

L. Naviy, N.N. Nurmukhanbetova  
Sh.N. Durmekbayeva,  
I.B. Fakhrudinova, S.K. Damekova

Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan  
(E-mail: liza281073@mail.ru, nn\_nurgul@mail.ru,  
durmekbaeva@mail.ru, agrokgu@mail.ru, damekova\_S@mail.ru)

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## Prospects of the children's university of Sh. Ualikhanov Kokshetau University

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**Abstract.** *The article deals with the actual problems of contradictions in the professional orientation of schoolchildren associated with changes in higher education and changes in the labor market. Both schools and higher education institutions interested in mobilizing a contingent of applicants take an active part in the professional orientation of schoolchildren. At the same time, professional orientation should be understood from the point of view of socialization of the individual and only then from the point of view of ensuring the admission of applicants.*

*Early education at a Children's University has a great responsibility for the development of children. The introduction of children to reading and writing culture is a necessary condition for the formation of a new generation of citizens who have to meet the challenges of modernity at a high intellectual level, to ensure the sustainable development of the country in the conditions of increasing global competition in the economy, politics, education, science, art, and other spheres. In Kazakhstan, Children's universities are organized and implemented at Taraz University, Sh. Ualikhanov Kokshetau University, Caspian University. Each of the Children's Universities discussed above works alone with a strong regional orientation and is unique in its local context.*

*Together with partner enterprises, the topics of the educational program modules of the children's university, including project cases, have been developed. A project of a digital platform for networking in the KAZCUNET (IRN AR09258554) ecosystem has been created.*

*The KAZCUNET (IRN AR09258554) digital platform will allow the implementation of innovative mechanisms of network interaction of ecosystem participants in the implementation of educational programs, projects, and scientific events in order to form the scientific capital of children.*

**Keywords:** *university, Children's University, career guidance, KAZCUNET digital platform.*

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### Introduction

At the Children's University, schoolchildren broaden their horizons, look at the world differently and open opportunities for themselves. As a result of training, the student becomes independent, and literacy develops. Communication and group work skills are being

formed. The applied approaches to learning make it possible to make child-parent relationships more trusting, and responsibility for decisions is developing.

In learning, much attention is paid to the interaction of parents and students, because without the support of parents and their participation, it is often difficult for a child.

Completing homework directly depends on the willingness of parents to support this initiative of the child, become his partner, and make your child feel the importance of the decisions made.

Recently, career guidance work with schoolchildren and schools has been changed. If for many years the professional orientation of students on the part of universities was limited to holding Open Days and informing about the areas of training of specialties and brochures, now universities offer a whole range of activities that contribute to the professional self-determination of students [1]. Schools and colleges themselves are actively involved in career guidance work, including in cooperation with universities. These changes are due to several factors of various levels and nature changes in the structure of training specialists, the emergence of new professional industries, the dynamic nature of the labor market, a significant expansion of specialties and training areas offered by universities, the consolidation of interuniversity competition for applicants. The influence of these factors gradually changes the concept and content of career guidance work, in some aspects bringing it closer to the field of marketing promotion of educational services [2].

**Purpose of the research:** the creation of a Children's University in Sh. Ualikhanov Kokshetau University aims to identify and study the indicators of extracurricular activities in STEM education, the creation of a Children's University at the Kokshetau University named after Sh. Ualikhanov is aimed at the prospects of early career guidance at a children's university, to introduce a child to science from an early age, and to show him that it is available not only to adults but, on the contrary, to everyone.

**Research objectives:**

- modernization of educational programs in the direction of training «Training of teachers of natural sciences»;
- early career guidance of pupils;
- increasing the recognition of the university in Kazakhstan and the world scientific and educational space;

Thus, the relevance of the research work follows from the above, and it should also be noted that the authors of the article are developing

mechanisms for working with children based on the best international practices implemented in the mode of network interaction between the Children's University of Kokshetau University and partner enterprises, schools of the Akmola region.

**Materials and methods**

Among the various psychological phenomena that are taken as an incentive to activity (including research), much attention is paid to interest [3]. The diversity of views on interest can be noted in the works of many famous psychologists: A.N. Leontyev, S.L. Rubinshtein, L.S. Vygotsky, etc. Interest as a focus of attention, as a motive for activity, as a source of personal development, etc. It is considered the sequential realization of the stages of cognitive interest, which begins with initiation in certain situations (caused by situational interest) and ends with the formation of a well-developed individual interest [4]. In our study, the first stage, the initiation of interest, was the focus of attention. The cognitive interest that arises in the learning process activates mental activity not only at the moment but directs it to the subsequent solution of various intellectual tasks.

