



ҒЫЛЫМИ ЖУРНАЛ | SCIENTIFIC JOURNAL

С. ДЕМИРЕЛ АТЫНДАҒЫ УНИВЕРСИТЕТТІҢ ХАБАРШЫСЫ

SULEYMAN DEMIREL UNIVERSITY BULLETIN

ISSN: 2415-8130

ИНДЕКС 7430

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ
СУЛЕЙМАН ДЕМИРЕЛ АТЫНДАҒЫ УНИВЕРСИТЕТІ

MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
SULEYMAN DEMIREL UNIVERSITY

**С. ДЕМИРЕЛ АТЫНДАҒЫ
УНИВЕРСИТЕТТІҢ
ХАБАРШЫСЫ**

**SULEYMAN DEMIREL
UNIVERSITY BULLETIN**

СӨУІР-МАУСЫМ
APRIL-JUNE

ҒЫЛЫМИ ЖУРНАЛ

С. Демирел атындағы университеттің хабаршысы филология ғылымдары, әлеуметтік ғылымдар, жаратылыстану және техникалық ғылымдар, педагогика және пәндерді оқыту әдістемесі бағытында жүргізілген ғылыми зерттеулер қорытындыларын қазақ, орыс, ағылшын, түрік тілдерінде жариялайды.

Ғылыми журнал Қазақстан Республикасы Мәдениет және ақпарат министрлігі тарапынан берілген №7714-Ж куәлігі негізінде 2007 жылдан бастап тоқсан сайын, жылына 4 рет шығады.

SCIENTIFIC JOURNAL

Suleyman Demirel University bulletin publishes scientific research work results on various branches not only papers of scholars from Kazakhstan, also other countries as well, in the following areas: philology, social sciences, natural and technical sciences, pedagogy and teaching methods.

The journal is registered by the Ministry of Culture and Information of the Republic of Kazakhstan, certificate issued by №7714- Ж., publishes materials in Kazakh, Russian, English and Turkish languages since 2007, publication frequency is once every quarter.

РЕДАКЦИЯ АЛҚАСЫ

Д. Ысқақұлы, ф.ғ.д., профессор
(бас редактор)
С.Н. Әмірғалиев, тех. ғ. д., профессор
З.Қ. Ахметжанова, ф.ғ.д., профессор
Б.Л. Тәтібеков, э.ғ.д., профессор
В.В. Вербовский, физ.-мат ғ.д.,
профессор
И.А. Малахова, п.ғ.д., доцент
Т.А. Ағдарбеков, з.ғ.д., профессор
Қ.Т. Қожахмет, PhD
С. В. Егоров, PhD
О.А. Баймуратов, PhD
Ш.М. Қадыров, PhD
(жауапты редактор)
Д.А. Хашимова, МА (техникалық
хатшы)

АҚЫЛДАСТАР АЛҚАСЫ

Ә.А. Ақматалиев, ф.ғ.д., профессор
(Қырғызстан)
Хуан Жуанчиан, филос.ғ.д., профессор
(Қытай)
К.Р. Айде-Заде, физ.-мат. ғ.д., профессор
(Әзербайжан)
Ары Ниязи, физ.-мат. ғ.д., профессор
(Швейцария)
Е.Н. Әмірғалиев, тех.ғ.д., профессор
(Қазақстан)
Л.Ю. Мирзоева, ф.ғ.д., доцент
(Қазақстан)
М.С. Жолшаева, ф.ғ.д., доцент
(Қазақстан)

EDITORIAL BOARD

D. Iskakuly, Doctor of Philological Sciences,
professor (chief editor)
S.N. Amirgaliyeva, Doctor of Phys. and Math.
Sciences, professor
Z.K. Akhmetzhanova, Doctor of Philological
Sciences, professor
B.L. Tatibekov, Doctor of Economic Sciences,
associate professor
V.V. Berbovsky, Doctor of Phys. and Math.
Sciences, professor
I.A. Malakhova, Doctor of Pedagogical Sciences,
associate professor
T.A. Agdarbekov, Doctor of Law, professor
K.T. Kozhakhmet, PhD
S.V. Egorov, PhD
O. A. Baymuratov, PhD
Sh.M. Kadyrov, PhD (responsible editor)
D.A. Khashimova, MA (technical secretary)

ADVISORY BOARD

A.A. Akmatalliev, Doctor of Philological Sciences,
professor (Kyrgyzstan)
Juan Juanchian, Doctor of Philosophical Science,
professor (China)
K.R. Ayde-Zade, Doctor of Phys. and Math.
Sciences,
professor (Azerbaijan)
Ary Niyazi, Doctor of Phys. and Math. Sciences,
professor (Switzerland)
E.N. Amirgaliev, Doctor of Technical Sciences,
professor (Kazakhstan)
L.Yu. Mirzoyeva, Doctor of Philological Sciences,
associate professor (Kazakhstan)
M.S. Zholshaeva, Doctor of Philological Sciences,
associate professor (Kazakhstan)

©СДУ, 2019

МАЗМҰНЫ

ӘЛЕУМЕТТІК ҒЫЛЫМДАР

<i>Б. Берліқожа</i>	
Студенттің әлеуметтік жағдайын және оның оқу үлгеріміне әсерін талдау.....	6
<i>Б.Е. Мырзабайқызы</i>	
Еңбек қатынастарын конституциялық-құқықтық реттеу.....	14
<i>К.С. Нурбекова</i>	
Электрондық үкімет: мәселеге кіріспе	22

ЖАРАТЫЛЫСТАНУ ЖӘНЕ ТЕХНИКАЛЫҚ ҒЫЛЫМДАР

<i>Д. Жумабек, А. Жайлаубек, А. Темиралы, Ж. Раев</i>	
Алматы қаласының тұрғын үй бағасының машиналық оқытуға негізделген классификациялық алгоритмін қолдану.....	28
<i>Ж. Раев, А. Айпенова, Т. Сулейжан, Д. Жумабек, А. Думан</i>	
Автокөліктердің мәліметтерінің базасы бойынша көп өлшемді регрессиялық талдау және модельдеу.....	36
<i>Г. Ермагамбет</i>	
Робототехника жүйесіндегі машиналық көру.....	44
<i>А. Ким</i>	
Ұсыным жүйесін дамыту.....	51
<i>Д. Turanov, A. Selbayev</i>	
Өзгертілген шартты ауыстыру арқылы QKD үшін қауіп.....	61
<i>А. Айпенова, Г. Алтажанова</i>	
Қазақстанның кинотеатрларында көрсетілген фильмдерге талдау.....	71

ПЕДАГОГИКА ЖӘНЕ ПӘНДЕРДІ ОҚЫТУ ӘДІСТЕМЕСІ

<i>Г.И. Чемоданова, М.В. Федяева, Н.Г. Павловская</i>	
Жоо жағдайында білім алушылардың зерттеу құзыреттілігін қалыптастыру.....	86
<i>М. Д. Ескендір</i>	

Тарихи элементтерді пайдалана отырып математиканы оқыту.....	94
<i>A.T. Каргабаева, A.K. Ешпанова</i>	
GEOGEBRA бағдарламасын геометриялық есептерді шешуде қолдану.....	101
<i>Ш.Т. Темирбеккызы</i>	
Математиканы оқыту-тәрбиелеу үдерісінің тиімділігін арттыратын модульді технологияның негізгі элементтері....	108
<i>A. M. Шамшайева, С. Борамбайева</i>	
Жалпы білім беру мектебіне математика оқытудағы ақпараттық технологияларды пайдалану.....	117
<i>D. Сабырбаева, С. Борамбаева</i>	
Модульдік технология көмегімен 8 сыныпта квадратты теңдеулерді оқыту.....	126
<i>Е. Нұршанов</i>	
Гипноз оқытушылардың стресс басқармасы құралы.....	136
<i>P.T. Ауесхан</i>	
Мектептерде Linux-негізіндегі сабақтарды енгізу.....	142

CONTENTS

SOCIAL SCIENCES

<i>B. Berlikozha</i>	
Analysis of student's social welfare and it's impact on academic performance.....	6
<i>B.E. Myrzabaykyzy</i>	
Constitutional and legal regulation of labor relations	14
<i>K. S. Nurbekova</i>	
E-Government: An Introduction to the Problem.....	22

NATURAL AND TECHNICAL SCIENCES

<i>D. Zhumabek, A. Zhailaubek, A. Temirali, Zh. Rayev</i>	
Using machine learning classification algorithms to study house price for Almaty.....	28

<i>Zh. Rayev, A. Aipenova, T. Suleizhan, D. Zhumabek, A. Duman</i> Multivariate regression analysis and modelling on cars dataset.. <i>G. Yermagambet</i>	36
Machine vision in robotic systems..... <i>A. Kim</i>	44
Recommender system development..... <i>D. Turanov, A. Selbayev</i>	51
Threat for QKD with a transfer of a modified condition..... <i>A. Aipenova, G. Altajanova</i>	
Analysis of films shown in cinemas in Kazakhstan.....	71

PEDAGOGY AND TEACHING METHODS

<i>G.I. Chemodanova, M.V. Fedyaeva, N.G. Pavlovskaya</i> Forming of research competences student in the conditions of institution of higher learning.....	86
<i>M.D. Yeskendir</i> The use of elements of the history of mathematics in teaching... <i>A.T. Kargabaeva, A.K. Eshpanova</i>	94
Use of GEOGEBRA program for solving geometric tasks..... <i>Sh. T. Temirbekkyzy</i>	101
The main elements of modular technology increase the efficiency of the educational process in mathematics lessons..... <i>A.M. Shamshayeva, S. Borambayeva</i>	108
Using information technology at training to mathematics at comprehensive school..... <i>D. Sabyrbayeva, S. Borambayeva</i>	117
Study of square equations in the 8th grade using modular technology..... <i>Y. Nurshanov</i>	126
Hypnosis as a stress management tool for teachers..... <i>R.T. Auyeskhana</i>	136
The introduction of linux-based classes in schools.....	142

ӘЛЕУМЕТТІК ҒЫЛЫМДАР

SOCIAL SCIENCES

IRSTI 04.21.71

*B. Berlikozha*¹

¹Suleyman Demirel University, Kaskelen, Kazakhstan

ANALYSIS OF STUDENT'S SOCIAL WELFARE AND IT'S IMPACT ON ACADEMIC PERFORMANCE

Abstract. Features of the social status of students are the subjects of scientific interest of many researchers. Various aspects of student life, such as social activity, value system, social reading practices, professional choice, secondary employment and others, are the subjects of scientific interest of many researchers, but in spite of this - the social status of students is investigated to a lesser extent. Its objective indicators are known, and in a historical retrospect they, of course, have changed, but not drastically. The social status of students in the subjective dimension is a very mobile subject of study. The self-assessment of the social status of students reflects public opinion, shapes attitudes towards higher education in society. This actualizes the study of the subjective component of the social status of Kazakh students.

