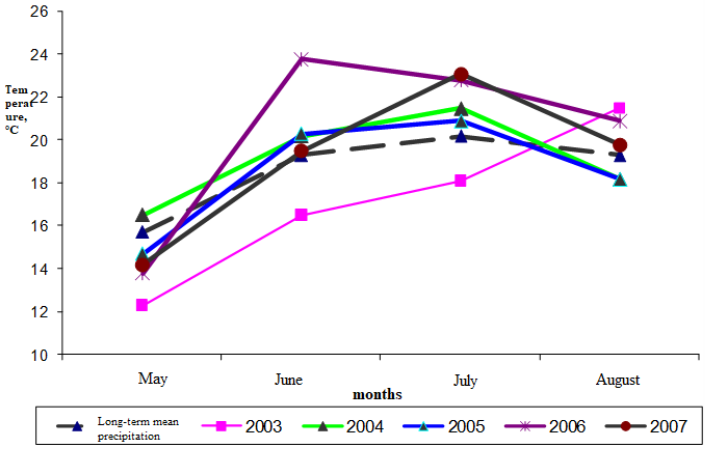

Figure 2. Daily Average Air Temperature during Vegetation Period

6 levels of phosphorus, 4 – nitrogen and pair combinations in total were studied in the tests. The scheme provided creation of different levels of phosphorus and nitrogen content in the soil (from low to excessively high) in order to establish a quantitative relationship between the level of nutrients content in the soil and chickpea productivity, on the one hand, and the efficiency of fertilizers, on the other hand.

The accounting area of a site is 112.5 m^2.

3 Results and Discussion

The research years were different in hydrothermal conditions: 2003, 2005, 2007 are moderately arid, with precipitation for the agricultural year, respectively, 252, 269, 248 mm, and deposits of productive moisture before sowing in the layer 0 100 cm – 111, 105, 141 mm; 2004, 2006 are very dry. Annual precipitations are 191, 203, 213 mm. Productive moisture in the soil is 133.6, 81.4, 129.3 mm.

Meteorological conditions have significantly affected the soil processes as well as the peculiarities of growth and development of plants, and the formation of the chickpea yield.

The conditions of soil nutrition in the research years have varied. Table 1 shows the original content of the nutrients in the soil before the chickpea sowing.

As we see from the table in all years, the chickpea has been grown with a scarcity of nitrogen and phosphorus in the soil. The sufficiency was increased only as for potassium.

Table 1. Nutrients Dynamics in the Soil Before Chickpea Sowing, mg/kg

Layer of the soil, cm	$N\text{-}NO_3$				P_2O_5				K_2O			
	The research years											
	2003	2004	2005	2006	2003	2004	2005	2006	2003	2004	2005	2006
0-20	11.0	9.8	9.1	12.0	**24.0**	**7.6**	**12.2**	**13.0**	**520**	**420**	**420**	**480**
20-40	6.5	7.9	2.5	9.1	7.4	2.8	5.4	7.0	340	280	340	320
0-40	**8.8**	**8.8**	**5.8**	**10.6**	15.7	5.2	8.8	10.0	430	350	380	400
40-60	3.2	6.8	4.1	9.2	3.2	0.0	0.0	7.0	320	180	240	200
60-80	3.5	3.8	3.0	1.1	2.8	0.0	0.0	1.6	220	160	170	160
80-100	-	3.8	2.0	0.0	0.0	0.0	0.0	0.0	220	180	180	160

The application of nitrogen and phosphorus fertilizers contributed to increasing the content of nitrogen nitrates, and labile phosphorus in the soil 2-3 times. It was determined by the number of applied fertilizers (table 2). Due to the high content of exchange potassium in the soil, the application of potassium fertilizers was not expected.

Consequently, according to the options, the supply of chickpea with nitrogen and phosphorus varied in the tests. Both the content and the ratio of nutrients depended on the number of applied fertilizers. Nitrogen nitrates played a major role in nitrogen nutrition. The content of ammonia nitrogen in the research years was largely dependent on climatic conditions. At the initial stage of the plants' development of the ammonia nitrogen was not available in the soil, which is explained on the one hand by its possible absorption by plants, and by active nitrification on the other hand.

Table 2. The Influence of Fertilizers on the Content of Nutrients in the Soil Before the Chickpea Sowing, mg/kg

Applied, kg, the rate of application.	The soil's layer, cm	The research years				
		2003	2004	2005	2006	2007
		Content of $N\text{-}NO_3$				
O	0-20	10.8	10.0	9.1	13.4	9.1
	0-40	**9.7**	**8.7**	**5.8**	**12.8**	**8.5**
N30	0-20	15.8	15.0	10.2	21.2	13.5
	0-40	**15.3**	**13.1**	**7.6**	**18.1**	**12.9**
N60	0-20	19.6	19.1	15.5	27.7	17.8
	0-40	**17.2**	**16.7**	**11.8**	**21.2**	**17.6**
N90	0-20	24.6	22.4	24.0	28.8	22.0
	0-40	**19.2**	**20.5**	**15.5**	**23.3**	**19.6**
		Content of P_2O_5				
O	0-20	24.0	9.6	13.0	14.4	17.8
P60	0-20	32.8	14.2	16.6	19.1	23.7
R90	0-20	35.6	17.2	19.6	21.2	27.5
P120	0-20	38.0	21.6	22.0	27.2	29.3
R150	0-20	41.6	26.0	29.6	30.6	34.7
R210	0-20	46.0	30.8	36.6	37.4	39.2

According to the options, the content of nitrogen nitrates ranged from 5.8 to 23.3 mg/kg of the soil. The content of labile phosphorus was from 9.6 to 24.0, at the control – 30.0-46.0 mg/kg, on fertilized options.

The conditions of moistening and soil nutrition also affected the chickpea productivity. Table 3.

As we see from the table, during the research years the chickpea's productivity, especially on the natural non-fertilized ground, was low. There are a few causes: the low level of moisture supply and mineral nutrition. The significant influence on the chickpea's plants by ascochytosis was also provided. The efficiency of fertilizers varied and depended on a number of factors. The most important factors were the moisture supply of the soil, the original content of the nutrients in the soil before the sowing, and their ratio. They also varied in the research years. That is the reason for a mixed reaction of chickpea for the application of the same types, doses, and combinations of a fertilizer.

The lowest productivity of chickpea and its sensitivity to fertilizers was observed in 2004, despite the scarcity of nitrogen and phosphorus in the soil. This year the determining factor was

the distribution of precipitations rather the number of them in the period of vegetation (125 mm). 50% of the precipitations occurred in August (59.9 mm). In May and June, the monthly precipitation amounted to no more than 22 mm. The plants survived mainly from spring moisture reserves – 133.0 mm in meters. This is the best figure of all years.

Table 3. Influence of Nitrogen-phosphorus Fertilizers on the Productivity of Chickpea, C/GA

Applied, kg, the rate of application.	The harvest of beans chickpea on control and a raise									
	2003.		2004.		2005.		2006.		The 2007	
	C	%	C	%	C	%	C	%	C	%
0	7.0	-	6.5	-	9.6	-	8.3	-	20.3	-
P60	0.3	4.3	0.2	3.1	1.3	13.5	1.7	20.5	3.8	18.7
P90	2.6	37.1	1.1	16.9	3.6	37.5	3.3	39.8	4.8	23.6
R120	1.8	25.7	1.3	20.0	2.6	27.1	3.9	47.0	6.1	30.0
P150	2.0	28.6	2.1	32.3	4.8	50.0	4.1	49.4	4.0	19.7
P210	1.5	21.4	0.5	7.7	3.8	39.6	5.3	63.9	2.5	12.3
N30	1.2	17.1	0.4	6.2	3.7	38.5	1.6	19.3	4.8	23.6
N60	0.5	7.1	1.5	23.1	5.3	55.2	2.6	31.3	5.9	29.1
N90	0.3	4.3	0.5	7.7	6.8	70.8	1.3	15.7	3.0	14.8
P60 N60	1.0	14.3	0.7	10.8	5.5	57.3	5.7	68.7	3.0	14.8
P90 N30	3.0	42.8	0.8	12.3	0.7	7.3	3.8	45.8	1.9	9.4
P90 N60	2.5	35.7	1.1	16.9	1.8	18.8	3.7	45.6	2.7	13.3
P90 N90	1.6	22.8	0.9	13.8	4.0	41.7	3.0	36.1	0.5	2.5
R120N60	3.3	47.1	1.5	23.1	3.6	37.5	3.8	45.8	3.1	15.3
P120N90	2.5	35.7	1.0	15.4	0.8	8.3	4.7	56.6	2.1	10.3
P150N60	3.8	54.3	1.1	16.9	4.1	42.7	5.7	68.7	3.3	16.3
P150N90	0.4	5.71	1.4	21.5	3.9	40.6	4.5	54.2	2.0	9.8
P210N90	3.0	42.8	0.1	1.5	0.7	7.3	4.7	56.6	2.5	12.3
NSR_{05}	0.48		0.64		1.21		0.79		1.68	
m%	1.94		3.02		3.34		2.35		2.51	

In 2004 phosphorus fertilizers were the most efficient. The best result was obtained from a dose R150, where the content of R2O5 in the soil was 26.0 mg/kg. A gain of the control is 32.3%. Other doses are less efficient.

Among nitrogen fertilizers, there was a little yield gain (23.1%) due to the application of 60 kg of nitrogen's rate of application where the content of N-NO3 in the soil in the 0-40 cm layer has increased from 8.7 to 16 mg/kg (table 2).

Lower and higher doses which provided the content of N-NO3 13.0 and 20.0 mg/kg in the soil, did not significantly gain the yield. In the first case, the yield gain was insufficient, whereas in the second one – excessive.

In 2003, for the same reasons, the better result was also due to the phosphorus being applied. The yield gain was 37% in a dose 90 kg of a rate of application. It was 17.1% from 30 kg of nitrogen (the content of N-NO3 in the soil is 15.3 mg/kg).

The largest gains due to fertilizers are obtained in the 2005 year which is more favorable for moistening. When the initial content of N-NO 3 in the soil layer 0-40 cm is 5.8 mg/kg of the soil, the highest yield gain 6.8 centners or 70.8% to the control is obtained from N90 being applied, where the content of N-NO 3 has reached 15.5 mg/kg of the soil. According to the phosphorous options, the best gain is obtained from R150, which provided the increase of phosphorus in the soil to 29.6 mg/kg of this soil. The increase in P 2 O 5 in the soil to 36.6 mg (with 210 kg of a rate of application) reduced the yield gain of chickpea from 4.8 to 3.8 centners or from 50 to 39.6 % to the control.

The efficiency of pair combinations varied in years and was determined by the same factors, i.e. the initial content and the ratio of elements.

According to researches, as any other crops, chickpea needs a certain level of soil's saturation with nutrients. We can achieve that by applying fertilizers, with a certain account of the initial content of nutrients in the soil.

There is a quantitative correlation between the content of nutrients in the soil and chickpea yield. This correlation allows determining the optimal parameters of the basic agrochemical properties of the soil.

Moisture level in the soil, mineral nitrogen, and labile phosphorus which more likely to determine the development of yields are mostly affected by weather and agronomic factors. Other factors (pH, Ca, Mg, and even humus) have had less influence on the yield due to a slight variation in tests. However, they are also important, as confirmed by the high correlation coefficient between them and their yield. So, in the test the highest yield of chickpea was developed at the pH 7.8 (R =0.71), the content of Ca and Mg at 21.6-21.9 mg-eq/100 g of the soil – at R=0.79. The correlation coefficient did not exceed 0.61 with the productive moisture before chickpea sowing in the 0-100 cm layer. In some years, the relation was insignificant, despite the great importance of the factor. This is because not only spring deposit of moisture, however very significant, but also the degree of a growing season's moistening, the number, and manner of precipitations' distribution play a major role in order to develop a yield. The precipitations in July are particularly important.

The potential opportunities for plant growth and development can be realized only in the optimal conditions of mineral nutrition. After the influence of fertilizers on chemical composition of the soil and plants was studied, the yield's quality can be purposefully changed.

The chemical composition of leguminous plants is rather completely studied, including chickpea, according to the conditions of growth. The influence of the properties of the soil and fertilizers on chickpea quality is less studied.