In this regard, when forming a cognitive interest in the system of non-formal education, it is necessary to consider the psychological factors of its formation. According to G.I. Shchukina, cognitive interest from a psychological point of view is a «natural engine of children's behavior» and is «a true expression of instinctive aspiration; an indication that the child's activity coincides with his organic needs» [5].

It is generally believed that not all academic subjects are of interest, and when the content of research affects a person's daily life, students are interested [6]. Similarly, in our study, we conducted 4 classes and then invited students to choose the topics most interesting to them. It should be noted that the popularity of chemistry, biology, and programming was observed among students.

Our research was also aimed at studying the role of the family in choosing the subject areas

of science of interest, often parents influence the future career of children because they believe that a scientific career is the best choice for their children [7].

### Results/discussion

The importance of the issue of professional orientation of students was noted at the national level. The reason for the inclusion of career guidance in the current agenda of the activities of educational organizations was the results of a study, according to which a significant part of parents of students does not consider effective career guidance in schools.

In recent years, the main tasks of professional self-determination of students are attributed to early career guidance, which provides comprehensive activities for preschool children and primary and secondary school students. For preschoolers, information about professions can be implemented in a playful way, for junior and high school students - in the form of training, Master Classes. Early career guidance was reflected in the idea of a children's University, which is carried out abroad in various forms.

Currently, children's universities and similar programs for children and youth operate in more than forty countries around the world. At least 350 institutions and 14,000 scientists are involved in this activity, covering more than half a million children annually.

In 2008, the European Network of Children's Universities (European Children's Universities Network – EUCUNET) was established, coordinating the activities of children's universities. The research experts of the European Network of Children's Universities recommended conducting children's university programs adhering to the following methodology: the choice of subjects that can arouse curiosity and (or) will be useful in life; the involvement of scientists who can transmit accessible scientific information to children; adaptation of programs for children's age groups with the support of methodologists from the departments of curriculum development, pedagogical faculties; conduct classes with children with the support

of art, sports and (or) other related faculties of universities (The EUCU.NETWhitebook, 2010) [8].

In the practice of implementing the idea of a children's university abroad, the first children's universities in Europe began to operate in Germany. In 2002, Eberhard Karl's University of Tübingen became the first higher education institution to conduct a free lecture cycle. Leading German professors answered the children's questions. This experience was highly appreciated by parents, as after classes at the children's University, Children's interest in regular school classes increased. Since 2002, on the basis of 70 German universities and universities of Applied Sciences, have begun to offer classes in order to introduce children to various branches of Science in a simple and understandable way. In Germany, classes in children's universities often take place during the semester holidays - in autumn and early spring. Children's universities were called upon to solve three main problems. On the one hand, it was necessary to introduce children to science. On the other hand, it is an incentive to understand the importance of the educational process in universities. At the same time, the children's university model contributes to the promotion of educational institutions among future applicants.

The model of a children's University in Germany has developed: the Goethe Institute has presented a new educational project-a German children's online university. The online format of the children's University helps students master modern technologies and teach media literacy, which is undoubtedly important in the XXI century. The children's university program is successfully implemented in Austria: classes are held in Vienna, Steyr, Graz, Salzburg, Feldkirch, and Krems an der Donau.

The experience of Germany and Austria was used in 40 countries around the world.

The children's university, based at the Children's University of Manchester, is aimed at students aged 7-11 years. The main tasks are to familiarize students with student life, teaching staff, and advanced scientific developments of University scientists. Training is conducted on a

paid basis. The children's university model has become widespread in the United States, but it is implemented in different ways at different universities.

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Children's University in the structure of August University (USA) offers programs for children from kindergarten and up to the 8th grade. Among the proposed areas: are robotics, electronics, medicine, architecture, design, etc.

Delaware Valley University Children's University offers a program in the format of a summer camp for children. It is divided into 4 groups: children aged 5-6 years, 7-9 years, 10-13 years, and older than 14 years. The duration of the shift in the camp is one week, for which children, under the guidance of experienced teachers and scientists, face problems in the fields of entrepreneurship and Innovation, Science and technology, digital media, art, and many others.