Keywords: High Education, social welfare, academic performance, engineering faculty, GPA, social status, IOS application, database.

Аңдатпа. Студенттердің әлеуметтік мәртебесінің ерекшеліктері көптеген зерттеушілердің ғылыми қызығушылығы болып табылады. Студенттік өмірдің әртүрлі аспектілері, мысалы, қоғамдық белсенділік, құндылықтар жүйесі, әлеуметтік оқу практикасы, кәсіби таңдау, екінші деңгейлі жұмыс және басқалары көптеген зерттеушілердің ғылыми қызығушылығына ие, бірақ соған қарамастан - студенттердің әлеуметтік мәртебесі зерттеледі аз дәрежеде. Оның объективті көрсеткіштері белгілі және тарихи ретроспективада олар, әрине, өзгерді, бірақ түбегейлі емес. Субъективті өлшемдегі студенттердің әлеуметтік мәртебесі өте ұтқыр оқу

пәні болып табылады. Студенттердің әлеуметтік мәртебесін өзін-өзі бағалау қоғамдық пікірді көрсетеді, қоғамдағы жоғары білімге қатынасты қалыптастырады. Бұл қазақстандық студенттердің әлеуметтік мәртебесінің субъективті компонентін зерттеуді өзекті етеді.

Түйін сөздер: Жоғары білім, әлеуметтік жағдай, академиялық үлгерім, инженерлік факультет, GPA, әлеуметтік мәртебе, IOS қосымшасы, мәліметтер базасы.

Аннотация. Особенности социального статуса студентов представляют научный интерес для многих исследователей. Различные аспекты студенческой жизни, такие как общественная деятельность, система ценностей, практика социального обучения, профессиональный выбор, работа второго класса и многие другие, имеют научный интерес, но все же имеют меньший социальный статус. Его объективные показатели являются определенными и исторически ретроспективными, конечно, они изменились, но не до бесконечности. Социальный статус студентов с субъективными измерениями - очень скромный предмет. Самооценка социального статуса студентов отражает общественное мнение, опирается на высшее образование в обществе. Это делает актуальным изучение субъективной составляющей социального статуса казахстанских студентов.

Ключевые слова: Высшее образование, социальные условия, академические достижения, инженерия факультет, средний балл, социальный статус, приложение IOS, база данных.

Introduction

Study in Higher Education Institutions (HEI) is getting harder every year. It is burning some problems in students' academic performance. Particularly, the new system is making confuse freshmen's mind. They at all did not know what is expecting them in their academic life in University and they did not know what factors will affect to their academic performance.

Education is no longer a one-time event, but a lifelong experience. One reason is that working time is now so long and changing rapidly that people need to continue to learn throughout their careers. Although the classical education model is not suitable for meeting these changing needs, the wider market introduces innovations that allow workers to learn in new ways [1, 2].

Expanding access to advanced professional subjects, of course, does not guarantee the success of students. In the general class, where the number of students is limited, various aspects of the interaction allow the teacher to very

effectively assess the level of involvement of an individual student, and predict the learning outcomes (for example, successful completion of the course, cancellation of the course, final assessments). A significant increase in the number of students makes it impractical even for experienced human teachers to carry out such individual assessments. In this case, an automated system can help, which accurately predicts the social status. This would be a valuable tool for making wise decisions about when to conduct educational activities during the course (and with whom) in order to increase engagement, provide motivation and enable students to achieve success [3].

Student activity records collected in different courses often have different lengths, formats, and content, so functions that are effective in one course may not be so in another. Even the carefully thought-out dimensions of the elements are usually limited. Both of these drawbacks provide input that is still too limited to take full advantage of consistent deep learning models. It is proposed to introduce a definition of social welfare, identifying problems faced by students of bachelor 1-3 courses - for predicting academic performance, as well as at the graduation course - the level of employability after graduation from the university.

In the article we will present the basic model of the questionnaire, followed by the data, as well as present the results. By questionnaire's results there will define the social life of students, what kind of habits they have and financial status of them. By spotting them I can reveal what impacts to their academic performance, looking at their current GPA.

Aim and objectives of research

The purpose of the study is to gain an in-depth understanding about students' experiences in an academic learning and identify challenges they face in this process.

- to identify factors that successfully influence on students' academic performance.
- to identify the challenges that influence on academic performance of High Education (HE) students.
- to develop IOS application, which platform contains questions about the students' life/habits.
- to help students to avoid the expecting negative affect on their academic performance.

Background of Literature Review

Addressing the problem of social adaptation of university students, as an integral part of the socialization of the individual, is quite natural, since the challenges of the modern development of society dictate the need to understand the existing practice of educational activities in higher education in terms of its

effectiveness and efficiency in the process of personal development. At present, modern society is more in need of an independent, creative, capable person, ready to be a subject of their own development, to make the right decisions and to make an independent life choice. Personality possessing such qualities as competitiveness, ability to orient in life reality with an established position and personal opinion [1]. The status of a student introduces a young person into a new system of relations, requiring systematic tension associated with self-determination, self-discipline and self-organization, which is not always the case for individuals. In this regard, the process of social adaptation is painful for the individual, being expressed in various forms of crisis, from changing a specialty, university, city to depression, apathy, etc. Accordingly, “creating conditions for successful socialization and effective self-realization of youth” is one of the goals of the state youth policy of Kazakhstan [1]. The goal involves of such tasks as ensuring an effective system of social adaptation of students, contributing to the formation of the personality of such qualities and characteristics as a subject position, social status, creative orientation and competitiveness [2, p. 2671].

1. Questionnaire and application.
2. Learning experiences of HE students.
3. Challenges of HE students
 - a. Student-professor interaction
 - b. Students performance
 - c. Social welfare.
 - d. Bad habits (smoking, bets, absences, and etc.).
4. Success factors
 - a. Mentoring students
 - b. Diversity in the delivery of courses
 - c. Creature focus groups.

The concept of social adaptation of university students, is defined by us as the active interaction of a student with the university environment and social environment, which is a necessary condition for his personal and professional development, influencing the formation of a subject position, social status “university student”. This concept explains the impact of factors of the educational environment and its subjects on the student’s personality and vice versa. The student, interacting with the university environment and social environment, adapts to the forms, methods, technologies of educational and social welfare activities, the level and quality of education. In this regard, it is quite natural to say that an active position in the process of social adaptation of a university student is characterized by a personality-professional development, when the types of activity are changed from reproductive to creative, which

contributes to the bright manifestation of the student's individuality. In this case, the change of the reproductive type of activity falls on the younger courses of study, and the creative - on the older ones. From this it follows that the social adaptation of university students is a dynamic, complex, step-by-step, multi-directional process that can affect the personality of the student, characterized by its own characteristics, specifics, steps and criteria [3]. The distinctive features of the process of social adaptation of students, we attributed their age features, features of the educational environment of the university and professional self-determination. The specificity of the process of social adaptation of university students is expressed in its many directional character, the active interaction of the student with the university environment and social environment, which is a prerequisite for the personal and professional development of the student, influencing the formation of the subject position, social status "university student". Under the subjective position of a university student, we understand the integrative characteristic of a personality, including value-semantic, motivational, activity components and significant indicators of goal-setting, identity, mobility, activity. The social status of the "university student" in our understanding is manifested in the students' compliance with the norms, traditions, requirements established by the higher educational institution and the rights and obligations fully realized. Defining the components, indicators, criteria and levels of the subjective position, the social status of the "university student", we proceed from the basic theoretical positions of the studies of B.G. Ananyev [3], V.V. Znakova [4], S.E. Kaplina [2]. From the subject position, the social status of the "university student", we identified the value-semantic, motivational and activity components, which correspond to the following indicators. So, the value-semantic component corresponds to the indicator — goal setting, motivational — identity, and activity — mobility and activity. The criteria for the formation of a subjective position, the social status of a "university student" are: presence of goals, interest, values, meaning and satisfaction in the professional direction; satisfaction with the student team, the absence of conflict situations in the social environment of the university, the nature of the relationship of students with the social environment of the university; characteristics of the organization of micro-social interaction with subjects of the educational environment, participation and involvement of students in various activities aimed at self-realization of the individual. Among the levels of formation of the subjective position, the social status of the "university student" we highlight, high, medium, low. These levels characterize the process of social adaptation of university students as "fully adapted", "partially adapted", "not adapted". The result of successful social adaptation of students is expressed in