Such environmental conditions as soil and air moisture, nutrients, temperature, and light most strongly affect the content and quality of both protein and albumen. (54) The protein content in the chickpea seeds is pretty high. However, according to protein content, chickpea is inferior to other leguminous crops. This is because there are a lot of fat, fiber, and other substances in the chickpea seeds. (54)

Table 4 shows the results of researches regarding the quality of chickpea grain.

Table 4. The Influence of Mineral Fertilizers on the Quality of Seeds of Chickpea Beans (Average Indicators by Years), %

Applied, kg, the rate of application.	Albumen	Protein	Ash	Fat	Fiber
O	19.2	21.0	3.07	5.7	5.08
R60	19.5	21.4	3.04	5.9	5.17
R90	19.5	21.4	3.19	6.1	5.26
R120	19.4	21.3	2.99	6.4	5.36
N30	21.6	23.7	3.04	5.9	5.02
N60	22.3	24.6	2.90	5.8	4.44
N90	22.1	24.3	2.84	5.6	4.40
R60N30	20.6	22.5	2.96	5.7	4.85
R60N60	21.2	23.2	3.00	5.9	4.80
R90N60	21.8	23.8	3.13	5.5	4.81
R120N60	21.5	23.6	3.03	5.6	5.02
R120N90	21.2	23.2	3.01	6.0	4.86
Average	20.8	22.8	3.02	5.8	4.92

The table shows that the chickpea' grain is described by albumen and protein content. It varied by years and test's options. The largest number of albumen and protein was accumulated in the 2005 year, which is more favorable by weather conditions (22% in the control). By the fertilized backgrounds, albumen and protein reached 26%. In 2006-2007 the albumen and protein content was by 3% lower and slightly varied according to the fertilized options. But the positive role of nitrogen fertilizers still remained. In moist, but cold 2003 year, chickpea was the least contained in grain. In very dry 2004 year, it was 17.9% in the control. The main reason is the low content of mineral nitrogen in the soil. The options with nitrogen fertilizers being applied confirmed this fact. Albumen and protein content increased to 24.4 and 26.8%, respectively, which is 4.6-7.2% more than on natural background.

An influence of any dose was determined by the initial nitrogen content in the soil and hydrothermal conditions of years. It depended both on the quantity and the manner of precipitations' distribution.

In the dry growing season in 2004, 2006 (this was also the case in 2007), when only ½ long-time average annual norm has fallen in May-July, even against the background of 60 kg/ha of nitrogen fertilizers (the best option), the albumen content was 20-21%, which is 4-5% lower than in 2003-2005.

This suggests that the drought of a growing season has had an adverse impact both on growth processes and on the consuming capacity of the root system.

Moreover, as we can see from the data of 2003-2004, and the later years, the excess of nitrogen (N90) did not affect or even reduced the albumen and protein content. The latter can be explained by the fact that against this background when chickpea is more intensively developing at the beginning of vegetation in the following drought, the plants suffered more from it.

The common thing was the great positive role of nitrogen in forming and accumulating albumen in chickpea products.

Admitting the positive influence of nitrogen fertilizers on albumen and protein accumulation, it should be noted that phosphorus fertilizers almost did not affect the albumen accumulation (+/-0.5 %). Moreover, there was an obvious trend to reduce it along with the doses of phosphorus fertilizers and level of phosphorus supply to the soils being increased. This is also observed in pair options with nitrogen.

Phosphorus fertilizers positively affected the content of fat raising its content as much as possible during the years by 0.5 (2003) – 0.8% (2004). The influence of nitrogen fertilizers was much weaker. Rather, there is a trend to reduce the fat content when nitrogen is excessively contained (by N90). Moderate doses (N30) increased fat by 0.5-0.3%.

The weather conditions – hydrothermal mode of a growing season affected the content of fat much largely than fertilizers. So, the least amount of fats was accumulated in moderately dry, but cold 2003 year (3.9-4.5%). Most fats were observed in the dry 2004 year – 6.2-7.5%. There are 6.1-6.8% in a wet 2005 year, which is favorable by temperature and mode. The difference in years is 2.3-3.0%, which is much more significant than the influence of fertilizers.

Thus, we can conclude that the temperature factor plays a key role to accumulate fats.

The content of ash elements in plants depends on biological features and growing conditions. According to Vladimir Balashov (57), the ash content in chickpea seeds ranges from 2.3 to 4.9 %. In chickpea ash, there are many elements, including (average, mg/%): potassium – 968, calcium – 192, magnesium – 126, sulphur – 198, phosphorus – 446, aluminium – 708, boron – 750, iron – 967, selenium – 28, zinc – 2100, etc.

The quantity of chickpea ash in our tests ranged from 2.58 to 3.33%. The fertilizers slightly affected on the ash content. There is no certain pattern in the influence of phosphorus fertilizers. We can give more definite information about nitrogen. Nitrogen fertilizers reduced the ash content in the chickpea seeds.

Attention must be paid that chickpea seeds have little fiber. That is important when feed rations are compiled. (56, 57)

A fiber or cellulose is the main part of the cell walls of the plants. The seeds of cereal crops with no film contain 2-3% of fiber, whereas the seeds of filmy grains (oats, rice, millet, etc.) contain much more fiber – 10-15%. The seeds of leguminous crops contain 3 -5%.

In tests, the fiber content in chickpea grain ranged from 3 to 7.9%. The most part of fiber was formed in the very dry 2004 year. That is 2 to 2.5 times less than in 2003, 2005, 2007 years which are more favorable for moistening.

According to the analysis of the obtained data, the fertilizers did not significantly affect the content of fiber. The determining factor was a moisture mode.

Thus, due to the accomplished researches we have: studied the relation of chickpea to the conditions of soil nutrition, its sensitivity to fertilizers, defined the main factors which determine their efficiency; established the main agrochemical properties of the soil that generate yield and quality of chickpea.

4 Conclusion

According to the researches carried out in 2003-2007 on the dark chestnut soils of a dry steppe area of Northern Kazakhstan, regarding the influence of soil conditions and fertilizer on the productivity and quality of chickpea, the cultivation of the latter in a dry steppe area presents some difficulties and is due to

climate continentality, insufficient and unstable moistening, rapid change of temperature even within 24 hours, to what chickpea is pretty sensitive.

Different cultures, due to their biological characteristics, present unequal requirements to the conditions of mineral nutrition, have different abilities to absorb elements from soil and fertilizers. Chemical composition, productivity, and quality of cultivation are formed under the combined effect of these factors. (58)

Due to the lack of moisture and heat in a waiting and post-seeding period, upswelling of chickpea seeds slows, and sproutings are delayed. If there are moisture and lack of heat, and the delay in seed sprouting due to that, the conditions to affect the seeds by bacteriosis are created.

Nitrogen and phosphorus fertilizers stimulate the intensive development of the vegetative mass and the root system, which is particularly important for arid years with high moisture scarcity in the soil. Depending on the prevailing conditions and doses, phosphorus fertilizers have increased the productivity of chickpea to 63.9%, whereas nitrogen fertilizers – to 70%.

According to the initial content of labile phosphorus and nitrate nitrogen in the soil, different doses of the applied fertilizers provided the best result in different years. So, in 2003, the highest yield gain of chickpea was achieved when 90 kg of a rate of application was applied, in 2004 and 2005 – from 150 kg of a rate of application, in 2006 – from 210 kg, and in 2007 – from R120. The same regarding nitrogen fertilizers. The efficiency of phosphorus and nitrogen fertilizers is significantly affected by the ratio of phosphorus to nitrogen in the soil created by the applied fertilizers.

The applied fertilizers had largely influenced the quality indicators of chickpea beans. Thus, the almumen content is sustainably and significantly increased only by the nitrogen fertilizers – an average of 4%, which is very important. Phosphorus fertilizers improved the formation of fat and fiber. Nitrogen fertilizers almost did not affect the formation of fats, whereas phosphorus fertilizers – the albumen production.

Generally, assessing the chickpea quality, it should be noted that chickpea is an important high-protein crop that helps to efficiently address the protein issue in both food and fodder industries. Significant content improves the advantages of this crop.

Given the combination of factors, chickpea is a proper culture to diversify grain production in Northern Kazakhstan.

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WAYS TO IMPROVE THE PRODUCTION AND PROCESSING OF DAIRY PRODUCTS IN THE AKMOLA REGION

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Abstract: Dairy production is one of the main branches of agricultural production in the world economy. The article considers the current state of dairy cattle-breeding and dairy-processing industry in Kazakhstan. Production, consumption, and processing of dairy products are analyzed as well as the key reasons for the crisis in this industry; a mechanism for further development and overcoming the current situation is offered.

Keywords: Dairy products, Innovative environment, Dairy products processing.

1 Introduction

The dynamics of development and efficiency of production of milk and dairy products, competitiveness is the subject of numerous publications by both domestic and foreign authors. If we consider the structure of all marketable agricultural products, then about a third of it is milk and dairy products, and most countries in the world produce it. Milk is one of the most valuable and high-calorie foods. The dairy industry with the advent of market relations in the post-Soviet space was in the deepest crisis. In Kazakhstan, there was a reduction in domestic production of whole milk, and, as a result, exports; conversely, imports of dairy products rapidly increased.

Most of the milk produced in the subsidiary household parts is consumed for their own needs, in particular, for feeding animals. And only a tiny part of it goes for processing into dairy plants. All this led to a sharp reduction in the production of milk and dairy products in the country. Today, Kazakhstan can satisfy its needs with its own products by 34%. The formation of market relations in this industry, as expected, did not lead to an increase in the efficiency of the industry, but on the contrary, it only destroyed the mechanism that existed at that time. As practice shows, the most effective form of production and storage of milk are medium and large enterprises. This form is beneficial compared to personal development with its more competent labor organization (production, maintenance, collection, storage, delivery of feed), and, most importantly, the quality of milk, which is very important for the processing plant.

Today, due to the difficult situation in the economy and changes in the international situation, new approaches are being considered that can ensure qualitative growth in the agro-industrial sectors, including the dairy industry. Dairy farming and the dairy industry are one of the most important subsystems of the agro-industrial complex of the Republic of Kazakhstan. The dairy industry is a set of enterprises engaged in the procurement and complex processing of milk in whole milk, dairy products, butter and clarified butter, natural cheeses, processed cheeses, brined cheeses, bryndza, dried whole milk, etc.

Milk and cheese market is one of the most popular food markets in Kazakhstan. According to experts in this industry, the capacity of the Kazakhstan market today is over 40 thousand tons per year.

To date, Kazakhstan-made cheeses account for about 35% in total sales of this category. Cheese of Kazakhstani production is quite competitive, including due to the price.

A review of the data of the Customs Control Committee of the Republic of Kazakhstan shows the growth in imports for the following groups of dairy products: processed milk and cream, butter, cheese and curd, and condensed milk.

The main exporter of processed liquid milk and cream, as well as powdered milk, in Kazakhstan, is Russia. For dry milk, the main suppliers are Russia and Belarus, which import 18% and 16%, respectively, of the total volume of imported milk powder. In addition, France is one of the largest importers of milk powder in Kazakhstan - 1,042.1 tons. In terms of cheese and cottage cheese, the main share of supplies falls to Russia - 87.7%

An analysis of the situation on the milk and dairy products market of the Customs Union, conducted in February 2014 by the Eurasian Economic Commission (EEC), revealed a general shortage in the milk market.

In their conclusion, the experts of the EEC noted that this situation poses the risk of the producers of the CU countries losing part of the total dairy market. This, in turn, can negatively affect the prices of milk and dairy products. In this situation, EEC experts recommended stimulating the specialization of countries in the production of certain types of dairy products through collective funding and coordination of state subsidies.

The share of domestic production in domestic consumption is 65%, while the remaining 35% is imported. Thus, in milk processing, there are significant prospects for increasing production and forcing out imports.

To address the problems of low-quality milk in the subsidiary household parts, as well as the collection of milk in connection with the remote location of subsidiary household parts, milk receiving points will be created. The low quality of milk in subsidiary household parts is usually due to the lack of necessary sanitary conditions for keeping livestock, not carrying out the necessary veterinary measures, etc. At the same time, the organization of milk receiving stations that have milk analyzers will make it possible to identify low-quality milk at the collection stage. At the same time, the presence of demand for milk and an adequate purchase price along with milk control should motivate the subsidiary household parts to improve the quality of milk. (1, 2)

2 Materials and Methods

The dairy industry is one of the fundamental sectors of the economy, which accounts for 16% of the volume of food produced in the country.