The first children's University in Kazakhstan appeared based on Caspian University in 2017 [9]. The project is aimed at demonstrating the accessibility of higher education for representatives of all strata of society, developing children's desire for education. Caspian University offers a unique methodology based on visibility, interactivity, and a large number of participants. The program provides lectures, workshops, general development classes, excursions, and art sessions on weekends and during the holidays. Lectures for children from 11 to 16 years are conducted by teachers and scientists of the University. Among the main courses: «Robotics», «Eco-laboratory», «programming for fun», «I want to become a

lawyer», «craft studio», «I am a future artist», «art therapy», «vocals», «choreography», «Sport Games», «team-building».

In Kazakhstan, Children's universities are organized and implemented at Taraz University, Sh. Ualikhanov Kokshetau University, Caspian University. Each of the Children's Universities discussed above works alone with a strong regional orientation and is unique in its local context. There are no reviews of the effectiveness of children's universities in Kazakhstan and there are no research results, Kazakh Children's universities are not members of the European network.

The format of a Children's university in the pedagogical environment is not new, thus in Europe, this format of work with children positions the social integration of higher education through regular exchange and attracting «newcomers» to the activities of Children's universities[10]. The activities of teachers and students involved in the Children's University of Sh. Ualikhanov Kokshetau University is focused on creating new learning platforms, expanding the educational space, and implementing joint pedagogical and didactic research. The format of the Children's University captures not only the creativity of using teaching approaches, but also the active involvement of students in the education of students, when the boundaries of communication are erased and there is interest in serious academic subjects, both from students and from students. Such meetings became possible thanks to the Children's University, which became the main one in the strategy of cooperation of teachers, parents, students, and teachers of the Akmola region.

According to professional orientation, it is customary to understand the «professional self-determination of young people, the process of choosing the optimal type of employment, taking into account their own needs and capabilities». I. A. Firsova understands career guidance as «a complex process aimed at developing students' competencies in choosing a career, in particular, the ability to analyze information about choosing a career, the ability to acquire theoretical and



practical knowledge and skills, as a result of which the ability to correctly determine the path of work» [11]. At the same time, it should be noted that Career Guidance work is carried out both by the school itself and by educational institutions that are interested in graduates of the school as applicants. Universities that compete with each other are actively working to attract a contingent of applicants.

The purpose of career guidance at school is «the gradual formation of a student's general readiness for independent and conscious career choice and planning of their professional, life and personal development, as well as readiness for timely adjustment and implementation of the established plans».

Career guidance work on the part of higher educational institutions has long been focused on the admission of applicants. There was no continuity of «school-university» in career guidance, and the main focus was on high school students. The problematic point of Career Guidance work in universities is considered to be excessive orientation to the admission of applicants, and the career guidance of students should be «a continuous social process that involves paying attention to the process of primary adaptation in the labor collective when studying at school when studying at the University». The similar nature of Career Guidance work presupposes a chain of interaction «School-University-Employer». In this chain, the main burden (financial, personnel, and organizational) should be placed on universities and large organizations that are interested not only in solving their tasks in the context of implementing the principles of social responsibility but also in solving the problems of the Region [12].

One of the main objectives of the project "Creation of a network of KAZSUNET Children's Universities" is the implementation of an effective modern model of the Children's University of Sh. Ualikhanov Kokshetau University based on the analysis of existing international studies and recommendations of EUCUNET.

The ongoing changes in education give special relevance to additional education. The article

discusses the formation and development of additional education as an independent field that provides a type of education that is focused on the free choice of various types and forms of activity by a child (teenager), the formation of his ideas about the world, the development of cognitive motivation and abilities, self-actualization of personality. Model of the Children's University of Sh. Ualikhanov Kokshetau University is an interconnected and interdependent complex that combines educational, research, methodological, and media-communication components.

The purpose of the Children's University is to involve the child in science from an early age, and also to show him that science is not only engaged in serious adults, on the contrary but is also accessible to everyone.