the formation of the subject position and social status “university student”. There was conducted the pedagogical experiment on the basis of the Faculty of Economics and Management, the Educational Center “Higher School of Economics, Management and Entrepreneurship”, the Student Scientific Society “Insight” of Transbaikal State University. The study included students from 1 to 5 courses (237 respondents) of the economic direction of two profiles: “Economics” (hereinafter - EC) and “Management” (hereinafter - MN) and two specialties: “Finance and Credit” (hereinafter referred to as FC) and Crisis Management (hereinafter referred to as AU), members of the institute for the supervision of student groups, faculty members, and specialists of the Insight student society (48 people). The age of students ranged from 18 to 25 years. Among them, the first and second courses included 50 people, the third and fourth, 45 people each, the fifth 47 people. The experimental group included 120 people, and the control group - 117 people. To study the social adaptation of students of EC, MN, FC, AU in the educational practice of the Faculty of Economics and Management of ZabsU, we determined the initial level of formation of the subjective position, the social status of “university student”. The definition of levels required the use of such diagnostic procedures as questioning, observation, description, methods of comprehensive study of the individual characteristics of the individual, a survey, analysis of the results of activities. Diagnostics of the initial level of formation of the subjective position, the social status of the “university student” was carried out for each selected component (value-semantic, motivational, activity). The value-semantic component of the subject position, social status “student EC, MN, FC, AU” which is the goal setting, was determined by us according to the author’s questionnaire “Difficulties of students in the process of assimilating accepted social norms, rules, requirements, values, traditions of the university and the chosen professional directions”, and according to “Test the meaning of life orientations” D.A. Leontiev. The data obtained by the relevant methods showed that the value-semantic component of the subjective position, the social status of “student EC, MN, FC, AU” is at an average level of – 41.2% (98 people). The motivational component of the subjective position, the social status of “student EC, MN, FC, AU”, whose identity is an indicator, was checked by the author’s questionnaire “Difficulties in interacting with the social environment of the university environment”, and by the sociometrist technique for diagnosing interpersonal relations J. Moreno. We note that the motivational component of the subject position, the social status of “student EC, MN, FC, AU” is mainly defined as the average - 36.2% (86 people). The activity component of the subjective position, the social status of “student EC, MN, FC, AU”, indicators of which were activity and mobility, was studied

using the questionnaire “Difficulties of students in organizing the microsocial interaction of students with subjects of the university environment” and methods of studying the motives of educational activity in the modification of A.A. Rean, V.A. Yakunin. The results indicate that the activity component of the subjective position, the social status of “student EC, MN, FC, AU” is at the average level - 49.12% (116 people). The results of the creative task “Trajectory of Future Development” confirmed the average level of formation of the subjective position, social status. This level indicates that students of EC, MN, FC, AU in the process of social adaptation to the university environment, social environment “partially adapted” [5,6].

Discussion

Depending on the properties of a priori information, simple and complex systems can be distinguished, systems that work with homogeneous or heterogeneous information to describe the characteristics of objects. This systems also include: determining the status of a student in the Internet [5]. Such questionnaires, mainly on paper, are very popular among teachers, as they are easy to use (distributed - collected-evaluated by the manual method) [6]. The novelty of this project lies in the creating IOS application which introduce of compulsory questioning for 1-4 bachelor students. Since, the first course faces problems previously unknown to them, and solving them is a difficult task, given that studying at the university, namely, in the Faculty of Engineering is not an easy task. For example, student X, enters the 1st year at the Faculty of Engineering. But unfortunately, after a short time, it turns out that he does not have time for all subjects, and becomes the official challenger - an outsider. Later we find out that student X - by Unified National Testing (UNT) scored a very good score, that he knows several languages, but that he simply did not get enough sleep because he lives very far away. And the hostel could not afford it because of finance - it is an expensive pleasure for him. If you implement a survey for students on a mandatory basis upon admission - identify assets, problems of students, as well as social status, propose a solution, put into practice, and at the end of the school year, again take a survey to compare the result - we will have statistics on the status students, as well as a big plus for the university, as the human resource is invaluable.

Conclusion

The findings of this study show that bad habits can make affect to academic performance of the students [8]. To achieve this goal, a questionnaire is being developed for identifying student assets and identifying problems for students. Also focus group results (4 course students) show that earned GPA for 4 years, it is results of their study, problems, bad habits, frivolities, welfares, financial states and etc.

References

- 1 Wohn, D.Y., LaRose, R., Effects of loneliness and differential usage of Facebook on college adjustment of first-year students. *Computers & Education*, 76 (2014): pp. 158-167.
- 2 John, O.P.S. Handbook of Personality: Theory and Research. 1999, New York, United States of America: A Division of Guilford Publications, Inc.
- 3 Gnevasheva, V.A., Suktalieva E.V. Vysshee professional'noe obrazovanie v sisteme tsennostei sovremennoi molodezhi [Higher Professional Education in the Value System of Contemporary Youth]. *Znanie. Ponimanie. Umenie*, no. 2, (2011) pp. 126–130. (In Russ.).
- 4 Ainin, S., Naqshbandi, M.M., Moghavvemi, S., Jaafar, N.I. , Facebook usage, socialization and academic performance. *Computers & Education*, 83 (2015): p. 6473.
- 5 Karlova, E.N. Osobennosti sotsial'nogo statusa studentov voennykh tsentrov [Some Features of the Social Status of Students at Military Educational Centers]. *Sotsiologicheskie issledovaniia*, 7, (2012) pp: 135–142. (In Russ.).
- 6 Osinskii, I.I., Dobrynina, M.I. O sotsial'nom statuse intelligentsii [On the Social status of the Intelligentsia]. *Sotsiologicheskie issledovaniia*, no. 2, (2011): pp. 148–149. (In Russ.)
- 7 Paul, M.G. College Students' Texting Habit And Their Academic Performance. in *Proceedings of the Academy of Educational Leadership*. 2011.
- 8 Sabir, R.I., Ahmad, W., Noor, N. Adoption of Social Networking Sites among Pakistani University Students: A Case of Face-Book. *Journal of Asian Business Strategy*, 3(6), (2013): p. 125.

FTAXP 10.31.01

Б.Е. Мырзабайқызы¹

¹Сүлейман Демирел атындағы Университет, Қаскелең қ., Қазақстан

ЕҢБЕК ҚАТЫНАСТАРЫН КОНСТИТУЦИЯЛЫҚ- ҚҰҚЫҚТЫҚ РЕТТЕУ

Аңдатпа. Мемлекет пен қоғамның даму деңгейі көбінесе қоғамдық қатынастарды құқықтық реттеудің тиімділігімен айқындалады. Адамның неғұрлым маңызды қажеттіліктерін іске асыруға мүмкіндік беретін және мемлекеттік институттар қызметінің мәні мен мазмұнын айқындайтын негізгі құқықтар мен бостандықтарға еңбек қатынастары саласындағы адамның конституциялық құқықтары мен бостандықтары жатады. Сондықтан қолданыстағы заңнаманың жай-күйі және құқықтар мен бостандықтардың осы санатын іске асыру практикасы қоғамның даму дәрежесінің көрсеткіші ғана емес, сондай-ақ оны одан әрі жетілдірудің шарты болып табылады.

Түйін сөздер: еңбек қатынастары, конституциялық құқық, жұмыспен қамту, еңбек құқығы, шетелдік азамат.

Аннотация. Уровень развития государства и общества во многом определяется эффективностью правового регулирования общественных отношений. К основным правам и свободам, позволяющим реализовать наиболее значимые потребности человека и определяющим смысл и содержание деятельности государственных институтов, относятся конституционные права и свободы человека в сфере трудовых отношений. Поэтому состояние действующего законодательства и практика реализации данной категории прав и свобод являются не только показателем степени развития общества, но и условием его дальнейшего совершенствования.

Ключевые слова: трудовые отношения, конституционное право, занятость, трудовое право, иностранный гражданин.

Abstract. The level of development of the state and society is largely determined by the effectiveness of legal regulation of social relations. The fundamental rights and freedoms that enable the realization of the most important human needs and determine the meaning and content of the activities

of state institutions include constitutional rights and freedoms in the sphere of labour relations. Therefore, the state of the current legislation and the practice of implementing this category of rights and freedoms are not only an indicator of the degree of development of society, but also a condition for its further improvement.

Keywords: labor relations, constitutional law, employment, labor law, foreign citizen.

Kipicne

Қазақстан - республикалық басқару нысаны бар демократиялық құқықтық мемлекет. «Әлеуметтік мемлекет» ұғымы - бұл, сөзсіз, адамның лайықты өмірі мен еркін дамуын қамтамасыз ете алатын, қолайлы еңбек жағдайларын жасау, еңбек қатынастары тараптарының құқықтары мен мүдделерін қорғауды талап етеді.

Қазақстан Республикасындағы еңбек қатынастарын құқықтық реттеудің негізін конституциялық құрылыстың мынадай негіздері құрайды:

- Қазақстанның өзін демократиялық, зайырлы, құқықтық және әлеуметтік мемлекет ретіндегі мәртебесі (Қазақстан Республикасы Конституциясының 1-бабы);

- адамның өмірі, құқықтары мен бостандықтарын жоғары мемлекеттік құндылық ретінде тану (Қазақстан Республикасы Конституциясының 1-бабы);

- Қазақстан Республикасы Конституциясының және бүкіл мемлекет аумағындағы мемлекеттік заңдардың үстемдігі (Қазақстан Республикасы Конституциясының 3-бабы);

- Әркімнің еңбек ету бостандығына, қызмет пен кәсіп түрін еркін таңдауына құқығы бар. Еріксіз еңбекке соттың үкімі бойынша не төтенше жағдайда немесе соғыс жағдайында ғана жол беріледі. (Қазақстан Республикасы Конституциясының 24-бабы);

- Заң мен сот алдында жұрттың бәрі тең. Әркімнің өмір сүруге құқығы бар. Әркім өзінің жеке басының бостандығына құқығы бар. (Қазақстан Республикасы Конституциясының 14, 15, 16-баптары).

Қазақстан Конституциясының 62-бабының 7-тармағына сәйкес оның барлық басқа ережелері бірінші тараумен бірлікте әрекет ететіндіктен, тікелей еңбек қатынастарын реттейтін Қазақстан Республикасы Конституциясының нормалары (24-бап) конституциялық құрылыстың аталған негіздерін іске асыруды қамтамасыз етуге міндетті.

ҚР Конституциясында еңбек құқығының негізгі принциптері болып табылатын нормалар бар: қауіпсіздік пен тазалық талаптарына сай еңбек

ету жағдайы, қызмет пен кәсіп түрін еркін таңдауы, жұмыссыздықтан әлеуметтік қорғалуға құқығы, жеке және ұжымдық еңбек дауларын шешу құқығы, тынығу құқығы. ҚР Конституциясымен бекітілген маңызды принциптердің бірі еңбек бостандығы принципі болып табылады (24-бап).