The main dairy regions are Almaty, East Kazakhstan Region, and South Kazakhstan Region, their total share is 43% of the total milk production in the country. At the same time, the leaders in the production of milk in agricultural enterprises and farm enterprises are the East Kazakhstan Region, Karaganda Region, and Almaty Region.

The share of processing of the total volume of marketable milk produced is 48% or 1 680 thousand tons. The export volume of dairy products is 22 thousand tons, and the volume of imports is 903 thousand tons, domestic consumption of dairy products is 2,560 thousand tons.

The share of domestic production in domestic consumption is 65%, while the remaining 35% is imported. Thus, in milk processing, there are significant prospects for increasing production and forcing out imports.

However, the development of the industry is hampered by a number of problems. (3):

1) low quality of milk in the subsidiary household plots and their territorial distance;

2) lack of uneven flow of raw milk to processing plants and the high cost of raw milk due to the high proportion of production in private farms and subsidiary household plots;
3) a high proportion of morally and physically worn-out equipment, in addition, quite expensive in energy and maintenance, low level of mechanization and automation;
4) lack of working capital at processing enterprises;
5) marketing problems of finished dairy products.

As a result, our products become less competitive compared to imported ones.

The diagram below presents the market capacity forecast for the coming years, which has a positive trend in the growth of the dairy products market.

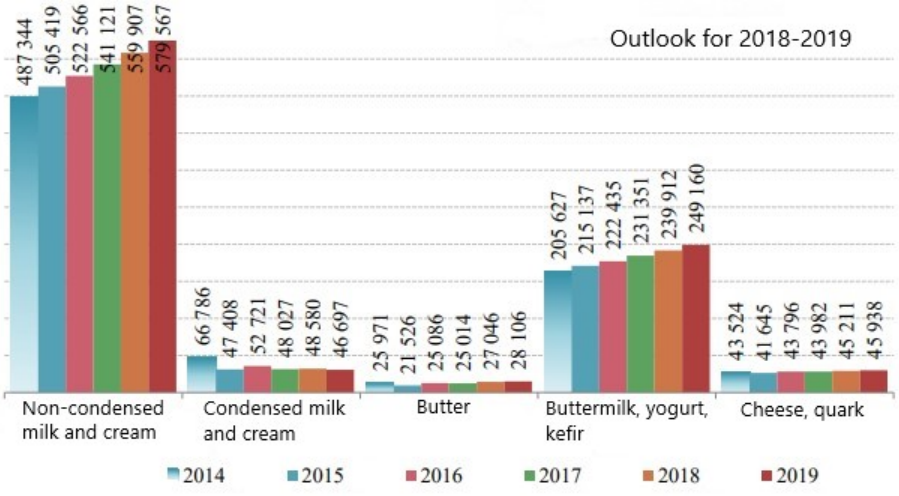

Figure 1. Market Capacity of Dairy Products of the Republic of Kazakhstan, tons
Source: Data from the Committee on Statistics of the Republic of Kazakhstan and the Customs Control Committee of the Republic of Kazakhstan.

3 Solutions to industry problems

Creation of milk receiving points. To address the problems of low quality of milk in the subsidiary household plots, as well as the collection of milk in connection with the remote location of the subsidiary household plots, milk receiving points will be created.

The low quality of milk in the subsidiary household plots is usually due to the lack of necessary sanitary conditions for keeping livestock, not carrying out the necessary veterinary interventions, etc.

At the same time, the organization of milk receiving stations that have milk analyzers will make it possible to identify low-quality milk at the collection stage. At the same time, the presence of demand for milk and an adequate purchase price, along with milk control, should motivate the subsidiary household plots to improve milk quality. (4)

According to preliminary data, the creation of milk receiving points is planned in the regions where the largest volumes of milk are produced: East Kazakhstan Region (15.3%), Almaty (14%), South Kazakhstan Region (13.5%), North Kazakhstan Region (9%) Kostanay Region (6.8%) and Akmola Region (6.3%).

4 Modernization and reconstruction of existing milk processing enterprises, provision of working capital

According to statistics, about 30% of existing equipment and technology of milk processing enterprises requires modernization. Considering that the total capacity of milk processing enterprises is about 3,000 thousand tons of dairy products, therefore, the equipment, which produces products for 900 thousand tons, requires modernization.

Modernization implies investments in the production technology (processing, treatment, packaging) of milk in order to increase the productivity of human labor, the profitability of enterprises and the competitiveness of products.

Options for the modernization of enterprises. Modernization through the use of Russian equipment. This method is the most common today because of its cheapness: Russian equipment is acquired mainly because of the price unavailability of Western equipment and unwillingness to carry out expensive modernization. The use of Russian machines involves their mandatory “fine-tuning” for 3-4 months on the ground, for which the enterprise creates a whole infrastructure of additional specialists and repairmen. As a result, the company receives equipment that can perform the same functions about 5 times cheaper. (5, 6)

Modernization through the use of licensed equipment. To date, a number of Russian enterprises (equipment manufacturers) have mastered the production of technologies under licenses from leading world manufacturers. So far, licensed technologies, although they have a lower price than Western ones, and higher production characteristics than traditional domestic technologies, are less popular due to the lack of an optimal price-quality ratio.

Modernization through the use of foreign equipment. As a rule, foreign production and packaging equipment of reputable companies is the most preferable choice for an enterprise, if there are financial opportunities. Western companies also compare favorably with the level of warranty and service. (7)

The use of more advanced equipment places higher demands on the quality of the workforce, which forces the management of enterprises to train workers and specialists. The training is organized with the help of specialists from equipment suppliers. As a rule, enterprises go for it, despite the costs, after all, having more trained workers, the enterprise thereby increases its “technical” and “social” capital, i.e., it accumulates advantages for its leadership in the future.

5 Subsidizing the costs of milk processing enterprises for the purchase of raw materials for the production of powdered milk, butter, and cheese

To solve the problem of the high cost of raw milk for the production of deep processed milk products: butter, dried milk, and cheese, it is planned to subsidize the costs of milk

processing enterprises for the purchase of raw materials for the production of these processed products.

Production of cheese, butter, and powdered milk is the most expensive of all dairy products. Thus, for the production of 1 kg of cheese, 10.8 liters of raw milk must be purchased, 20.3 liters for the production of butter, and 7.3 liters for the production of milk powder. Thus, the share of raw materials in the cost of these types of dairy products is significant. As a result, domestic processors of the price of finished products (cheese, butter, and milk powder) is higher than that of foreign suppliers. (8)

In order to produce competitive products, processors must purchase raw materials at a cheaper price. However, the cost of raw milk from manufacturers, given the high cost of feed is much higher. As a result, there is a vicious circle: raw milk producers cannot sell their products at a reasonable price, and milk processors cannot buy raw milk at a price that suits them.

At the same time, many enterprises that were focused on the production of butter, cheese, and powdered milk due to the high cost of production and the lack of a sales market are forced to reduce their production, if not even to completely stop the production of these types of dairy products, repurposing production into quickly paying back and more profitable types. (9)

At the same time, since butter and cheeses are in great demand among the population and should be present in the daily diet, consumers buy imported cheaper products, which adversely affects not only the work of the dairy industry but also the whole economy of the country. So, only in 2012, the import of dairy products amounted to about 400 million US dollars. These are the financial resources that could be directed to the development of domestic milk processing enterprises.

To solve this problem, a mechanism for guaranteeing the purchase price is envisaged, which involves subsidizing the difference between the price at which agricultural producers can profitably sell the produced dairy raw materials and the price at which processors can profitably buy it. (10)

Among the most important factors that caused the growth of imports of dairy products from foreign countries is the shortage of raw milk resources on the countries market, which is associated with insufficient investment in dairy farming, lack of low quality of feed, deterioration of dairy herds. In addition, a reduction in the rates of the Common Customs Tariff leads to a decrease in prices for imported products. (11, 12)

For Kazakhstan's exports of dairy products, the Russian market would be attractive due to its capacity, sanctions and a decrease in domestic production in the country, but within the EurAsEC framework, Belarusian products were the strongest competitors. Common borders, low prices, stable dynamics of price growth, the identity of consumer preferences in these countries leaves little hope for an increase in Kazakhstan’s exports in this direction.

The main problems are price fluctuations, shortage of raw milk, lack of funds from producers for modernization, low number of cows and productivity, a significant proportion of low-income households in the production of raw milk, reduced profitability of producers and processors of milk due to increased cost of production and processing against the devaluation of the national currency, a relatively high import dependence, low investment activity, a decrease in consumer demand for milk and dairy products while reducing the purchasing power of the population. (13)

To solve these problems, systemic measures are needed to develop the dairy market. Within the Commonwealth countries, it is necessary to stimulate the specialization of countries in the production of certain types of dairy products with collective financial support tools and to coordinate the policy in the field of state subsidies for dairy production, apply joint project financing in the agro-industrial sector and, above all, in the dairy sector and pursue a common policy in breeding livestock It is recommended to deepen production cooperation in the form of joint ventures.

It is expedient for manufacturers to reduce the share of raw materials and low value-added goods in the export structure due to the development of the production of butter and cheese. The production of dairy products should be carried out in such areas as the production of natural environmentally friendly products; production with biologically and physiologically active substances; with a reduced calorie, with therapeutic and prophylactic properties; application of the latest developments in the field of packaging and packaging of dairy products, especially kumis and shubat. The development of camel and mare's milk production should be a priority within the framework of export-oriented production for sales in the markets of foreign countries. (14)

An increase in the share of production of these types of dairy products could increase the share of exports to European countries. Given that the main consumers of dairy products in Kazakhstan are the countries of Central Asia (Uzbekistan, Tajikistan, etc.), which account for 70% of all domestic exports, it is advisable to increase exports to these countries. And these factors are common borders, the identity of consumer preferences that can be a catalyst for increasing exports in this direction.

As noted above, the demand for dry milk is increasing, while activities related to the restoration of existing dry milk plants are not planned. Government support is needed in the form of compensation for the direct costs incurred for the creation of new dairy cattle breeding facilities and their reconstruction, subsidizing the production of commercial milk. (15) The key tasks should be reimbursement of part of the capital expenditures for the creation and modernization of processing enterprises, the promotion of the consumption of milk and dairy products to the level of scientifically based consumption standards through the program of domestic food aid and the development of infrastructure systems of social nutrition.

6 Results and Discussion

To implement the tasks of ensuring food security and ensuring the domestic milk of the Kazakhstan market, it is necessary not only to increase the production of raw milk suitable for processing but also to increase the volume of collection and sale of raw milk for industrial processing.

The main raw material for production is freshly whole milk, which, according to the Statistics Agency, feeds about 4 million liters per year in Kazakhstan, but according to expert estimates, only about 30% of the produced milk goes into industrial processing. This volume is not enough for the production of dairy products in volumes that ensure the food security of the country. But it is precisely this volume that underlies the production of dairy products and the provision of a diverse assortment for consumption by the population of the republic through commercial networks. (16)

One of the reasons for the shortage of raw materials for the dairy industry in Kazakhstan, experts call the difficulty of collecting milk, which in 85% of cases is located in private farms. Due to the geographical remoteness of settlements from each other, the collection of milk from households is costly. For frequent remote farms, milk production becomes unprofitable due to costly transportation. For comparison, if in Europe the distance from the supplier (or milk handler) is no more than 50 km, in the conditions of Kazakhstan the distance to the milk processing enterprise may be more than 600 km.

The tasks to increase the volume of collected raw materials dictate the need for measures to create a network of milk receiving points in rural areas. This is important both in terms of reducing the shortage of raw materials and in terms of the need to improve the quality of raw materials and the development of dairy farming. It is very important that milk be suitable for

processing, as soon as raw materials of a certain quality can be taken to produce safe and nutritionally valuable food.

Milk reception points are designed for receiving, cleaning and cooling milk, which preserves the quality of raw materials before handing it to the milk processing company. The presence of a milk collection point also reduces the cost of collecting milk, and, consequently, reduces the cost of production in the future. (1, 17)

Any reduction in milk collection is a loss in processing volumes and in the dairy market as a whole. As a result, the reduction of taxes and budget revenues, the reduction of jobs, as in milk processors, and in allied industries, employed as contractors. While reducing purchases from local farmers, losses are up to 40% of the rural population of the republic, which is an important social factor.