In connection with this goal, the following tasks were identified:

- educational: development of cognitive interest and critical thinking of children in physics, chemistry, biology, geography, going beyond the school course and modern topical issues of science using game and project methods;
- development of emotional intelligence and national identity in children;
- research: formation of research skills among elementary school students; compilation of a virtual diary of young researchers; popularization of the children's university through scientific research by scientists of the Sh. Ualikhanov Kokshetau University;
- methodical: development of methodological recommendations of the participants of the children's university (instructions, methodical instructions, handbook);

Group and individual views of interactive teaching methods are used to conduct classes at the children's university. When organizing group work, discussion methods (group discussion, brainstorming, presentation), training methods (socio-psychological, business communication training, psycho-technical games), and game methods (business game, story-role-playing game, didactic game) are used. Types of individual work are the performance of practical work and training. The participants

of the children's University are schoolchildren, university scientists, students, parents, school teachers, and university administration. All participants interact.

### Conclusion

It should be noted that schools and universities should review the content of the Career Guidance work of students. The need for participation of all

interested entities in Career Guidance work and the creation of a career guidance system «School-University-employer» is obvious. Special attention should be paid to early career guidance, which includes preschool children, and primary and secondary school students.

Together with partner companies, the theme of the modules of the children's university educational program, which includes project cases, has been developed.

### References

1. Илюхина Н. А. Профориентационная работа вузов со школьниками: новые возможности традиционных форм. // Вестник РГГУ. Серия «Философия. Социология. Искусствоведение». – 2016. – №. 4 (6). – С. 83-88.
2. Прохоров А. В., Семишова Е. П. Современные технологии продвижения образовательных услуг // Вестник Тамбовского университета. Серия: Гуманитарные науки. – 2014. – №. 10 (138). – С. 47-51.
3. Прохоров А. В. Специальное событие как инструмент продвижения образовательных услуг. // Вестник Тамбовского университета. Серия: Гуманитарные науки. – 2014. – №. 4 (132). – С. 49-53.
4. Столяренко А. М. Общая педагогика. – Юнити-Дана, 2006.
5. Щукина Г.И. Педагогические проблемы формирования познавательного интереса учащихся. – М.: Просвещение. – 2005. – 280 с.
6. Susanne Walan, Niklas Gericke (2019). Factors from informal learning contributing to the children's interest in STEM – experiences from the out-of-school activity called Children's University, Research in Science & Technological Education.
7. Susanne Walan, Niklas Gericke (2019) Factors from informal learning contributing to the children's interest in STEM – experiences from the out-of-school activity called Children's University, Research in Science & Technological Education.
8. The EUCU.NET White book (2010) - URL: <https://eucu.net/eucu-net-charter/> (Accessed: 09.08.2021).
9. Site of CU of Caspian University. - URL: <https://asu.edu.kz/ru/university/innovation/childrens-university/> (Accessed 08.10.2021).
10. Merzagora T., Jenkins T. (2013) Listening and empowering: children and science communication - Journal of Science Communication // [online] <https://scholar.google.com/scholar?um=1&ie=UTF8&lr&q=related:7Ml8ZqM1tLyGJM:scholar.google.com/> (Accessed: 12.10.2021).
11. Фирсова И. А. Профориентационная работа в системе развития образования: опыт работы финансового университета. // Управленческие науки в современном мире. – 2015. – Т. 2. – №. 1. – С. 4-7.
12. Балакина А.П. Профориентация в системе управления развитием человеческих ресурсов // Экономика и управление. - 2011. - № 12. - С. 3-6.

### References

1. Ilyukhina N. A. Proforientacionnaya rabota vuzov so shkol'nikami: novye vozmozhnosti traditsionnyh form [Vocational guidance work of universities with schoolchildren: new opportunities for traditional forms], Vestnik RGGU. Seriya «Filosofiya. Sociologiya. Iskusstvovedenie» [Bulletin of the Russian State University for the Humanities. Series "Philosophy. Sociology. Art Criticism"], 6, 83-88 (2016).