Еңбек қатынастарының әлеуметтік аспектісіне қоғамның көзқарасының сапалық өзгеруінің тән үлгісі жұмыспен қамту проблемасын шешу болып табылады. «Жақында болған толық жұмыспен қамту біздің қоғамымызға жаппай жұмыспен қамту аз мобильді жұмыс күші айналды, ол еңбек үшін емес, жұмыс орнына төмен жалақы алуға үйренді. Жұмысшылардың едәуір бөлігі қазір де өндіріс саласында білікті емес жұмыс еңбегімен айналысады. Басқаша айтқанда, Еңбек ресурстарын пайдаланудың осы моделі қазіргі заманғы қажеттіліктер дамымаған және сапасы төмен тегін әлеуметтік қызметтердің көп саны бар арзан жұмыс күшіне бағытталған». Алайда, жұмыспен қамту проблемасының осындай шешімі әлеуметтік мемлекет қағидатының шын мәнінде іске асырылуын дәлелдейді.

Сондықтан еңбек қатынастары саласындағы құқықтық реттеудің негізгі міндеттерінің бірі бюджет шығыстарының құрылымын өзгерту, оларды әлеуметтік бағдарламаларды іске асыру саласына қайта бөлу болып табылады.

Еңбек бостандығы қамтамасыз етіледі өз қабілетіне еркін иелік ету, Қызмет түрі мен мамандығын таңдау құқығы. Аталған ережелер еңбек пен жұмыспен қамтуға қатысты кез келген кемсітушіліктерді жоюға, сондай-ақ мәжбүрлі еңбекке тыйым салуға бағытталған халықаралық-құқықтық реттеудің жалпы нормаларына негізделеді.

ҚР Конституциясының 24-бабында «Әркімнің еңбек ету бостандығына, қызмет пен кәсіп түрін еркін таңдауына құқығы бар» Қазақстан Республикасының құзыретіне жатады және мемлекеттік заңдармен реттеледі. Мемлекет өкілеттіктерінің көлемі бүкіл мемлекет ауқымында еңбек қатынастары тараптарының мүдделерін, мемлекет мүдделерін оңтайлы келісуге қол жеткізу үшін қажетті құқықтық жағдайлар жасайтын, сондай-ақ еңбек қатынастары мен еңбекті ұйымдастыру және еңбекті басқару, осы жұмыс берушіде жұмысқа орналастыру, қызметкерлерді тікелей осы жұмыс берушіде кәсіптік даярлау, қайта даярлау және біліктілігін арттыру, әлеуметтік әріптестік, Ұжымдық келіссөздер жүргізу жөніндегі қатынастарды реттейтін нормативтік құқықтық актілер қолданылуымен айқындалады, ұжымдық шарттар және келісімдер мен басқа да қатынастар еңбек қатынастарына тікелей байланысты.

Нормативтік құқықтық актілер еңбек қатынастарын реттейтін, бірыңғай жүйесін құрайтын негізінде олардың иерархиялық бағыныстылығын айқындайтын заңдық күші бар актілер. Жүйе ҚР-ның барлық аумағындағы барлық қызметкерлерге қатысты жалпы еңбек заңнамаларынан және қызметкерлер мен жұмыс берушілердің белгілі бір санатына таралатын нормалардың саралануын көрсететін арнайы нормалардан тұрады.

Айта кету керек, ҚР Еңбек кодексінде (ҚР ЕК) «еңбек заңнамасы» ұғымы жиі кездеседі және Қазақстан Республикасының Конституциясына негізделеді және осы Кодекстен, Қазақстан Республикасының заңдарынан және Қазақстан Республикасының өзге де нормативтік құқықтық актілерінен тұрады. Еңбек заңнамасы: Еңбек кодексі, басқа да мемлекеттік заңдар. Басқа нормативтік құқықтық актілерге: ҚР Президентінің жарлықтары; ҚР Үкіметінің қаулылары және атқарушы биліктің мемлекеттік органдарының нормативтік құқықтық актілері жатады; ҚР субъектілерінің атқарушы билік органдарының нормативтік құқықтық актілері, жергілікті өзін-өзі басқару органдарының нормативтік құқықтық актілері.

Осылайша, ҚР Конституциясына сәйкес еңбек заңнамасы ұғымын тек Қазақстан Республикасының және оның субъектілерінің заңнамалық актілерінің жиынтығы ретінде түсіну керек (ҚР Конституциясының 24 - бабы) және еңбек қатынастары субъектілерінің негізгі еңбек құқықтары мен міндеттерін және олармен тікелей байланысты өзге де қатынастарды жүзеге асыру құқығы нормаларымен қамтамасыз етуге арналған.

Халықаралық құқықтың жалпыға танылған қағидаттары мен нормаларын негізге ала отырып және ҚР Конституциясына сәйкес жүйелендірілген заңнамалық актіде — ҚР Еңбек кодексінде еңбек қатынастарын және олармен тікелей байланысты өзге де қатынастарды құқықтық реттеудің негізгі принциптері бекітілген: еңбек бостандығы, оның ішінде еңбек құқығы, әркім еркін таңдайтын немесе еркін келісетін; өзінің еңбек қабілеттеріне иелік ету құқығы, кәсіп пен қызмет түрін таңдау; еңбек саласында мәжбүрлі еңбек және кемсітушілікке тыйым; жұмыссыздықтан қорғау және жұмысқа орналасуға жәрдемдесу және т.б. осылайша, ҚР Еңбек кодексі, ҚР Конституциясының ережелерін егжей-тегжейлі көрсете отырып, еңбек бостандығы мен келісім-шарт еркіндігін және басқа да құқықтар мен кепілдіктерді қамтамасыз етуге бағытталған.

Мемлекетте жүргізіліп жатқан әлеуметтік-экономикалық реформалар еңбек қатынастарын реттейтін қазіргі заманғы заңнаманың даму серпініне әсер етеді. Сонымен, ҚРЕК бұрын қабылданған нормалар ҚР

Конституциясына нақтылауды талап еткенінен емес еқайшы келгеніне байланысты бірнеше рет өзгерістермен толықтырулар енгізілді. Еңбек заңнамасын дамытуда соттарда еңбек дауларын қарау тәжірибесі үлкен маңызға ие.

Еңбек қатынастарын реттеудің ұқсас тұжырымдамасы Швейцария Конфедерациясында тандалды. «Швейцария Конституциясы федералдық органдардың еңбек туралы заңдарды шығаруға қатысты құзыретін білдіреді және федералдық заңнамаға қатысы жоқ салаларда ғана заң шығаруға құқылы кантондармен шығарылатын заңдардан федералдық заңнаманың басымдығын белгілейді».

Алайда еңбек заңнамасында дамуды талап ететін проблема — жұмыспен қамту мәселесі шешілмеген. Осыған байланысты В.И. Шкатулланың «жұмыспен қамту саласындағы әлемдік жағдай күйзеліске ұшырауда. Барлық елдерде жұмыссыздық және толық емес жұмыспен қамту деңгейі өзгеріссіз жоғары. Жұмыспен қамтудың қысқаруы, азаю және өсіп келе жатқан әлеуметтік шиеленіс әсіресе Шығыс Азия дағдарысына тап болған мемлекеттерге тән, дегенмен басқа елдерде де жұмыспен қамту маңызды проблема болып қала береді. Халықаралық еңбек ұйымы өнімді және еркін сайланатын жұмыспен қамтуды қолдау ұлттық деңгейде де, жаһандық деңгейде де берік және әділ экономикалық өсуді қамтамасыз етудің ең тиімді шарасы деп санайды».

Шындығында, еңбек заңнамасының нормаларын қолдану практикасы заңнамада кейбір олқылықтардың бар екенін көрсетеді, олар мемлекеттің экономикалық және әлеуметтік саясатының бірінші кезектегі міндеті және ажырамас бөлігі болып табылатын толық, өнімді және еркін таңдап алынған жұмыспен қамтуға жәрдемдесу принципін толық көлемде іске асыруға мүмкіндік бермейді. Конституцияда бекітілген жұмыссыздықтан қорғау құқығы, барлық жалдамалы еңбек тұлғалары, сондай-ақ жалпы қоғам үшін өмірлік маңызы бар ҚР Еңбек кодексінде тиісті көрініс таппады.

Біздің ойымызша, проблеманы тиімді шешуді іздестіру, халықты жұмыспен қамту және жұмысқа орналастыру туралы заңнамаға жүйелілік беру мақсатында еңбекті қорғауды заңнамалық реттеудің қалыптасқан тәжірибесіне — Жұмыстың қауіпсіз және салауатты жағдайларын қамтамасыз ететін еңбек құқығының маңызды институттарының бірі назар аудару қажет. Еңбек кодексінің ҚР –қатынасқа түсінігі, негізгі бағыттары, мемлекеттік саясат еңбекті қорғау саласындағы және басқада мәселелер бойынша бұрын реттелген ҚР «Еңбекті қорғау туралы» 22-қаңтардың 1993 ж. ҚР –ның Заңы (ҚР Жоғарғы Кеңесінің Жаршысы, №3, 40-құжат).

Қазіргі уақытта қарым-қатынас халықты жұмыспен қамту саласындағы 2016 жылғы 6 сәуірдегі «Халықты жұмыспен қамту туралы» ҚР Заңымен реттеледі, жұмыссыздықтан қорғауға ерекше мұқтаж халықтың жекелеген топтарына қатысты жұмыспен қамту саласындағы мемлекеттік саясатты айқындайтын өзге де заңдар мен заңға тәуелді нормативтік актілер.

Жұмыспен қамту және жұмысқа орналастыру мәселелерін құқықтық регламенттеуді дамыту мақсатында ҚР Еңбек кодексінде халықты жұмыспен қамтуға мән беру орынды деп санаймыз, ол Кодекстің 16-бабында бекітілген жұмыссыздықтан қорғау және жұмысқа орналасуға жәрдемдесу қағидатының мәнін ашуға мүмкіндік береді.