According to the estimates of the Dairy Union of Kazakhstan to ensure food security of Kazakhstan, local production should occupy at least 80% of the domestic market, which was indicated by the President of the country among the tasks to ensure food security of the country. MSCs are confident that the achievement of this result and maintaining a stable state of production is possible with the implementation of a whole range of measures, including the development of a network of milk receiving stations with state support. (18)

The Kazakhstan Dairy Union unites the largest enterprises that traditionally produce dairy products and process more than 60% of the commercial milk produced in Kazakhstan. (19)

The supply of milk and dairy products is formed in the republic by several sources of income, but, first of all, by its own production. According to the Statistics Agency of the Republic of Kazakhstan, the first place in milk production occupies the East Kazakhstan Region, the share of participation is 13.83%. In turn, Almaty and South Kazakhstan Region produce 12.81% and 12.65%. As for Astana and Almaty, the share of their participation in the market is the most minimal, and the reason for this is the inconvenience of conditions for production (Figure 2).

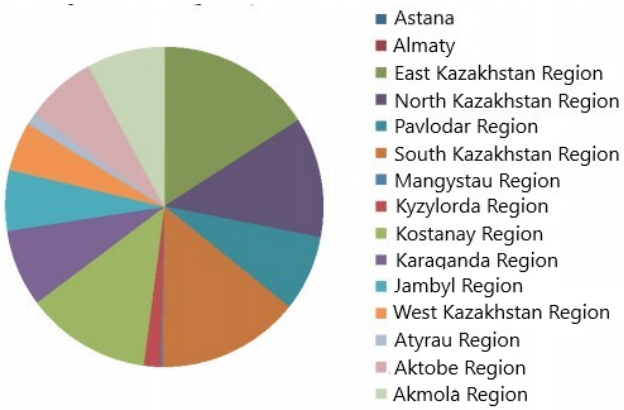

Figure 2. Data of the Agency of the Republic of Kazakhstan for the Production of Milk.

Milk is produced continuously throughout the year, in all climatic zones of the republic. At the same time, milk production is seasonal in nature, increasing in spring and summer and falling in autumn and winter (in June, the production volume is 3.5 times higher than the January figure). To expand the range used imports. At the same time, the volume of milk processing does not depend on the seasonal production of raw materials, which indicates the use of powdered milk, mainly imported. (20, 21)

The development of dairy cattle and the dairy industry in Kazakhstan is constrained by the following factors:

- dilapidated state, technical backwardness of livestock farms;
- high costs and labor intensity of production;
- low herd productivity, which is one of the reasons for the low profitability of dairy cattle breeding;
- an unfavorable climate, insufficiently effective measures to protect domestic producers - this is due to taxation and the availability of cheap dried milk from foreign countries, as well as dairy products, which are inferior in price to domestic producers;
- low level of the material-technical base of most processing enterprises. The lack of advanced equipment equipped plants for deeply integrated processing of raw milk;
- lack of qualified specialists of the highest and medium level, which is a big problem for the dairy industry;
- a sharp reduction in cattle as the main source of production of raw materials - milk;
- a sharp reduction in the acreage of forage crops, which led to the destruction of the food supply. This trend has been observed in Kazakhstan for the past 15 years.

Innovation should be introduced not only in the dairy industry; innovation should be interested and heads of agricultural enterprises specializing in the production of whole milk. The number of dairy herds, which grew in the first half of the 1990s, has declined sharply over the last decade. The villagers do not provide their own needs for milk and dairy products, and entrepreneurs who have retail outlets, because of the perishable nature of dairy products, do not buy it at milk plants, therefore, with all their desire, villagers cannot buy the product at retail. In addition, milk and dairy products are specific products, without heat treatment in some cases they can be hazardous to health, especially children. In this regard, the organization of workshops for the primary and secondary processing of milk and packaging of dairy products in rural areas is relevant. (22, 23)

Of particular relevance at present, both in the country as a whole and in a particular region, the purchase of natural dairy products is acquiring among the urban and rural population. Analytical studies confirm that the main feature of the current situation in the Kazakh market for milk and dairy products is a significant increase in demand. However, the demand for milk and dairy products for individual market segments (the low-income segment, the children's segment) is characterized as unsatisfied.

Functional drinks are distinguished into a special group, the demand for which is characterized by positive dynamics. Competitive advantages, in terms of product quality, of agricultural producers are the use of natural milk. Manufacturers can cooperate with mutually beneficial conditions with research institutes engaged in the development of new technologies and new generations of products. (24) It is necessary to unite the interests of manufacturers, technological scientists, and consumers of innovative products offered through advertising, dissemination of information through business incubators,

information and consulting centers. (25) The implementation of innovative projects of organizing mini-workshops for the production of dairy products enriched with useful substances can become a promising business for domestic producers.

Kazakh producers of milk and dairy products have all the opportunities to supply high-quality innovative dairy products to the market. To do this, scientists, technologists, economists constantly create innovative technologies, develop innovative products, and offer innovative solutions for organizing production in the dairy industry. It is necessary to establish a link between science and business in order to the mutually beneficial and successful implementation of innovative projects in practice. This will certainly contribute to the strengthening and further growth of the competitiveness of domestic producers in the domestic market of milk and dairy products.

7 Conclusion

Considering the current state of the dairy industry in Kazakhstan, as well as analyzing domestic products on the market, we can conclude that dairy cattle breeding and the processing industry as a whole are in a depressed state and require urgent resuscitation. It is necessary:

1. The government should focus on the development of animal husbandry on agricultural formations (both large and medium), increasing the number of main livestock in them from 3-5% to 60-65%.
2. Develop a state program for the development of animal husbandry (both dairy and meat), which would first of all solve the issue of financial support in the form of long-term lending with an interest rate from 0 to 3% per annum (with a deferred payment of up to two years) for the purchase livestock, construction of milking halls and premises for animals.
3. To improve the selection and breeding work, to transfer livestock to intensive technology of maintenance, to mechanize labor-intensive processes as much as possible.
4. Introduce guaranteed subsidies for each liter of milk sold to producers.
5. Save the preferential tax regime of 70–80% when paying the following types of taxes: social, property, VAT, corporate income tax for producers and processors working on domestic raw materials.
6. In order to provide the industry with personnel, the state must introduce an obligation for graduates of specialized higher education institutions: after graduation, work at the village or milk processing enterprises for at least 3 years, and only after that consider the diploma confirmed.

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Primary Paper Section: G

Secondary Paper Section: GH, GI, GM

I INFORMATICS

IN INFORMATICS

IMPROVE THE EFFICIENCY TO SEARCH FOR VIETNAMESE INFORMATION WITH COREFERENCE RESOLUTION AND EVENT-ORIENTED SEMANTIC MODEL OF TEXT

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Abstract: In this article, we present a coreference resolution using an event-oriented semantic model of text to search and classify text by the content from a set of documents. We have developed a test of the coreference dataset as a basis for improving search functionality based on a set of synonymous queries and indexing the content of obtained results based on the event-oriented semantic model of text. The article also proposes a mathematical model for indexing calculation based on the semantic relation of Vietnamese texts and some entities with English names. The article presents in detail the process of indexing systems such as pre-processing steps, using coreference dataset, extracting and indexing documents according to the semantic model of text.

Keywords: Coreference resolution, Vector space model, Semantic model of text, Entities with specific names.

1 Introduction

Nowadays, searching for information on the Internet has become an urgent need for most users, but we often face difficulties when sources of information are duplicated. For example, in the field of sports, when an event takes place, many online newspapers will produce information, the user's concern is to read the most accurate and complete information about the event without spending much time reading from different sources. Currently, websites allow users to search and classify for specific purposes (which may be commercial), which makes it difficult for users.

For the above reasons, we propose a process of indexing of information sources to provide the most complete and accurate content for readers. We apply methods of word separation, labeling in the preprocessing step of the Vietnamese language, build a coreference dataset and build an event-oriented semantic model of text, from which to study and propose methods of indexing texts in order to set up an indexing system of text in information systems.

The system is based on using a coreference resolution to improve the searching results based on a set of synonymous queries instead of using only the original query. This greatly increases the searching efficiency with texts whose content is closely related to the user's intent, making the search for semantics improved. For that reason, the system produces better semantic searching results than using only the original query string on some search engines.

We have developed a test system to evaluate the results of the application of the above-proposed methods, including the application of a coreference resolution in the formation of synonymous query sets, combining with the use of the semantic model of text and indexing algorithms based on that model, and tests with actual data.

1.1 Model of System

The original query will be pre-processed, then use a coreference resolution to produce a set of synonymous queries, which will be put into search engines in turn to improve search efficiency. The results of the content of the websites will be saved and the semantic model of text will be applied to the index.

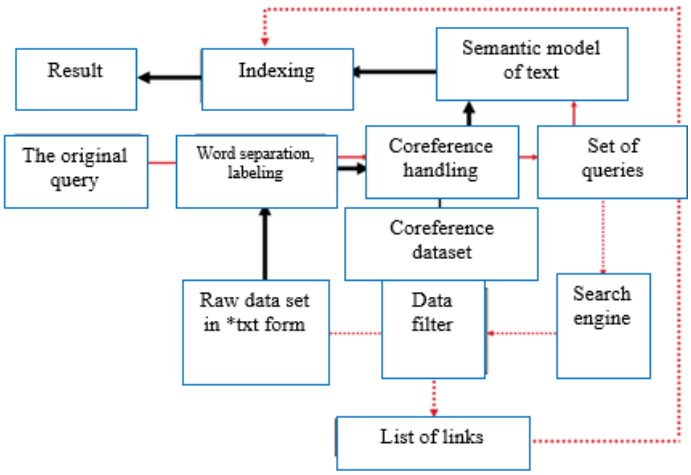


Figure 1. System Model

1.2 Pre-processing Texts: Word Separation, Labeling

We use two pre-processing modules including:

Word separation module to separate words in the text.

Labeling module to label from the category after the word has been separated.

Both of these two modules are used in the pre-processing step of the input text. However, it stems from the complexity of natural language, the accuracy in word separation and labeling has not reached the absolute level, which affects the results with the problems using word separating, labeling. Therefore, the coreference resolution uses a rule, the author has combined with training data to separate words and re-label specific names to increase the accuracy of word separation and labeling.

1.3 Coreference Resolution in Text

The problem of determining the coreference in text is the problem of determining the phrases in a same document referring to a defined entity in the real world and clustering these words into coreference series. (1-3) This is a difficult issue of processing natural language. For the Vietnamese language, this problem still poses many challenges due to its complexity and inadequate language resources. However, it is a problem with high potential of exploitation for Vietnamese data sources, which should be explored and researched.

The concept of coreference relation by Véronique Hoste (4): "The relation of coreference is the relation between two or more phrases that refer to a specific entity in the real world."

To further clarify the concept of coreference, we consider the following example: "Rooney is the captain of Man United. He is the soul of the Red Devil".

In the above example, the pronoun "He" and the noun "Rooney" have a coreference relation because they refer to a human entity named "Rooney". The words "Man United" and "Red Devil" refer to the same entity which is "Manchester United Football Club ".

With the model of solving the coreference in text, the authors in the study stated the problem of coreference in text as follows: "Solving the coreference in text is a problem defining phrases (nouns or pronouns) in a document with coreference relation and collecting these phrases into coreference strings." (5, 6) With the above statement, the input and output data of the problem can be determined as follows:

Input: Natural language text

Output: Groups of coreference words

In this research, the author uses the method of determining the coreference groups based on the rules and the coreference dataset that are built and classified manually. The coreference resolution algorithm is presented as follows: After labeling the input data, conduct the matching with the database of coreference samples, which is in the statistic data and groups, entity representing the coreference string is the first entity of each data line, corresponding to the highest statistical value (most commonly used). The next step, the entities in each document will be replaced by representative coreference entities, which serves the evaluation of the classification later. The result of a coreference group will have a structure as the following example:
Liverpool / Np: 428 | The_Kop / Np: 11 | Home_team_Anfield/Np: 2.

The above example shows the nouns and corresponding occurrences in the texts. Coreferences such as The_Kop / Np, Home_team_Anfield / Nps will be replaced by the most listed entity representing the coreference group that is Liverpool / Np.

To detect the coreference in documents needing to be reviewed, we shall develop the following algorithm:
Call t_i - the entity in text and f- input text data. Function $match(t_i, f)$ - the function that checks the appearance of entity t_i- in f.
Approve t_i in the text d_j
If match (t_i, f) – then replace (t_i, representative coreference (t_i))
Next t_{i+1}.