2. Prokhorov A. V., Semishova E. P. Sovremennye tekhnologii prodvizheniya obrazovatel'nykh uslug [Modern technologies for promoting educational services], Vestnik Tambovskogo universiteta. Seriya: Gumanitarnye nauki [Bulletin of the Tambov University. Series: Humanities], 10 (138), 47-51 (2014).
3. Prokhorov A.V. Special'noe sobytie kak instrument prodvizheniya obrazovatel'nykh uslug [Special event as a tool for promoting educational services], Vestnik Tambovskogo universiteta. Seriya: Gumanitarnye nauki [Bulletin of the Tambov University. Series: Humanities], 4 (132), 49-53 (2014).
4. Stolyarenko A. M. Obshchaya pedagogika [General pedagogy]. (Yuniti-Dana, 2006).
5. Shchukina G.I. Pedagogicheskie problemy formirovaniya poznavatel'nogo interesa uchashchihsya [Pedagogical problems of forming the cognitive interest of students]. (Prosveshchenie, Moscow, 2005, 280 p.).
6. Susanne Walan, Niklas Gericke Factors from informal learning contributing to the children's interest in STEM – experiences from the out-of-school activity called Children's University, Research in Science & Technological Education, 2019.
7. Susanne Walan, Niklas Gericke Factors from informal learning contributing to the children's interest in STEM – experiences from the out-of-school activity called Children's University, Research in Science & Technological Education, 2019.
8. The EUCU.NET White book. 2010. - URL:<https://eucu.net/eucu-net-charter/> (Accessed: 09.08.2021).
9. Site of CU of Caspian University URL:<https://asu.edu.kz/ru/university/innovation/childrens-university/> (Accessed: 08.10.2021).
10. Merzagora T., Jenkins T. (2013) Listening and empowering: children and science communication, Journal of Science Communication [online]. – URL: <https://scholar.google.com/scholar?um=1&ie=UTF8&lr&q=related:7Ml8ZqM1tLyGJM:scholar.google.com/> (Accessed: 12.10.2021).
11. Firsova I. A. Proforientacionnaya rabota v sisteme razvitiya obrazovaniya: opyt raboty finansovogo universiteta [Career guidance in the system of education development: the experience of the financial university], Upravlencheskie nauki v sovremennom mire [Management sciences in the modern world], 2, 4-7 (2015).
12. Balakina A.P. Proforientaciya v sisteme upravleniya razvitiem chelovecheskih resursov [Vocational guidance in the management system for the development of human resources], Ekonomika i upravlenie [Economics and Management], 12, 3-6 (2011).

**Л. Нәби, Н.Н. Нурмуханбетова, Ш.Н. Дүрмекбаева, И.Б. Фахрудинова, С.Қ. Дәмекова**

*Ш. Уәлиханов атындағы Көкшетау университеті, Көкшетау, Қазақстан*

### **Ш. Уәлиханов атындағы Көкшетау университетінің балалар университетінде ерте кәсіптік бағдар беру болашағы**

**Аңдатпа.** Мақалада жоғары білім беру жүйесіндегі өзгерістерге және еңбек нарығындағы өзгерістерге байланысты мектеп оқушыларының кәсіби бағдары арасындағы қайшылықтардың өзекті мәселелері қарастырылған. Талапкерлер контингентін жұмылдыруға мүдделі мектептер де, жоғары оқу орындары да мектеп оқушыларының кәсіби бағдарлануына белсенді қатысады. Бұл ретте кәсіби бағдарды жеке тұлғаның әлеуметтенуі тұрғысынан, содан кейін ғана талапкерлерді қабылдауды қамтамасыз ету тұрғысынан түсіну керек.

Балалар университетінде ерте білім беру балалардың дамуы үшін үлкен жауапкершілікті жүктейді. Балаларды оқу мен жазу мәдениетімен таныстыру – қазіргі заманның сын-қатерлеріне жоғары интеллектуалдық деңгейде жауап беруге, елдің тұрақты дамуын қамтамасыз ететін жаңа ұрпақты қалыптастырудың қажетті шарты. экономика, саясат, білім, ғылым, өнер және басқа салалардағы жаһандық бәсекеlestіктің күшеюі.

Қазақстанда Балалар университеттері Тараз университетінде, Ш.Уәлиханов атындағы Көкшетау университетінде, Каспий университетінде ұйымдастырылып, жүзеге асырылуда. Жоғарыда аталған балалар университеттерінің әрқайсысы аймақтық бағытта жалғыз жұмыс істейді және жергілікті контекстте бірегей болып табылады.

Серіктес кәсіпорындармен бірлесіп Балалар университеті білім беру бағдарламалары модульдерінің тақырыптары, соның ішінде жобалық кейстер әзірленді. KAZCUNET экожүйесіндегі желіге арналған цифрлық платформаның жобасы (IRN AR09258554) жасалды.

KAZCUNET (IRN AR09258554) цифрлық платформасы балалардың ғылыми капиталын қалыптастыру мақсатында білім беру бағдарламаларын, жобаларын және ғылыми іс-шараларды жүзеге асыру кезінде экожүйе қатысушыларының желілік өзара әрекеттесуінің инновациялық тетіктерін енгізуге мүмкіндік береді.