Еңбек нарығының қалыптасуына байланысты ҚР-да еңбек қызметін жүзеге асыру кезінде шетелдіктердің құқықтық жағдайына ерекше назар аудару қажет. Шетелдік жұмыс күшін тарту және пайдалану еңбек заңнамасының жетілмеуі туындайтын проблемаларға байланысты.

«ҚР -дағы шетел азаматтарының құқықтық жағдайы туралы» ҚР 1995 жылғы 19 маусымдағы N2337 Заңықолданысқаенгізілуімен әлеуметтік — экономикалық қайта құрулар кезеңі басталды-мемлекет шетелдік жұмыс күшін пайдалану қағидаттарын белгілегені белгілі. Заңға тәуелді актілер оны тарту және пайдалану мәселелері кейбір дәрежеде реттелді.

Алайда, ҚР Еңбек кодексінде Г.С. Скачкова әділ атап өткендей, шетелдік қызметкерлердің еңбегін реттеу ерекшеліктеріне арналған арнайы нормалар жоқ.

Демек, рұқсат беру және (немесе) ұзарту үшін жұмыс берушілерге Қазақстан Республикасы Үкіметінің 2018 жылғы 3 сәуірдегі «Қазақстан Республикасына шетелдік жұмыс күшін тартуға рұқсатты бергені және (немесе) ұзартқаны үшін алым мөлшерлемелерін белгілеутуралы» №157 қаулысымен бекітілген Қазақстан Республикасына шетелдік жұмыс күшінтартуға рұқсат беру және (немесе) ұзарту үшін алым мөлшерлемелеріне сәйкес салықтықалымдар есептеледі.

Аталған өзгерістер Қазақстан Республикасының аумағында еңбек заңнамасымен және еңбек құқығы нормалары бар өзге де актілермен белгіленген ережелер шетел азаматтарының, азаматтығы жоқ тұлғалардың қатысуымен еңбек қатынастарына қолданылады.

Осылайша, еңбек құқықтық қатынастарын конституциялық-құқықтық реттеу одан әрі жетілдіруді талап етеді. Еңбек заңнамасын жетілдіру бойынша ұсыныстар қазақстандық еңбек заңнамасының жүйелілік деңгейін арттыруға мүмкіндік береді, бұл қайшылықтарды, қайталауларды жоюға алып келеді, еңбек құқықтық қатынастарына

қатысушылардың мүдделерін келісу және ҚР Конституциясында бекітілген құқықтар мен бостандықтарды тиімді іске асыру үшін құқықтық жағдайлар жасайды.

Адамның және азаматтың құқықтары мен бостандықтарының мемлекет мүддесінен басымдығы тұрғысынан еңбекке конституциялық құқықты жүргізілген зерттеу, осы негізде еңбек қатынастарын реттеудің конституциялық негіздерін, еңбек құқығын іске асыру қағидаттарын ашу, еңбек қатынастары саласында мемлекеттік басқару мен нормативтік-құқықтық реттеудің ерекшеліктерін бөлу, мынадай тұжырымдарға негіз болды:

Біріншіден, еңбек қатынастарын реттеудің конституциялық негіздері күрделі құрамдас санат болып табылады, ол Қазақстан Республикасы Конституциясының 1, 3, 14, 15, 16-баптарының, сондай-ақ тікелей еңбек қатынастарын регламенттейтін және конституциялық құрылыстың аталған негіздерін іске асыруды қамтамасыз ететін Қазақстан Республикасы Конституциясының 24-бабының ережелерін қамтиды.

Екіншіден, еңбек қатынастарын реттеудің негізін қалаушы конституциялық принцип еңбек бостандығы болып табылады, өйткені азаматтың еңбек (жұмыс), әкімшілік (қызмет), азаматтық (кәсіпкерлік) құқықтардың әртүрлі салаларымен регламенттелетін қатынастарға кіруі арқылы іске асырылады.

Тиісінше, еңбек-құқықтық қатынастар Конституциялық еңбек бостандығын іске асырудың барлық мүмкін болатын нұсқаларын қамтымайды.

Мемлекеттің еңбек қатынастарын реттеуге белсенді қатысу қажеттілігін ескере отырып, Конституциялық еңбек бостандығы (адамның дербес мінез-құлқының мүмкін болатын шарасы), адамның еңбекке конституциялық құқығына (мемлекет кепілдік берген мүмкіндік) негізделеді.

Пайдаланылған әдебиеттер:

1 Қазақстан Республикасының Конституциясы 1995 жылы 30 тамызда республикалық референдум.

2 Трудовой Кодекс Республики Казахстан // Казахстанская правда 22 мая, 2007 г.

3 ҚР «Еңбекті қорғау туралы» 22-қаңтардың 1993 ж. ҚР –ның Заңы (ҚР Жоғарғы Кеңесінің Жаршысы, №3, 40-құжат).

4 2016 жылғы 6 сәуірдегі «Халықты жұмыспен қамту туралы» ҚР Заңы.

5 «ҚР-дағы шетел азаматтарының құқықтық жағдайы туралы» ҚР 1995 жылғы 19 маусымдағы N2337 Заңы.

6 Александров Н.Г. Трудовое правоотношение. М.: Юридическое издательство МЮ СССР, С.190-195 3.Закон РК от 20.03.2001г., «О военной службе по контракту» // Казахстанская правда. – 26 марта 2001 г.

7 Закон РК от 7.01.2005г., «Об обороне и Вооруженных Силах Республики Казахстан»- //Казахстанская правда. – 13 января, 2005г.

8 Указ Президента РК от 25 мая 2006г. № 124 «Об утверждении Правил прохождения воинской службы в Вооруженных Силах, других войсках и воинских формированиях Республики Казахстан» / САПП РК, 2006г., № 19, ст.183.

9 Закон РК № 74 –Ш от 8.07.2005г., «О воинской обязанности и воинской службе» - //Казахстанская правда. – 21 июля 2009г., Ожегов С.И. Словарь русского языка: ок.57000 слов /Под ред. док.филол.наук, проф.Н.Ю.Шведовой- М.: Рус.яз., 1983г., ст.78-80 8.Закон РК от 24.03.1998г., «О нормативных правовых актах» // Ведомости Парламента РК, 1998г., № 2-3, ст. 25.

10 Қазақстан Республикасы Үкіметінің 2018 жылғы 3 сәуірдегі «Қазақстан Республикасына шетелдік жұмыс күшін тартуға рұқсатты бергені және (немесе) ұзартқаны үшін алым мөлшерлемелерін белгілеу туралы» №157 қаулысы.

11 Проблемы. Факты. Комментарии. – 1999. - №8. – С. 56.

МРНТИ 50.49.02

К.С. Нурбекова¹

¹Алматинский Университет, г. Алматы, Казахстан

ЭЛЕКТРОННОЕ ПРАВИТЕЛЬСТВО: ВВЕДЕНИЕ В ПРОБЛЕМУ

Аннотация. Развитие и широкое применение информационных и коммуникационных технологий является глобальной тенденцией последних десятилетий. Использование современных технологий сбора, обработки и передачи информации становится все более значимым фактором обеспечения конкурентоспособности экономики, повышения эффективности процессов управления, как в частном, так и в государственном секторах экономики. Современный подход к государственному в условиях перехода к новой экономике и развития информационного общества определяется структурой электронного правительства. Целью данной статьи является краткий обзор ряда вопросов, связанных со структурой электронного правительства.

Ключевые слова: электронное правительство, структура, развитие, экономика.

Аңдатпа. Ақпараттық және коммуникациялық технологияларды дамыту және кеңінен пайдалану соңғы онжылдықта әлемдік үрдіс болып табылады. Ақпарат жинау үшін қазіргі заманғы технологияларды қолдану, өңдеу және беру, экономиканың жеке және мемлекеттік секторлардың басқару процестерінің тиімділігін арттыру, экономиканың бәсекеге қабілеттілігін қамтамасыз ететін аса маңызды факторына айналып отыр. Жаңа экономикаға көшу және ақпараттық қоғамның дамуына мемлекеттің қазіргі заманғы көзқарас электрондық үкімет құрылымы анықталады. Осы баптың мақсаты е-үкіметтің құрылымы байланысты бірқатар мәселелерді қысқаша шолу болып табылады.

Түйін сөздер: электрондық үкімет, құрылымы, даму, экономика.

Abstract. The development and widespread use of information and communication technologies is a global trend of recent decades. The use of modern technologies for collecting, processing and transmission of information is becoming an increasingly important factor in ensuring the competitiveness of the economy, enhance the effectiveness of the management processes in both

the private and public sectors of the economy. The modern approach to the state in the transition to the new economy and the development of the information society is determined by the e-government structure. The purpose of this article is a brief overview of a number of issues related to e-government structure

Keywords: E-government, structure, development, economics.

В середине 1990-х гг. Реформы государственного управления вступили в новый этап, связанный с развитием и массовым распространением информационно-коммуникационных технологий(ИКТ). Являясь самым крупным поставщиком услуг, с другой стороны, государство не могло оставаться за рамками процессов информатизации и новых стандартов взаимоотношений «потребитель-производитель». Так началось формирование концепции электронного правительства. (Рис 1) [1,2].

В развитие концепции электронного правительства значительный вклад внесли не только анализ предшествующего опыта реформирования государственного сектора и практики административных реформ, но и теория и практика управления в частном секторе.

Группы	Экономические	Социальные	Технологические
Предпосылки	-Рост спроса на услуги государственного сектора; -ограниченность финансовых и людских ресурсов, определяющая невозможность решения управленческих проблем старыми способами.	- Демографические преобразования; - недовольство граждан качеством работы государственных структур.	-быстрое развитие информационных технологии и интернета

Рис 1. Предпосылки появления электронного правительства.