1.4 Building the Event-oriented Semantic Model of Text

The semantic model of text often relies on semantic relations between concepts. (7) Establishing the relation between concepts will increase the semantics of sentences or paragraphs. Through semantic relations, the search results will be interlinked, which means that when searching for information, in addition to the exact results returned, it is possible to get the results that are semantically related to those results. To do that, it is necessary to build a suitable model of semantic text presentation, structuring the text as well as finding and quantifying the relations between the elements in the text.

With the above idea, the study has proposed a semantic model of text as well as the processing of text from raw structure to the following structure (8):

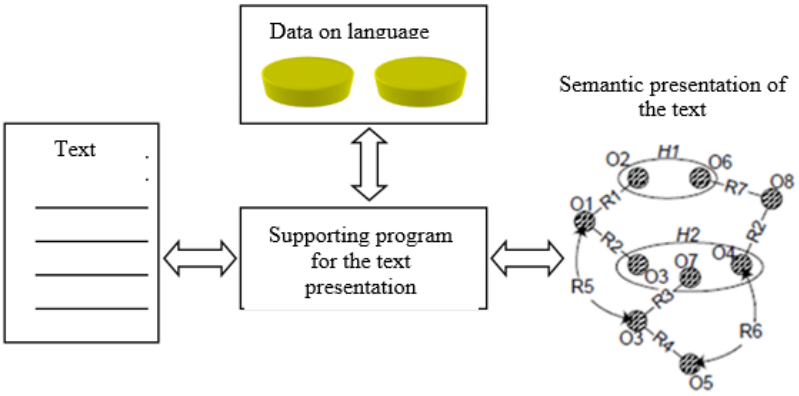


Figure 2. The Semantic Model of Text

The data of the input texts is processed by a program supporting the semantic text representation through language databases, thereby extracting relations between entities and representing them in the form of semantic graphs. In which:

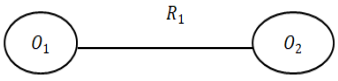
O_i - Concepts, they are nouns referring to entities,

R_i- Relation between objects.

Semantic representation of text is created from semantic representation of separate sentences of the text, their elements are concepts extracted from the analyzed texts and there are semantic relations between them. (9) Text semantic representation is expressed in graphs, each vertex of the graph is concepts, each edge is semantic relations between them. We can take an example from the following sentence:

"The wind blows the leaf. The wind passes through the gap"

With the sentence: "The wind blows the leaf", the semantic relation is expressed as follows:



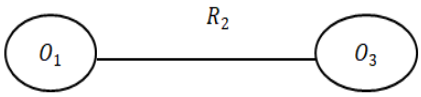
In which:

$$R_1 = blow(O_1, O_2)$$

O_1- "the wind"

O_2- "the leaf"

The semantic relation in the second sentence "The wind passes through the gap" as follows

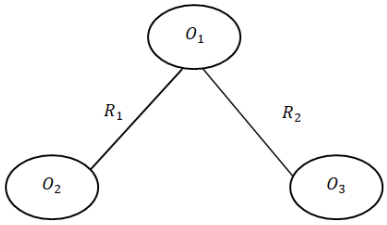


$R_2 = pass\ through(O_1, O_3)$

O_1- "The wind"

O_3- "the gap"

For the above two sentences in the same text, we shall have the following relation:



The above semantic model of text still has some drawbacks. Firstly, when the amount of data is large, the graph will rapidly increase in the number of vertices and edges, which greatly affects the performance of storing and querying information. Secondly, events stand aloneand not highly practical in the application of information search. For events with many entities participating in, or the entities with the same coreference, the above model has not integrated them together yet. This is shown in the following example: "MU and Man City entered to play theManchester derby match this weekend. The Red Devil is being evaluated higher than MCFC" (1). With the above model, it will be difficult to build a semantic model of text due to the following: the first entity includes both" MU "and" Man City", the semantic relation between these two entities is two verbs:"enter","play", the second entity is"the Manchester derby match". For the second sentence, the first entity is "Red Devil", the second entity is "MCFC" with the semantic relation that is "evaluated". The example above has semantic relations as follows:

$R_1 = enter\ (O_1, O_3)$, with O_1- "MU", O_3- "the Manchester derby match"

$R_2 = enter(O_2, O_3)$, with O_2- " Man City", O_3- "the Manchester derby match"

$R_3 = play\ (O_1, O_3)$

$R_4 = play\ (O_2, O_3)$

$R_5 = evaluated\ (O_4, O_5)$, with O_4- " Red devil", O_5- "MCFC"

Through the semantic expression of the text as above, an original text will produce many relations with which these representations also partly lose the original meaning of the sentence, making the semantics partlychanged by the order of elements in the sentence are not represented in the model.

In search queries, users often pay attention to nouns and verbs, sentences containing nouns and verbs which are meaningful are considered an event. In other words, an event is created by arranging nouns and verbs provided that the arrangement is meaningful. Through modeling the text into a model of events, finding data based on text will return more semantic results with the query. For these reasons, the author proposes an event-oriented semantic model of text as follows:

$M =< O_t, V_t > (2)$

O_t- noun phrase

V_t- verb phrase

For this model, a sentence or a text can be represented as an ordered set of O_t and V_t. So a text can be represented in the following form:

$O_n - V_n - O_k$

In general, a text can be represented in the following form:

$O_1 \dots O_n - V_1 \dots V_m - O_k \dots O_h$ (3)

With $n, m, k, h \geq 0$.

Using event-oriented semantic representation of text, combining with co-reference, the sentence (1) shall be represented as follows

$O_1 O_2 - V_1 V_2 - O_3$ và $O_1 - V_3 - O_2$

In which

O_1- "MU" (coreference with Red Devil),

O_2- " Man City" (coreference with MCFC),

O_3- " the Manchester derby match"

V_1- " enter",

V_2- " play",

V_3- "evaluated".

In this semantic model of text, the semantic representation will become simpler and semantically guaranteed. In the Information Retrieval (IR) systems, this model also helps improve the capable of querying documents based on words or analyzing phrases of the content and it produces more accurate ranking results. (10)

Applying the above model to the ranking of search results will help the search engines display the most semantically relevant results at the top of the list, the results will appear according to semantic priority compared with the input queries. In particular, the queries as well as the searched text are modeled by an event-oriented semantic model of text. With the above proposal, the queries are modeled: $Q =< O_t, V_t >$.

Considering the specific case with the following query: "MU borrows Falcao", the event-oriented semantic model of text of this query will be $Q = (O_1, V_1, O_2)$. With O_1- "MU", V_1- "borrow", O_2- "Falcao". It is possible to model the above query as a vector with the corresponding value of $q = [1,1,1]$with three dimensions of O_1, V_1, O_2. Queries can be generated from the original query is as follows:

Type of query with one missing component:

$Q_{11} = [0,1,1]$ (missing O_1) , $Q_{12} = [1,0,1]$ (missing V_1) , $Q_{13} = [1,1,0]$ (missing O_2)

Type of query with two missing components:

$Q_{212} = [0,0,1]$ (missing O_1, V_1),
$Q_{213} = [0,1,0]$ (missing O_1, O_2),
$Q_{223} = [1,0,0]$ (missing V_1, O_2)

So, with the above query, it is possible to create seven near-meaning queries (including the original query), in which the semantics at the highest priority is the original query, the next is the one with one and two missing components. Semantics are reduced in the incremental direction of missing elements in the query.

In the general case, we can consider $Q =< O_t, V_t >$, with the direction of the query vector as $|Q| = |O_t| + |V_t| = n$. We have the vector of the original query: $Q = [q_1, q_2, \dots q_n]$ with $q_i = 1\ (i = \overline{1,n})$

After that, we consider the cases of incomplete semantics as the query but they still take the context of the query by phasing out entities from n entities to 1 entity. Therefore, we have:

At the first priority, compared to the original query, the number of missing entities in this level is 1. We assume that Q_{1j} is the j[th] vector at level 1. That vector is represented as follows:

$$Q_{1j} = [q_1, q_2, \dots q_n] \text{ with}$$
$$q = 1\ (i = \overline{1,n},\ i <> j), q_j = 0$$

It can be seen that, at level 1, the number of queries is C_n^1

Also with the above representation, the vector of the queries at the second priority is as follows

$$Q_{2jk} = [q_1, q_2, \dots q_n] \text{ with}$$
$$q_i = 1\ (i = \overline{1,n},\ i <> j,k;\ j <> k), q_j = 0, q_k = 0$$

Similarly, the number of queries at level 2 is C_n^2

Present queries and the number of queries at priority levels are similarly as calculation at level 1 and 2. Number of queries at level i is C_n^i

Include the original query, the number of priority levels from 0 (priority level of the original query) to $n-1$ (n priority level). The total number of queries counted is:

$$N = 1 + C_n^1 + C_n^2 + \dots C_n^i + \dots + C_n^{n-1}$$

with n is the direction of the query vector.

The query search process in the text set D is implemented after the queries at those levels have been identified. Call d_i as the i[th] document in the document set D, perform a search for the occurrence of queries at priority levels in each document d_i, the result obtained is the n-dimensional vector, corresponding to n priority levels. The vector symbol is V(d_i)

$$V(d_i) = (v_{i0}, v_{i1}, \dots, v_{i(n-1)})$$

In which v_{ij} is the number of occurrences of the queries at the j[th] priority level in the text d_i.

The efficiency of searching for information is a recommendation for users but the most concise and accurate information according to the query is included. Therefore, the authors propose a method of indexing texts by calculating the scores of the query results. In other words, from the vector $V(d_i)$, we calculate the scores for each of those vectors and then arrange the documents into the list in order from high to low scores. The function "Scores"of vector $V(d_i)$ is proposed by the authors as follows:

$$Scores(d_i) = \sum_{j=0}^{n-1} \frac{v_{ij}}{(j+1) * S} \quad (4)$$

With

$$S = \begin{cases} \max(v_{ik}), (i,k = \overline{1,n}), & \text{if } \max(v_{ik}) \neq 0 \\ 1, & \text{if } \max(v_{ik}) = 0 \end{cases}$$

With the "Scores" function as above, according to the input query string, each document d_i in the document set D will have its own $Score_{s(d_i)}$ value, the larger the value is, the greaterthe semantic relevance between the text and the query is.

2 Applying and Testing

Based on the research results, the authors have built a program to index news based on the queries. The data set was built by getting information from 2500 sports articles. The program has also carried out pre-processing steps such as word separation, labeling, entity identification and replacement of coreferences, and then modeled semantic relations and classified.

Applying the ideas of the study, the authors have built a coreference dataset based on semantic models. The structure of each file is a set of lines, each of which is a set of coreferences and the frequency of occurances, the biggest frequency is placed at the beginning of each line:

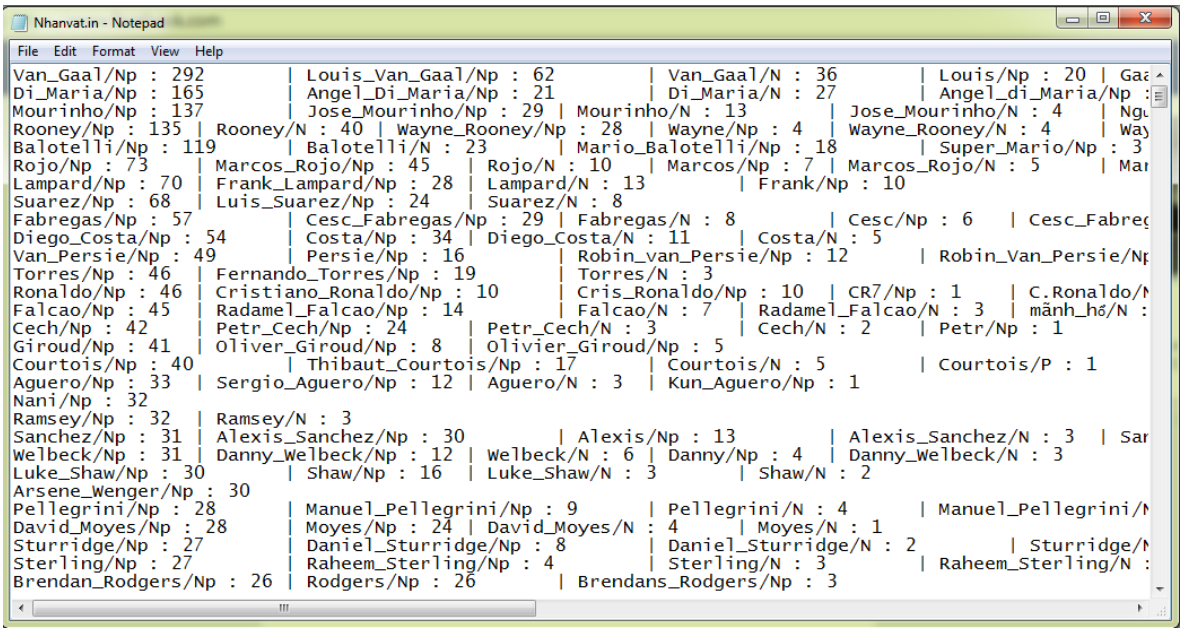


Figure 3. The Structure of a Coreference Dataset File

For texts, after having been extracted, the entity shall be separated, and each sentence is built into event-oriented semantic models as in the model (2). Example: Sentence: "Man United borrowed Ramadel Falcao in this season."