**Түйін сөздер:** университет, Балалар университеті, кәсіптік бағдар, KAZCUNET сандық платформасы.

**Л. Навий, Н.Н. Нурмуханбетова, Ш.Н. Дурмекбаева, И.Б. Фахрудинова, С.К. Дамекова**  
*Кокшетауский университет им. Ш. Уалиханова, Кокшетау, Казахстан*

### **Перспективы ранней профориентации в Детском университете Кокшетауского университета имени Ш. Уалиханова**

**Аннотация.** В статье рассматриваются актуальные проблемы противоречий профессиональной направленности школьников, связанные с изменениями в системе высшего образования и изменениями на рынке труда. И школы, и высшие учебные заведения, заинтересованные в мобилизации контингента абитуриентов, принимают активное участие в профессиональной ориентации школьников. При этом профессиональную направленность следует понимать с точки зрения социализации личности и только потом с точки зрения обеспечения приема абитуриентов.

Раннее обучение в Детском университете несет большую ответственность за развитие детей. Приобщение детей к культуре чтения и письма является необходимым условием формирования нового поколения граждан, которым предстоит на высоком интеллектуальном уровне отвечать на вызовы современности, обеспечивать устойчивое развитие страны в условиях возрастающей глобальной конкуренции в экономике, политике, образовании, науке, искусстве и других сферах.

В Казахстане Детские университеты организованы и реализуются при Таразском университете, Кокшетауском университете имени Ш.Уалиханова, Каспийском университете. Каждый из упомянутых выше Детских университетов имеет ярко выраженную региональную ориентацию и уникален в своем местном контексте.

Совместно с предприятиями-партнерами разработана тематика модулей образовательных программ Детского университета, включая проектные кейсы. Создан проект цифровой платформы для нетворкинга в экосистеме KAZCUNET (IRN AR09258554).

Цифровая платформа KAZCUNET (IRN AR09258554) позволит реализовать инновационные механизмы сетевого взаимодействия участников экосистемы при реализации образовательных программ, проектов, научных мероприятий с целью формирования научного капитала детей.

**Ключевые слова:** университет, Детский университет, профориентация, цифровая платформа KAZCUNET.

#### **Information about authors:**

**Наби Л.** – **корреспонденция үшін автор**, педагогика ғылымдарының кандидаты, Ш. Уәлиханов атындағы Көкшетау университетінің педагогика және психология кафедрасының профессоры, Көкшетау, Қазақстан.

**Нұрмуханбетова Н.Н.** – химия ғылымдарының кандидаты, Ш. Уәлиханов атындағы Көкшетау университетінің химия және биотехнология кафедрасының меңгерушісі, Көкшетау, Қазақстан.

**Дурмекбаева Ш.Н.** – биология ғылымдарының кандидаты, Ш. Уәлиханов атындағы Көкшетау университетінің биология және оқыту әдістемесі кафедрасының меңгерушісі, Көкшетау, Қазақстан.

**Фахрудинова И.Б.** – биология ғылымдарының кандидаты, Ш. Уәлиханов атындағы Көкшетау университетінің химия және биотехнология кафедрасының асс. профессоры, Көкшетау, Қазақстан.

**Дамекова С.К.** – педагогика ғылымдарының кандидаты, Ш.Уәлиханов атындағы Көкшетау университетінің физика және математика кафедрасының меңгерушісі, Көкшетау, Қазақстан.

**Naviy L.** – **Corresponding author**, Candidate of Pedagogical Sciences, Professor of the Department of Pedagogy and Psychology Sh.Ualikhanov Kokshetau University, Kokshetau, Kazakhstan.



***Nurmuhanbetova N.N.*** – Candidate of Chemical sciences, Head of the Department of chemistry and biotechnology, Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan.

***Durmekbayeva Sh.N.*** – Candidate of Biology Sciences, Head of the Department of biology and biotechnology, Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan.

***Fakhrudinova I.B.*** – Candidate of Biological Sciences, ass.professor of the Department of chemistry and biotechnology, Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan.

***Damekova S.K.*** – Candidate of Pedagogical Sciences, Head of the Department physics and mathematics, Sh. Ualikhanov Kokshetau University, Kokshetau, Kazakhstan.