На сегодняшний день термин «e-Government» является международно принятым и используется во всех странах мира, где используются электронное правительства. Ключевыми принципами, заложенными в рамках концепция электронного правительства, является:

- повышение с помощью ИКТ качества государственных услуг, ориентация услуг на потребителя;
- увеличение доступности государственной информации и услуг;
- включение общества в процессы государственного управления;

Совокупность этих направлений определяет механизмы реализации принципов электронного правительства. Ричард Хикс выделяет три основных направления развития электронного правительства: электронное администрирование, электронное взаимодействие с гражданами, а также развитие информационного общества [3].

Электронное администрирование (*e-Administration*). Переход на электронные методы управления включает:

- 1) Автоматизацию: перевод в автоматизированный режим функций, связанных со сбором, хранением, обработкой и передачей информации.
- 2) Трансформацию: создание и поддержку новых функций, реализуемых с помощью ИКТ или выполняемых человеком.
- 3) Информатизацию: информационную поддержку реализуемых функций.

Электронное взаимодействие с гражданами(*e-Citizens*), предоставление электронных услуг(*e-Services*). Ориентация органов государственного управления на максимальное удовлетворение потребностей граждан является центральным звеном в концепции электронного правительства [2-5].

Повышение с помощью ИКТ качества государственных услуг и развитие цифровой демократии играют значительную роль в трансформации внутренних и внешних взаимодействий в системе государственного управления: предоставление электронных государственных услуг предопределяет необходимость реинжиниринга процессов управления, тогда как развитие инструментов цифровой демократии создает основу для трансформации взаимоотношений между государством и обществом.

Общая архитектура и этапы развития электронного правительства

Общая архитектура электронного правительства представлена в таблице 1. Все направления внутренних и внешних взаимодействий в электронном правительстве можно разбить на пять основных типов [4,5]:

- G2G (Government to Government)- горизонтальное и вертикальное взаимодействие государственных структур;
- G2C (Government to Citizens)- взаимодействие государственных органов с гражданами;
- G2B (Government to Business) - взаимодействие государственных органов с бизнес структурами;
- G2N (Government to Nonprofit) - взаимодействие государственных органов с некоммерческими организациями.

Архитектура электронного правительства: организация внутренних и внешних взаимодействий

Взаимодействия	Информационно-коммуникационная инфраструктура, обеспечивающая взаимодействие	Направление и цели взаимодействия	
		Government to Government (G2G)	Government to Employees (G2E)
Внутреннее (внутри и межведомственное взаимодействие)	Внутренняя (внутренняя правительственная сеть)	Обеспечение эффективного межведомственного взаимодействия как на федеральном, так и на региональном, местном уровнях государственного управления для реализации государственных функций	Обеспечение внутренней эффективности и производительности государственных структур: снижение затрат и повышение эффективности администрирования за счет применения наилучшей практики и опыта деятельности коммерческих организаций в таких областях, как логистика, управление финансами, управление знаниями
		Government to Citizen (G2C)	Government to Business (G2B)
Внешнее (взаимодействие органов государственного управления с гражданами и организациями)	Внешняя (представительство органов государственного управления в сети Интернет)	Построение системы предоставления высококачественных услуг для граждан, легкой в поиске и использовании (принцип «единого окна»)	Снижение нагрузки на бизнес за счет исключения сбора дублирующих данных и более эффективного использования информационных технологий электронного бизнеса для взаимодействия
		Government to Nonprofit (G2N)	Установление информационных и партнерских взаимодействий между правительственными структурами и некоммерческими организациями в целях развития информационного общества

Таблица 1. Архитектура электронного правительства



Рис 2. Модель развития электронного развития

Выгоды, получаемые в результате развития электронного правительства, и их распределение.

Получатели выгод	Выгоды и их распределение
Органы государственного управления	• Сокращение издержек внутреннего (межведомственного) и внешнего (с гражданами и организациями) информационного обмена • Оптимизация операционных и управленческих деловых процессов в органах государственного управления • Повышение эффективности используемых ресурсов • Интеграция правительства • Увеличение гибкости правительственных структур
Граждане	• Улучшение доступа к правительству, круглосуточная доступность информации и услуг • Повышение качества государственных услуг • Экономия временных и финансовых затрат на взаимодействии с органами государственного управления • Вовлечение граждан в процессы управления
Бизнес-структуры	• Информационная поддержка развития бизнеса • Снижение административных барьеров • Сокращение затрат на взаимодействие с органами государственного управления

В заключении хотелось бы, добавить что история развития электронного правительства насчитывает более десяти лет. Однако на сегодняшний день внедрение и развитие электронных методов взаимодействия в системе государственного управления является одним из наиболее актуальных направлений в практике административных реформ.

Электронное правительство рассматривается не только как перспективный подход к реформированию государственного управления в целях повышения его эффективности, но и как способ трансформации отношений между государством и обществом в условиях новой постиндустриальной экономики и информационного общества.

Список использованной литературы:

- 1 Мониторинг и оценка «электронных правительств», «Процесс Консалтинг», 2003 [Электронный ресурс].
- 2 Мониторинг и оценка «электронных правительств», «Процесс Консалтинг», 2003 [Электронный ресурс].
- 3 Сериков С.Н. Электронное государственное управление – состояние, перспективы, проблемы.
- 4 Совершенствование государственного управления на основе его реорганизации и информатизации. Мировой опыт / Под ред. В.И. Дрожинова. М.: Эко-Тренда, 2002.
- 5 URL: <http://cyberleninka.ru/article/n/o-primenimosti-ekspertnyh-sistem-v-uchebnom-protsesse>
- 6 URL: http://www.tadviser.ru/index.php/Статья: Экспертные_системы

ЖАРАТЫЛЫСТАНУ ЖӘНЕ ТЕХНИКАЛЫҚ ҒЫЛЫМДАР

NATURAL AND TECHNICAL SCIENCES

IRSTI 27.47.23

D. Zhumabek¹, A. Zhailaubek², A. Temirali³, Zh. Rayev⁴
^{1,2,3,4}Suleyman Demirel University, Kaskelen, Kazakhstan

USING MACHINE LEARNING CLASSIFICATION ALGORITHMS TO STUDY HOUSE PRICE FOR ALMATY

Abstract. In real estate valuation and house market research, house prices and rental value are generally analyzed by decision tree regression and random forest regression model based on machine learning. Regression model examines the effect of characteristics of goods on their prices. Factors that determine the house prices in Almaty are analyzed in this paper using real dataset from legal site. The most important variables that affect house rents are type of house, type of building, number of rooms, size, and other structural characteristics such as water system, pool, natural gas. Also used jupyter notebook, numpy, pandas, matplotlib, scipy and scikit-learn.

Keywords: house price, decision tree, random forest regression model, Almaty.

Аннотация. В оценке недвижимости и исследовании рынка жилья цены на жилье и стоимость аренды обычно анализируются с помощью регрессии дерева решений и модели случайной регрессии леса, основанной на машинном обучении. Модель регрессии исследует влияние характеристик товаров на их цены. Факторы, которые определяют цены на жилье в Алматы, анализируются в настоящем документе с использованием реального набора данных с юридического сайта. Наиболее важными переменными, которые влияют на арендную плату дома, являются тип дома, тип здания, количество комнат, размер и другие структурные характеристики, такие как система водоснабжения,

бассейн, природный газ. Также используется блокнот jupyter, numpy, pandas, matplotlib, scipy и scikit-learn.

Ключевые слова: цена дома, дерево решений, модель случайной лесной регрессии, Алматы.

Аңдатпа. Жылжымайтын мүлікті бағалауда және тұрғын үй нарығын зерттеуде тұрғын үй бағасы мен жалдау құны әдетте регрессия ағашы және машиналық оқытуға негізделген кездейсоқ регрессиясы орман моделі арқылы талданады. Регрессия моделі тауарлар сипаттамаларының олардың бағасына әсерін зерттейді. Алматыдағы тұрғын үй бағасын анықтайтын факторлар осы мақалаға заңды сайттан нақты деректер жинағын пайдалану арқылы талданады. Үйдің жалға алу ақысына әсер ететін ең маңызды айнымалы болып табылады: үй түрі, ғимарат түрі, бөлме саны, мөлшері және басқа да құрылымдық сипаттамалары сияқты су мен жабдықтау жүйесі, бассейн, табиғи газ. Сондай-ақ, jupyter, numpy, pandas, matplotlib, scipy және scikit-learn блокноты пайдаланылады.

Түйін сөздер: үй бағасы, регрессия ағашы, кездейсоқ регрессиясы орман моделі, Алматы.

1. Introduction

Facing the upcoming era of big data, more and more people begin to engage in data analysis and mining. Machine learning [1], as a common means of data analysis, has gotten more and more attention. People of different industries are using machine learning algorithms to solve the problems based on their own industry data [2, 3]. Experts in the field of industry used machine learning in pattern recognition [4] and fault diagnosis [5, 6]. People in the field of economy began to use machine learning algorithms in economic modeling [7, 8]. The advantages of these algorithms were taken by the specialist in the field of aerospace in the aspect of classification and prediction [9]. Researchers in the field of construction combined machine learning methods with the professional domain knowledge of construction industry. Many intelligent systems are used in the construction industry, and lots of them have achieved good economic and social benefits. In general, the budget of construction project and benefit analysis of construction are usually gotten by the experience of the professionals and the construction of traditional models. If the housing values can be accurately predicted, the government can make a reasonable urban planning [10].

In this paper, the background and current situation of the application of machine learning methods are firstly introduced. The development of its application in construction and real estate value is also expounded. Then, several machine learning algorithms which are involved in this paper are introduced. The mathematics process of them is described in detail. In this study, we apply the classification algorithms of machine learning known to us as Linear Regression. Also used dataset taken from legal site of Almaty, namely krisha.kz. According to the prediction results of these several methods, a discussion is made.

II. Main part

The house price estimation have a direct relationship with its quality and other sizes of estimation, for example house location, level, material play enormous role for house price. In this regard, this paper analyzes the main indicators that affect the estimation of prediction, which are the square feet, number of rooms, levels, location and house material made by.