After labeling, extracting the entity, replacing the co-reference, it will become: Man_United / Np borrow/ V/ V Falcao / NP. The semantic models are represented as follows:

O1->V3->V2->O23:

In practice, the authors performed the semantics of semantic texts as the image below:

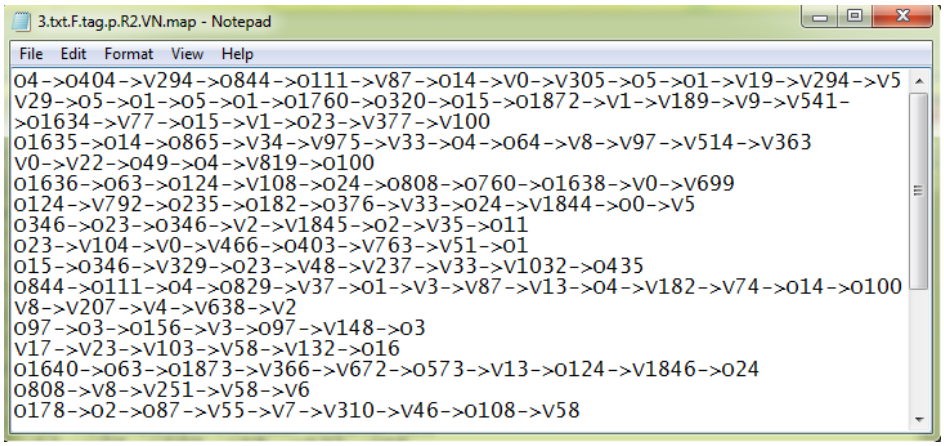


Figure 4. A Text File After Having Been Semantically Modeled

With a dataset which is semantically modeled in an event-oriented manner, the program conducts document indexing based on the semantic matching of the input query. For indexing algorithms, in addition to using proximity phrases, there is also a step to assess the semantic relevance of keywords. This makes the indexing more valuable, especially with the queries which do not contain verbatim texts in the document.

3 Result Evaluation

In this article, the coreference method of handling the Vietnamese query and the semantic model of text of the authors is an additional support method for search engines, helping search enough semantic content that it might have, instead of just searching for the keywords of the query. To evaluate the effectiveness of the proposed model, the authors based on the average "loss function" parameter, signed as L, calculated by the following formula:

$$L = \frac{1}{T}\sum_{t=1}^{T} |y' - y^t| \quad (5)$$

In which T is the number of test samples, y^t is the actual labeled value of the sample, y' is the ranking value predicted by the model.

The authors compare the proposed model with the VSM Algorithm. By surveying the queries, the evaluation results are given by the table of L value as follows:

Table 2. Test Results of the System

No.	Query			Number of test samples	Loss function	L
	O	V	O		VSM Algorithm	Proposed model
1	MU	borrowed	Falcao	120	1.8333	1.67
2	Arsenal, Man City	fight	Super Cup in England	150	4.6667	1.14
3	MU	draw	Sunderland	100	3.5000	0.50
4	Lampard	score		200	2.5714	1.00
5	Mu	borrowed	Falcao	150	4.1667	1.17
Average L					**3.3476**	**1.0952**

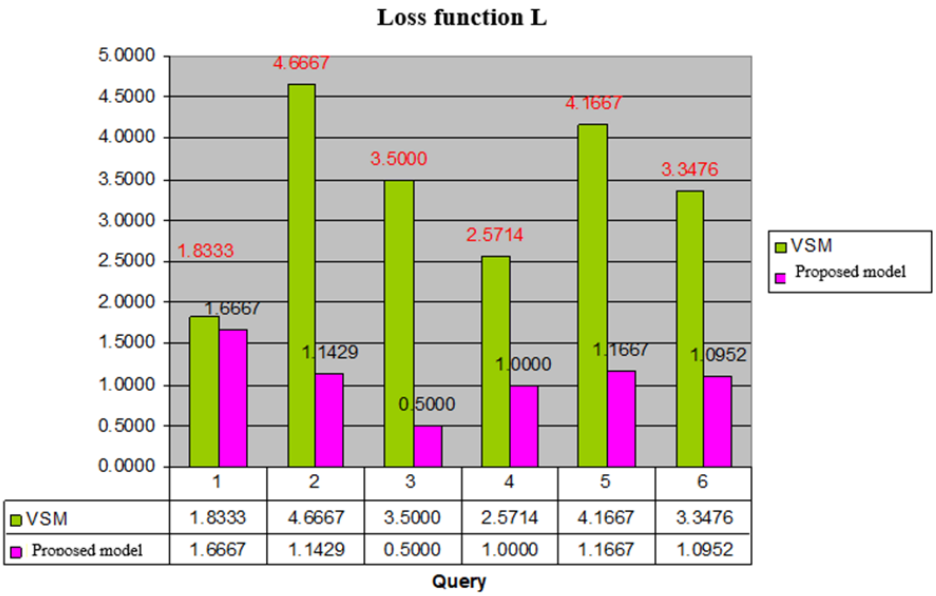


Figure 5. Evaluation Results between the Two Models

It can be seen that the results from semantic model show the indexing results with much lower semantic deviation than the indexing results by VSM model.

4 Conclusion

Some words may not have a semantic relation but can still be coreferent owing to their semantic similarity. This observation has led Ponzetto and Strube (11) to encode features based on various measures of similarity, which have been shown to improve their baseline system.

While using semantic roles improves Ponzetto and Strube's resolver (11), semantic parallelism is a fairly weak indicator of coreference. For instance, if two verbs denote events that are unrelated to each other, it is not clear why their arguments should be coreferent even if they have the same semantic role.

Generally speaking, the results of employing semantic and world knowledge to improve knowledge-poor coreference resolvers are mixed. The mixed results can be attributed at least in part to differences in the strengths of the baseline resolvers employed in the evaluation: the stronger the baseline is, the harder it would be to improve its performance. Since different researchers employed different baselines and evaluated their resolvers on different feature sets, it is not easy to draw general conclusions on the usefulness of different kinds of semantic features. We presented an overview of the models and features developed for learning-based entity coreference resolution. Despite the continued progress on this task, it is far from being solved. Recent results suggest that the performance of coreference models that do not employ sophisticated knowledge is plateauing. (12) Hence, one of the fruitful avenues of future research will likely come from the incorporation of sophisticated knowledge sources.

As coreference resolution is inherently a clustering task, it has received a lot of attention in the machine learning and data mining communities, where the task has been tackled under different names, such as record linkage/matching and duplicate detection. Some researchers have focused on name matching, where the goal is to determine whether the names appearing in two records in a database refer to the same entity. The focus on name matching effectively ignores pronoun resolution and common noun phrase resolution, which are arguably the most difficult subtasks of entity coreference resolution. (13)

Many machine-learned entity-based models have been developed over the years. The most notable ones include the entity-based versions of mention-pair models and entionranking models. Entity-mention models, the entity-based version of mention-pair models, determine whether a mention is coreferent with a preceding, possibly partially-formed, cluster. (14, 15) Despite their improved expressiveness, early entitymention models have not yielded particularly encouraging results. Cluster-ranking models, on the other hand, are the entity-based version of mention-ranking models. (16) They rank preceding clusters rather than candidate antecedents, and have been shown to outperform entity-mention models, mention-pair models, and mention-ranking models. While the entity-based models discussed so far have all attempted to process the mentions in a test text in a left-to-right manner, easy-first models aim to make easy linking decisions first, and then use the information extracted from the clusters established thus far to help identify the difficult links.

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Primary Paper Section: I

Secondary Paper Section: IN, JC, JD

K MILITARISM

KA MILITARISM

ASSESS THE ABILITY TO INTERCEPT CRUISE MISSILES OF SURFACE-TO-AIR MISSILE SYSTEM

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Abstract: With the continuous development of technology, missile systems, especially cruise missiles (CM) have become an extremely dangerous threat to national security. The CM can pass through the defense zone without being detected, they are equipped with systems used for electronic war and are capable of flying hundreds of kilometers. CMs are small in size, so they are easily stored and transported by many different methods. For these reasons, building and evaluating the ability of the CM defense system is essential. The paper will investigate the effects of various factors: giudance laws and noise to the ability to intercept CM by the surface-to-air missile defense system (SAM). The guidance laws investigated in the paper are the proportional navigation (PN) guidance law and differential geometry (DG) guidance law. The simulations on MATLAB software will show the ability to intercept CM in different situations.

Keywords: Missile system, Cruise missile, Surface-to-air missile, Guidance law, Proportional navigation guidance law.

1 Introduction

The cruise missile has demonstrated its ability to damage from the beginning of World War II when Germany launched more than 200 cruise missiles towards England and Belgium. (1) Although at that time, cruise missiles still lacked of accuracy but they caused thousands of deaths. More recently, during the Iraq War in 2003, Kuwaiti and US ballistic missile defense systems failed to detect and intercept 5 Seersucker HY-2/CSSC-3 cruise missiles of Iraq. (1)

The CM can fly at subsonic speeds, can also fly at supersonic speeds (up to 3 Mach), at the distance up to 3000 km. (2) Modern CM missiles can pass through missile and radar systems without much difficulty. Using high-precision guidance systems such as GPS (global positioning system) or GLONASS allows the CM to fly thousands of kilometers to destroy the target with a deviation within a few meters. Another reason that makes CM become a dangerous target for CM missile defense systems is that it can be easily transported, it is difficult to detect because it is small in size and mobile.

With the continuous development of CM, the construction, consolidation, and strengthening of the missile defense system to cope with different types of target, especially cruise missiles is always essential to ensure national security. One of the most important components of a missile is the guidance law, which determines the necessary acceleration command for a missile to fly in the desired orbit. (3) For that reason, it is necessary to investigate and evaluate the ability to intercept cruise missiles, whereby we can make changes to enhance the ability to intercept cruise missiles of the missile defense system.

2 Purpose

The paper will investigate the effect of guidance laws and noise on the ability to intercept CM by the surface-to- air missile defense system, thereby synthesizing the most optimal guidance law.

3 Research Method

The paper will use the three-degree-of-freedom model (3DOF) to model the dynamics of missiles. Specifically, the defense missile used for the simulation will be based on the technical parameters of PAC-3 missile (4), while the target model (cruise missile) will be based on the technical parameters of Tomahawk cruise missile. (5)
In simulations, missiles are modeled in NED coordinate system (North - East - Down coordinate system). The NED coordinate system has the origin located on the tangent plane of the Earth. The X axis of the coordinate system points to the north, the Y axis points to the east. To match the right hand rule, the Z axis of the coordinate system will point vertically to the center of the Earth (3) (Figure 1). In figures 1, η_M and η_T are respectively the guidance angles of the missiles and targets; $\vec{V}_M$ and $\vec{V}_T$ are respectively the velocity vectors of missiles and targets; $\theta_{L_{az}}$ and $\theta_{L_{el}}$ are respectively the line-of-sight (LOS) angles for the azimuth and deviant. Assume that the earth is flat and ignores the effect of angular velocity in the rotation of the earth.

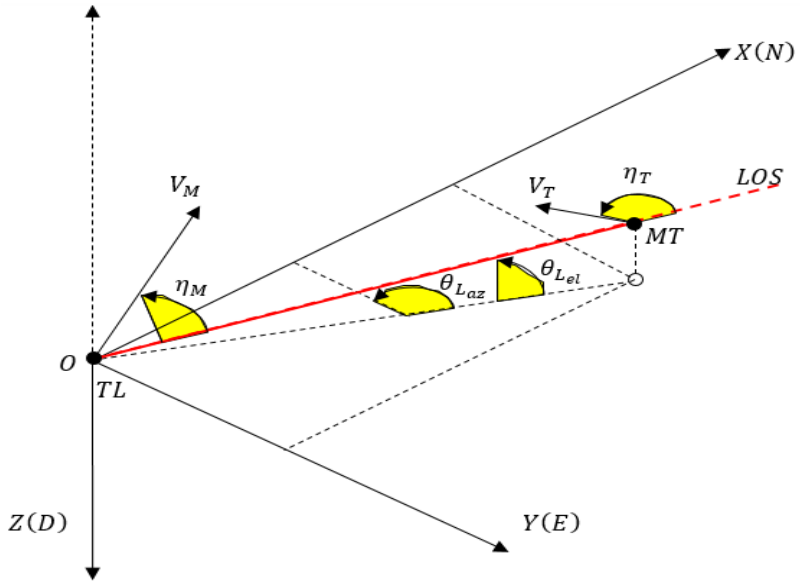

Figure 1. Missiles and Targets in the NED Coordinate System

The vectors or matrices associated with the missile will be added to the index under M; while the parameters related to the target will be added index under T.

3.1 Missile Models

In simulations, missiles will be modeled according to the specifications of PAC-3 missile. Because the maneuverability of missile is always limited due to physical factors, it is necessary to obtain a linear accelerator limiter. In simulations, the paper will limit the guidance acceleration to no more than 50g. The technical parameters of PCA-3 missile are given in Table 1 below (4):

Table 1. The Technical Parameters of PCA-3 Missile, which are used for Missile Models

Length	5.205 m
Diameter	255 mm
Mass	Launch: 315 kg Collision: 142 kg
Speed	1700 m/s
Distance	15 km
Warhead	Kinetic energy
Guidance	INS, active radar
Type of propellant	Solid fuel (175 kg of HTPB)

a) Movement of missiles

At the initial time, the missile position coincides with the origin. Assume that there is no deviation of initial guidance angle. Before launching, missiles are headed straight to the target. The target starts on the positive part of the X axis and is at a distance away from the missile equal to the investigated distance (from 2 km to 15 km). The initial guidance angle of the target is set to the desired deviation angle. The paper investigates with surface-to-air missiles and they are launched from the ground, so it is necessary to define the parameters of vertical lauching angle, which will be set from 15° to 41° and calculated according to the following expression:

$$VLA = 15 + 2(D_T - 2) \quad (1)$$

In which, D_T (km) is the initial distance to the target. The missile status vectors with velocity components and distances along X, Y and Z axes are used to calculate missile motion from time to time. The missile status vector $M(k)$ at the k[th] time has the form of:

$$M(k) = [x_M(k)\dot{x}_M(k)y_M(k)\dot{y}_M(k)z_M(k)\dot{z}_M(k)]' \quad (2)$$

and the missile status vector at the next time is $M(k+1)$ which is determined from the transition matrix and missile acceleration matrix as follows:

$$M(k+1) = F_M M(k) + M_a(k) = \cdots$$
$$\cdots \begin{bmatrix} 1 & \Delta & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & \Delta & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & \Delta \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_M(k) \\ \dot{x}_M(k) \\ y_M(k) \\ \dot{y}_M(k) \\ z_M(k) \\ \dot{z}_M(k) \end{bmatrix} + \begin{bmatrix} \frac{\ddot{x}_M(k)\Delta^2}{2} \\ \ddot{x}_M(k)\Delta^2 \\ \frac{\ddot{y}_M(k)\Delta^2}{2} \\ \ddot{y}_M(k)\Delta^2 \\ \frac{\ddot{z}_M(k)\Delta^2}{2} \\ \ddot{z}_M(k)\Delta^2 \end{bmatrix} \quad (3)$$

b) Missile thrust

A thrust model which is close to reality requires the following parameters:

Combustion time, thrust /weight ratio (T/W) and specific impulse (I_{sp}). These parameters are subjectively determined because there are no open documents that provide accurate information about these parameters. The T/W ratio of the MIM-104A PAC-2 missile is 15.57 to be used for the PAC-3 missile. (6) The missile which has a single-stage propulsion with solid fuel that is hydroxyl-terminated polybutadiene (HTPB). The specific impulse value I_{sp} of this fuel engine is between 260 s and 265 s. (7)

The paper will choose I_{sp} = 260 s. With the assumption of T/W ratio and I_{sp} above, missile thrust T và burn time t_{burn} calculated as follows:

$$T = (T/W).mass_{total}.g \quad (4)$$

$$t_{burn} = \frac{I_{sp}\left(mass_{total} - mass_{impact}\right)g}{T} \quad (5)$$

In which, $mass_{total}$ is the mass of missiles at launch time; $mass_{impact}$ is the mass of missiles after the fuel has burned out; g is the earth gravitational acceleration. At that time, in the acceleration phase of the flight process, the calculated values of T and t_{burn} are respectively 48.087 (N) and 9.1711 (s)

Assume that the speed of air discharge and fuel flow is constant to ensure constant thrust. At that time, missile acceleration will increase over time because missile mass will decrease over time due to fuel combustion process. (3)

c) Resistance model

The paper only considers two main types of resistance that affect the flight process of missiles are: inductive resistance and parasitic resistance. A missile with a mass of m at a specific time, the total resistance is equal to the total of two component resistance. The total resistance vector has a direction opposite to the direction of the missile velocity vector. The magnitude of the acceleration caused by the resistance is calculated as follows:

$$\left\| a_{M_{drag}} \right\| = \frac{F_{dp} + F_{dl}}{m} \quad (6)$$

In which, F_{dp} is the parasitic resistance, F_{dl} is the inductive resistance.

The parasitic resistance F_{dp} is proportional to the parasitic resistance coefficient C_{dp} and the horizontal cross-section area S_{REF} according to the following expression (8):

$$F_{dp} = QC_{dp}S_{REF} \quad (7)$$

Q is dynamic pressure, depending on missile speed v_M and flight altitude according to the following expression (8):

$$Q = \frac{\rho\|v_M\|^2}{2} \quad (8)$$

For inductive resistance, it can be determined through parasitic resistance, the magnitude of the linear acceleration command and the value of maximum allowed acceleration command of the missile as follows (9):

$$F_{dt} = 4F_{dp}\frac{\|a_c\|}{a_{cmax}} \quad (9)$$

3.2 Target Model

In simulations, the target is modeled according to the parameters of the Tomahawk cruise missile. The target is modeled as a material point in the NED coordinate system with the origin coinciding with the missile launch point. The initial position of the target is set on the positive side of X axis of the coordinate system. With 3DOF simulations, the target will maintain the flight speed and altitude is respectively 249.6312 m/ s and 276.7584 m. (5)

The target maintains a linear trajectory before the encounter time of 3 seconds. The effect of resistance and gravity on the target will not be considered in the paper. In the last 3 seconds before the end of the flight process, the target (cruise missile) performs maneuvering of 6.89 g and that is also the maximum overload value of the Tomahawk missile. (5)

Using concepts similar to those in the part of building a missile model, we obtain the target state vector at the time k is $T(k)$ as follows:

$$T(k) = [x_T(k)\dot{x}_T(k)y_T(k)\dot{y}_T(k)z_T(k)\dot{z}_T(k)]' \quad (10)$$

When the target does not perform any initial maneuver, the target's linear trajectory is determined based on the target transition state matrix F_T as follows:

$$T(k+1) = F_T T(k) = \begin{bmatrix} 1 & \Delta & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & \Delta & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & \Delta \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_T(k) \\ \dot{x}_T(k) \\ y_T(k) \\ \dot{y}_T(k) \\ z_T(k) \\ \dot{z}_T(k) \end{bmatrix} \quad (11)$$

When the target performs maneuvering, we can represent the target state vector at the time of $k+1$ according to the target transition matrix F_{turn} as follows (10):

$$T(k+1) = F_{turn}T(k) = \cdots$$

$$= \cdots \begin{bmatrix} 1 & \sin\frac{\omega_{turn}\Delta}{\omega_{turn}} & 0 & \frac{1-\cos(\omega_{turn}\Delta)}{\omega_{turn}} & 0 & 0 \\ 0 & \cos(\omega_{turn}\Delta) & 0 & -\sin(\omega_{turn}\Delta) & 0 & 0 \\ 0 & \frac{1-\cos(\omega_{turn}\Delta)}{\omega_{turn}} & 1 & \sin\frac{\omega_{turn}\Delta}{\omega_{turn}} & 0 & 0 \\ 0 & \sin(\omega_{turn}\Delta) & 0 & \cos(\omega_{turn}\Delta) & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & \Delta \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_T(k) \\ \dot{x}_T(k) \\ y_T(k) \\ \dot{y}_T(k) \\ z_T(k) \\ \dot{z}_T(k) \end{bmatrix} \quad (12)$$

3.3 Noise Model

The missile model used in the paper is working with active radar systems on the compartment and it is used to measure the parameters of LOS angle and distance, those measurements are affected by noise. The noise model will be added the sensor deviation so the measurement is more close to the reality.

Noise is added to the distance, azimuth LOS angle and LOS angle according to the following expressions:

$$\theta^*_{L_{az}} = \theta_{L_{az}} + \sigma_{\theta_L} n_{rand} \quad (13)$$

$$\theta^*_{L_{el}} = \theta_{L_{el}} + \sigma_{\theta_L} n_{rand} \quad (14)$$

$$r^* = r + \sigma_r n_{rand} \quad (15)$$

Expressions (13, 14, 15) represent measurements that have been affected by noise; σ_{θ_L} and σ_r are respectively the standard deviations of LOS angle and distance measurements by noise. The n_{rand} parameter is the Gauss random variables with a variance of 1, which simulates the noise that affects the measurements. The variance of the measurements will be determined by multiplying the base standard deviation by the noise factor f_{noise}:

$$\sigma_{\theta_{Laz}} = f_{noise}\sigma_{L(base)} \quad (16)$$

$$\sigma_{\theta_{Lel}} = f_{noise}\sigma_{L(base)} \quad (17)$$

$$\sigma_r = f_{noise}\sigma_{r(base)} \quad (18)$$

In which, f_{noise} is a multiplier factor that is used in general to synchronously increase the influence of noise on measurements.

With 3DOF model, conductive base standard deviation for the distance $\sigma_{r(base)}$ is 10.0 m; conductive base standard deviation for deviant and azimuth angles $\sigma_{\theta_{L(base)}}$ is 1.0 mrad.

3.4 PN and DG Guidance Laws

a) PN guidance laws

PN giudance laws have 2 versions: TPN and PPN. In keeping with the reality, the paper investigates with PPN giudance laws. At that time, the acceleration command vector is perpendicular to the missile velocity vector. (11) With the assumption of a small attack angle, we obtain the acceleration command vector which is perpendicular to the vertical axis of the missile. The expression that defines the missile acceleration command is shown below (11):

$$a_c = \frac{N' v_c \dot{\theta}_L}{\cos\eta_M} \quad (19)$$

In which, η_M is the angle between the missile velocity vector and LOS vector, also known as the missile guidance angle (Figure 1).

b) DG guidance laws

The concept of differential geometry has been used as a basis for developing more generalized guidance methods. In the document (12), the author has given the expression to determine the linear acceleration command which is perpendicular to the missile velocity as follows:

$$a_c = \|a_T\|\frac{\cos\eta_T}{\cos\eta_M} + \frac{N' v_c \dot{\theta}}{\cos\eta_M} \quad (20)$$

The guidance angles of the target and missile are symbolized as η_T and η_M. These angles are shown in Figure 1. The magnitude of the target acceleration, $\|a_T\|$, and the target guidance angle, η_T, carrying the information about the target trajectory curvature.

4 Investigating Method

Simulations will be performed at specific distances and angles. The investigating angle will be gradually increased from 0^o to 180^o. The simulation will stop when:

- The sign of the approaching velocity starts to change from positive to negative.
- When the missile meets the target or when the distance is less than 5m.
- The height is less than 0.
- In addition, there will be constraints approaching velocity to
- Avoid the phenomenon that the simulation stops before applying the guidance laws

- Ensure the missile velocity is greater than the target velocity.

The quality of the guidance laws will be assessed through three parameters: the encounter time, the encounter velocity and the integral of the linear acceleration command of the flight process, this is an important parameter because it allows to obtain a relative comparision of the amount of fuel consumed. For the parameter of encounter time, we always want this parameter to be as small as possible. Since the paper investigates with the presence of noise, at each investigating angle value, the result will be the average value of the parameters after 20 simulations. The paper will carry out PN and DG guidance laws at 3 values of distance of 2 km, 8 km and 15 km. The investigating results in the above 3 values of distance will be shown on one graph to facilitate the comparison.