General information about dataset. We can download all codes and dataset here:

https://github.com/ZhumabekDildar/diss/blob/master/data_scraping.ipynb

The training data has 1426 observations and 6 explanatory variables and the test file has 117 observations and 5 explanatory variables. (Table1).

Here is the data description:

- Price: the property's sale price in tenge. This is the target variable that we are trying to predict.
- Square feet: lot size of home.
- Region: 6 regions of Almaty city.
- Levels: floor of house.
- Sanuzel: bathrooms of each house.
- States: plight of home.
- Security: video surveillance or fence of house.

Out[43]:

	price	square	region	levels	san	states	secur
0	30000000	278 м²	Наурызбайский	3	3 м	черновая отделка	4 сот.
1	110000000	270 м²	Медеуский	2	2 с/у и более	евроремонт	сигнализация
2	77000000	440 (219) м², кухня — 40 м²	Алатауский	4	2 с/у и более	евроремонт	сигнализация, видеонаблюдение, видеодомофон
3	73000000	320 м²	Наурызбайский	3	3 м	2 с/у и более	евроремонт
4	195000000	100 м², кухня — 18 м²	Жетысуский	1	3 м	раздельный	хорошее
5	47000000	225 (174) м², кухня — 18 м²	Медеуский	2	2.7 м	раздельный	хорошее
6	22000000	150 м²	Ауэзовский	1	2.5 м	раздельный	хорошее
7	100000000	52 (45) м², кухня — 6 м²	Турксибский	1	совмещенный	требуется ремонт	5.28 сот.
8	269000000	470 м², кухня — 20 м²	Бостандыкский	3	3.2 м	2 с/у и более	евроремонт
9	18000000	100 (155) м², кухня — 75 м²		0	1	3 м	черновая отделка

Table1. General information about dataset

	price	square	region	levels	san	states
143	15000000	70.0	Медеуский	1	во дворе	среднее
654	21500000	78.0	Алмалинский	1	во дворе	среднее
963	8000000	90.0	0	1	во дворе	среднее
1039	15500000	202.6	Алатауский	2	во дворе	среднее
1040	30000000	200.0	Турксибский	2	во дворе	среднее

Table2. After preprocessing

```
In [88]: dset = dset.drop(columns=['region_0'], axis=1)
dset.head()
```

Out[88]:

	price	square	region_Алатауский	region_Алмалинский	region_Ауэзовский	region_Бостандыкский	region_Жетысуский	region_Медеуский	region_Турксибский
143	15000000	70.0	0	0	0	0	0	1	
654	21500000	78.0	0	1	0	0	0	0	
963	8000000	90.0	0	0	0	0	0	0	
1039	15500000	202.6	1	0	0	0	0	0	
1040	30000000	200.0	0	0	0	0	0	0	

5 rows × 10 columns

Table3. This table show us information about dates choose one explanatory variable

```
In [92]: from sklearn.tree import DecisionTreeRegressor
        from sklearn.model_selection import GridSearchCV
        from sklearn.model_selection import train_test_split
        from sklearn.metrics import mean_absolute_error, mean_squared_error
        from sklearn.ensemble import RandomForestRegressor
```

```
In [101]: acc_list_abs = []
        acc_list_sq = []

        counter = 1

        for i in range(3,11):
            tree_ = DecisionTreeRegressor()
            grid_tree = GridSearchCV(tree_, param_grid=params, cv=i, n_jobs=-1)
            grid_tree.fit(X_train, y_train)
            acc_list_abs.append(mean_absolute_error(y_test,grid_tree.best_estimator_.predict(X_test)))
            acc_list_sq.append(mean_squared_error(y_test,grid_tree.best_estimator_.predict(X_test)))
            print(counter)
            counter+=1
```

1
2
3
4
5
6
7
8

```
In [102]: import matplotlib.pyplot as plt
%matplotlib inline
```

```
In [107]: plt.plot(range(3,11), acc_list_abs, color='r')
#plt.plot(range(3,11), acc_list_sq, color='b')
plt.xlabel("Cross-val score")
plt.ylabel("Errors")
```

```
Out[107]: Text(0, 0.5, 'Errors')
```

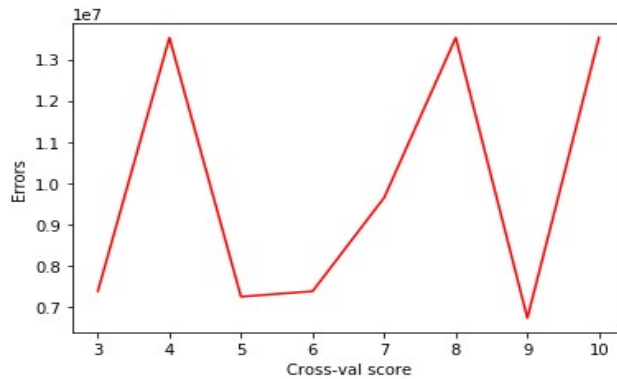


Table4. Error of Decision tree

```
In [110]: acc_list_abs = []
acc_list_sq = []

counter = 1

for i in range(3,11):
    rand_ = RandomForestRegressor()
    grid_rand = GridSearchCV(rand_, param_grid=params, cv=i, n_jobs=-1)
    grid_rand.fit(X_train, y_train)
    acc_list_abs.append(mean_absolute_error(y_test,grid_rand.best_estimator_.predict(X_test)))
    #acc_list_sq.append(mean_squared_error(y_test,grid_tree.best_estimator_.predict(X_test)))
    print(counter)
    counter+=1
```

```
In [111]: plt.plot(range(3,11), acc_list_abs, color='r')
          #plt.plot(range(3,11), acc_list_sq, color='b')
          plt.xlabel("Cross-val score")
          plt.ylabel("Errors")
```

Out[111]: Text(0, 0.5, 'Errors')

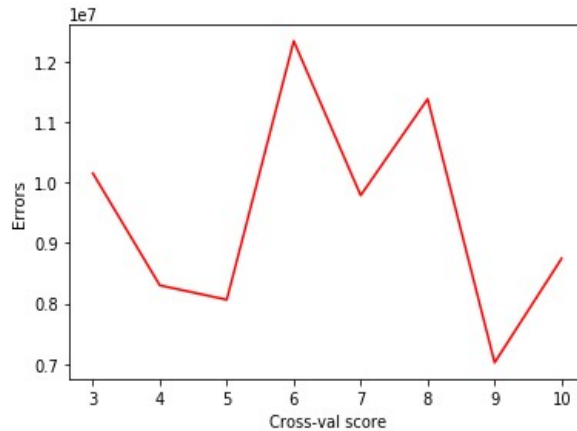


Table5. Error of Regression fores

III. Conclusion

In this paper, linear regression algorithm is used in the field of construction to predict the housing value. According to multiple characteristics, the housing value of Almaty suburb is forecasted. The models of several machine learning methods should be constructed and analyzed at first and then combined with the corresponding characteristics of testing data to predict the housing value. The prediction results of various machine learning approaches are not the same. Aiming at the regression decision tree and regression forest has better prediction effect, learning ability, and generalization ability. Table 4 and table 5 shows that when we divide the cross value score into 9 parts it gives us lowest error figure which is equal to 0.7.

References

- 1 Bishop, C. *Pattern Recognition and Machine Learning*. Springer, 2006.
- 2 Yin, S., Wang, G., Karimi, H. Data-driven design of robust fault detection system for wind turbines. *Mechatronics*, 24 (4), (2014): pp. 298–306.
- 3 Yin, S., Yang, X., Karimi, H.R. Data-driven adaptive observer for fault diagnosis. *Mathematical Problems in Engineering*, (2012): P. 21.
- 4 Bhagat, P. *Pattern Recognition in Industry*, Elsevier, 2005.

- 5 Widodo, A., Yang, B. Support vector machine in machine condition monitoring and fault diagnosis. *Mechanical Systems and Signal Processing*, 21 (6), (2007): pp. 2560–2574.
- 6 Yin, S., Li, X., Gao, H., Kaynak, O. Data-based techniques focused on modern industry: an overview. *IEEE Transactions on Industrial Electronics*, (2014): pp. 1-17.
- 7 Huang, C.L., Chen, M.C., Wang, C.J. Credit scoring with a data mining approach based on support vector machines. *Expert Systems with Applications*, 33 (4), (2007): pp. 847–856.
- 8 Ding, S., Yin, S., Peng, K., Hao, H., Shen, B. A novel scheme for key performance indicator prediction and diagnosis with application to an industrial hot strip mill. *IEEE Transaction on Industrial Informatics*, 9 (4), (2013): pp. 2239–2247.
- 9 Staszewski, W. J., Mahzan, S., Traynor, R. Health monitoring of aerospace composite structures—active and passive approach. *Composites Science and Technology*, 69 (11-12), (2009): pp. 1678–1685.
- 10 Jingyi Mu, Fang Wu, Aihua Zhang. Housing Value Forecasting Based on Machine Learning Methods. *Abstract and Applied Analysis*, 4 (2014): p. 7.

IRSTI 28.17.27

Zh. Rayev¹, A. Aipenova², T. Suleizhan³, D. Zhumabek⁴, A. Duman⁵
^{1,2,3,4,5} Suleyman Demirel University, Kaskelen, Kazakhstan

MULTIVARIATE REGRESSION ANALYSIS AND MODELLING ON CARS DATASET

Abstract. The results of the work are based on the construction of a mathematical model for determining unknown parameters using multivariate regression analysis. Structured data are given for the derivation and elimination of significant factors and coefficients. Also, machine learning simple regression models are used for modelling. The results have been evaluated and shown for comparative purposes.

Keywords: multivariate regression analysis, modelling, machine learning.

Аннотация. Результаты работы основаны на построении математической модели для определения неизвестных параметров с использованием многомерного регрессионного анализа. Структурированные данные приведены для вывода и исключения значимых факторов и коэффициентов. Также для моделирования используются простые регрессионные модели машинного обучения. Результаты были оценены и показаны для сравнительных целей.

Ключевые слова: многомерный регрессионный анализ, моделирование, машинное обучение.