5 Results

The results at 3 different investigating distances: 2 km, 8 km, and 15 km will be performed on one graph at the investigating angle from 0o to 180o to facilitate the comparison.

When we investigate at the farthest distance that is 15 km, the missile misses the target when the investigating angle is less than 20o, so the investigating results at a distance of 15 km with the investigating angle range from 0o to 20o will not be shown on the diagram showing the difference between the parameters when applying PN and DG guidance laws (Figure 2a, Figure 3a and Figure 4a). To clarify the investigating results at a distance of 15 km, the parameters evaluating the effectiveness of PN and DG guidance laws will be presented on separate graphs (Figure 2b, Figure 3b and figure 4b).

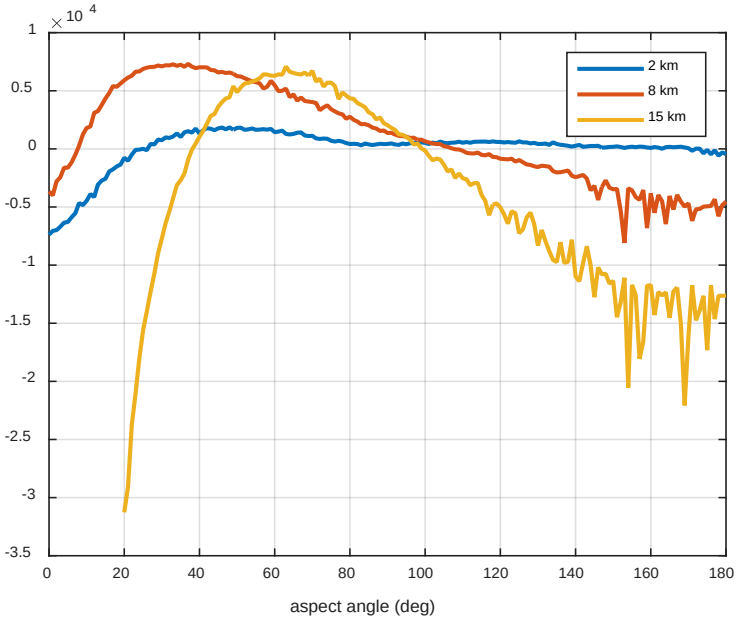

Figure 2a. The Difference between the Integrals of the Magnitude of Linear Acceleration Command of PN and DG Guidance Laws

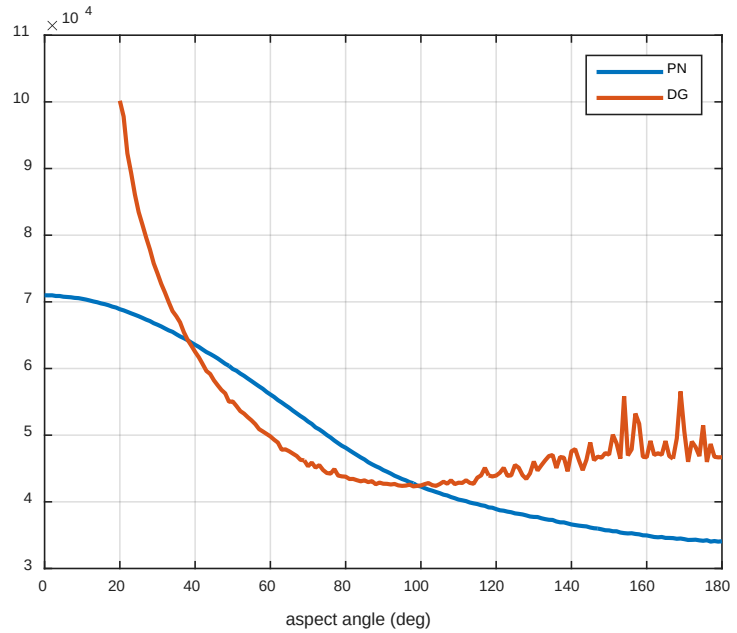

Figure 2b. The Integral of the Magnitude of Linear Acceleration Command of PN and DG Guidance Laws When Investigating at a Distance of 15 km

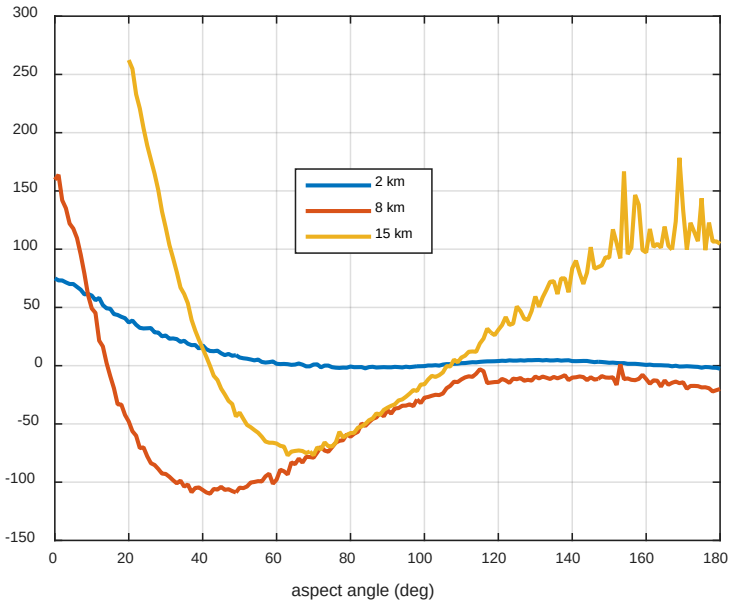

Figure 3a. The Difference between the Missile Collision Velocities When Applying PN and DG Guidance Laws at 3 Distances

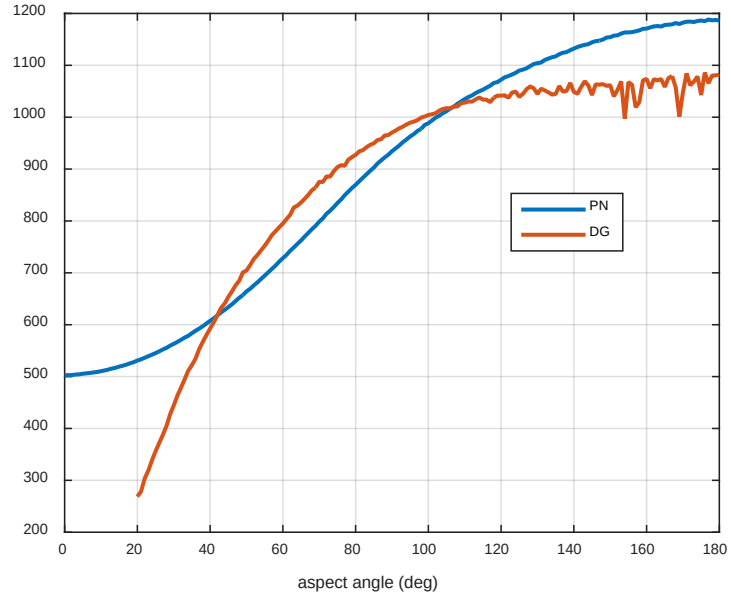

Figure 3b. The Missile Collision Velocities When Applying PN and DG Guidance Laws at a Distance of 15 km

From Figure 2a we can see that the difference between the two guidance laws is more obvious when increasing the investigating distance. At the investigating distance of 2 km, the DG guidance law appears to be dominant compared to the PN guidance law when the integral of the magnitude of the guidance command is smaller than that in the case of the PN guidance law in most investigating angles. When the investigating distance is increased to 8 km and 15 km, the investigating angle that DG guidance law governed was narrowed. On the whole investigating distance from 2 km to 15 km, we can say that the integration parameters of the magnitude of the guidance command when applying DG guidance law are always better (smaller) than those in case of applying the PN guidance law in the investigating angle range from 40o to 97o (in case of chasing - target flying out).

Figure 3a shows the difference between the missile collision velocities when applying PN guidance law and when applying DG guidance law, this is perfectly consistent with Figure 2a. That is, the missile velocity will decrease due to the resistance and gravity when the missile performs maneuvering, so the more the missile performs maneuvering, the more the missile's collision velocity will decrease.

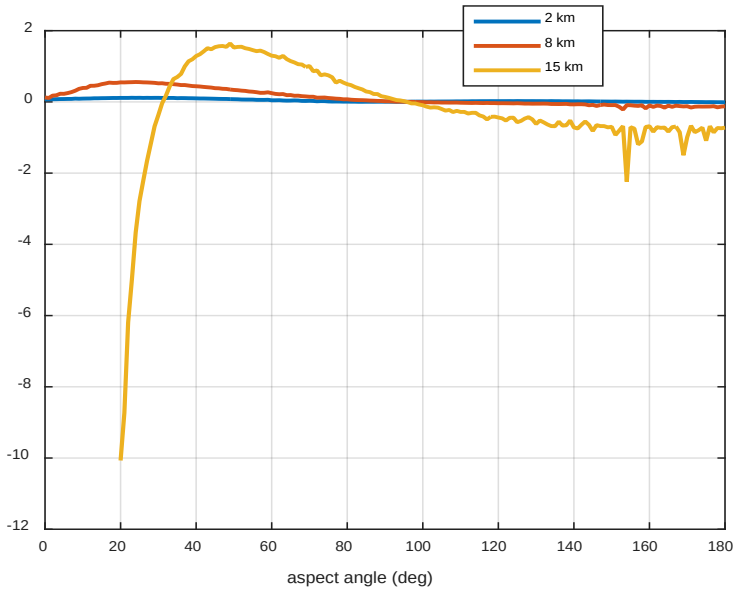

Figure 4a. The Difference Between the Collision Time When Applying PN and DG Guidance Laws at 3 Investigating Distances

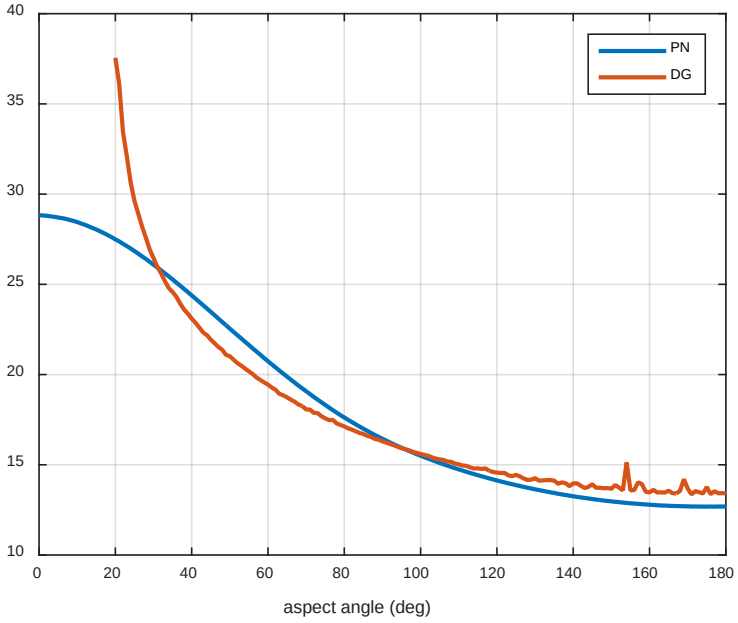

Figure 4b. The Collision Time When Applying PN and DG Guidance Laws at a Distance of 15 km

Figure 4a compares the missile collision time when applying the two guidance laws. Similar to the previous two parameters, the DG guidance law appears to be dominant in the case of chasing the target on the investigating angle range from 31° to 97°.

6 Scientific and Practical Significance

The paper used the three-degree-of-freedom model to simulate the situation of intercepting the cruise target (modeling according to the parameters of the Tomahawk missile) of surface-to-air missiles (modeling according to the parameters of the PAC-3 missile). From the obtained parameters of quality evaluation of the guidance laws from the simulation, we can see that when shooting the flight target at small distance with a constant velocity, both PN and DG guidance laws have its own limitations. The obtained investigating results have a practical significance in the process of improving the effectiveness of intercepting the cruise target of air defense missile system. The ability to destroy the target is improved while the time required to destroy the target is shortened when building a guidance system that allows to choose between PN and DG guidance laws based on the angle position of the target.

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Primary Paper Section: K

Secondary Paper Section: JT, JW, JY