Аңдатпа. Жұмыстың нәтижелері көпөлшемді регрессиялық талдауды қолдану арқылы белгісіз параметрлерін анықтау үшін математикалық модельдің құрылысына негізделген. Құрылымдық деректер маңызды факторлармен коэффициенттерді көрсету үшін беріледі. Сондай-ақ модельдеу үшін қарапайым регрессиялық үлгілерді машиналық оқыту модельдері қолданылады. Нәтижелер салыстырмалы мақсаттар үшін бағаланып көрсетілді.

Түйін сөздер: көп өлшемді регрессиялық талдау, модельдеу, машиналық оқыту.

Introduction

The considered structural data are taken from Kazakhstani sources and not all parameters have been fully described. During analysis process [3], implicit data were identified and replaced with average values.

	names	year	volume	fuel_type	transmission	body	drive	mileage	wheel	color	city	customs clearance	price
0	Toyota Camry	2018	2.5	бензин	автомат	седан	передний привод	1.0	слева	серебристый металлик	Алматы	Да	13800000
1	Mercedes-Benz G 63 AMG	2014	5.5	бензин	автомат	внедорожник	NaN	10300.0	слева	черный	Алматы	Да	68000000
2	Toyota Corolla	2013	1.6	бензин	автомат	седан	передний привод	39258.0	слева	серый металлик	Алматы	Да	5499999
3	Mercedes-Benz E 220	1993	2.2	газ-бензин	автомат	седан	задний привод	NaN	слева	серый металлик	Шымкент	Да	1850000
4	Mitsubishi Outlander	2013	2.4	бензин	автомат	кроссовер	полный привод	60000.0	слева	серый	Актобе	Да	6100000

Table 1.1

The first five rows of dataframe has been shown in Table 1.1.

```

RangeIndex: 4997 entries, 0 to 4996
Data columns (total 13 columns):
names          4997 non-null object
year           4997 non-null int64
volume         4995 non-null float64
fuel_type      4995 non-null object
transmission   4997 non-null object
body           4997 non-null object
drive          4405 non-null object
mileage        3276 non-null float64
wheel          4952 non-null object
color          4596 non-null object
city           4997 non-null object
customs clearance 4997 non-null object
price          4997 non-null int64
dtypes: float64(2), int64(2), object(9)

```

Table 1.2

General information about dataframe content (Table 1.2) is quite clear and enough to model and analyze.

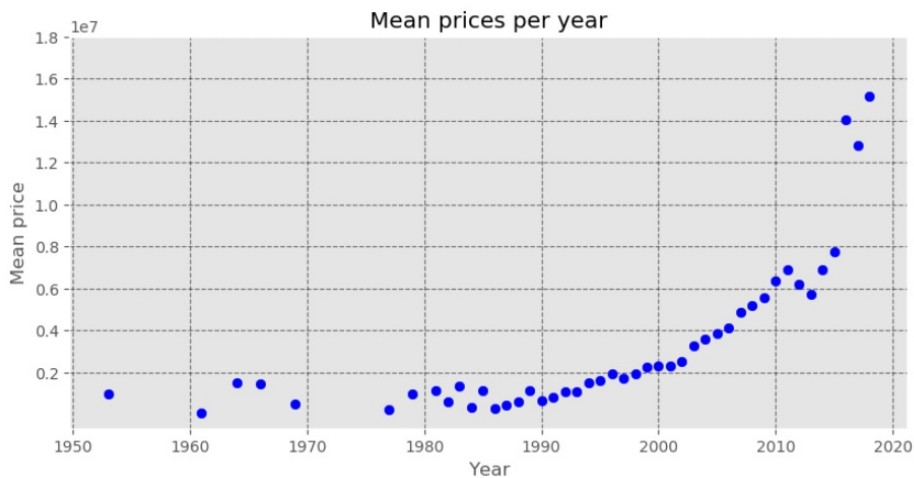


Table 1.3

Mean prices of cars after 2016 has been looked overwhelming (Table 1.3), but it has been up to individual production models of cars as ‘Rolls Royce’ or so on. Those data has not been counted as outliers.

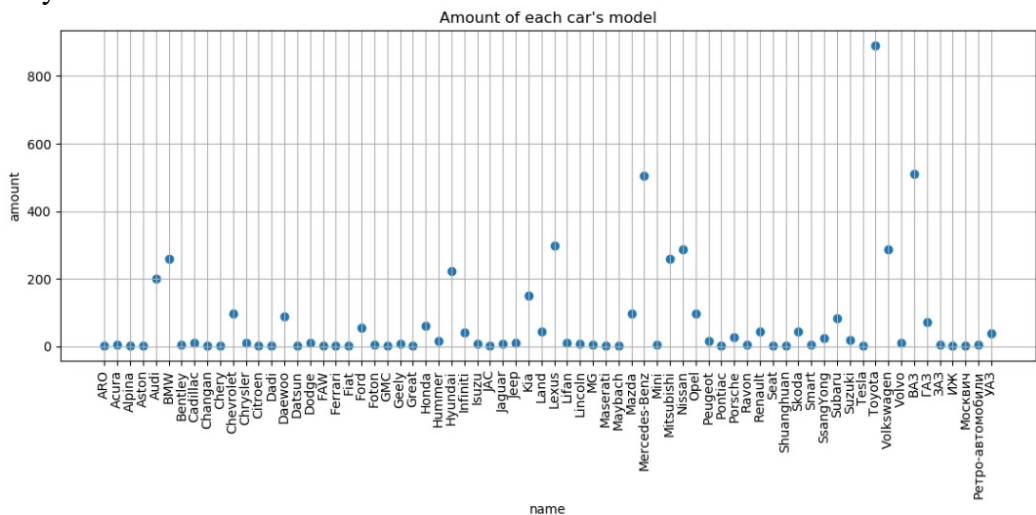


Table 1.4

The minimum point of amount was 1 and it has been grown in certain models of cars which are popular and high sold in Kazakhstan (Table 1.4 and Table 1.5).

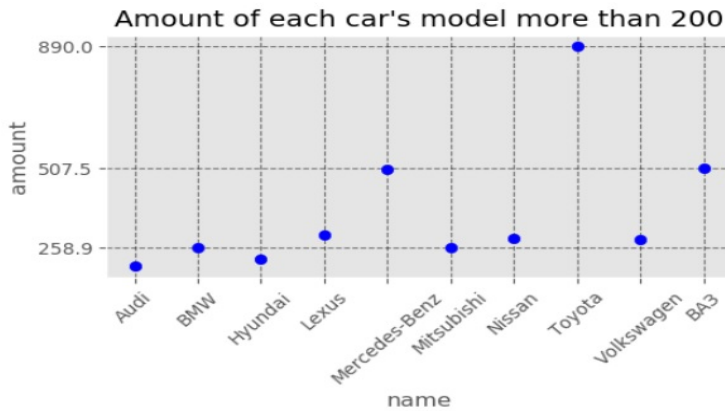


Table 1.5

The total number of unique city is 137 and there were a lot of unimportant suburbs and villages. Table 1.6 has shown the important places in general which amount is more than 30.

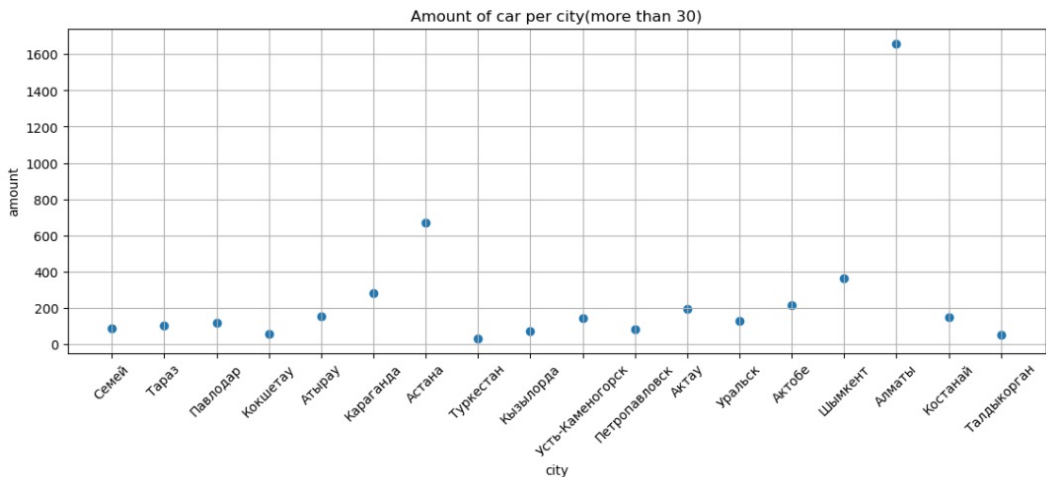


Table 1.6

Table 1.3 and Table 1.4 have fully described the unbalance of data [7]. In the next step we have cut the data by triangle method.

Modelling

In modelling process prediction has been resolved in price column. In this case multiple learning algorithms methods, so called ensemble learning methods, have been used. The main principle to use ensembles was to have more flexibility in the function they can represent [1]. This flexibility could enable them to over-fit the training data more than a single model would, but the purpose of modelling is to show that in practice, some ensemble techniques tend to reduce problems related to over-fitting of the training data [5].

Random forest

The random forest prediction is the unweighted average over the collection:

$$h(x) = (1 / K) \sum_{k=1}^K h(x; \theta_k)$$

where x -observed covariate vector of length p , as k approaches to infinity the Law of Large Numbers ensures

$$E_{X,Y} (Y - \bar{h}(X))^2 \rightarrow E_{X,Y} (Y - E_{\theta} h(X; \theta))^2$$

where the quantity on the right is the generalization error for the random forest [2].

Adaboost

AdaBoost (Freund & Schapire, 1997; Schapire & Singer, 1999) is based on the exponential loss

$$\sum_{k=1}^K \exp(-y_k f_{\lambda}(x_k))$$

where this equation has upper-bounded

$$\sum_{k=1}^K [[y_k f_{\lambda}(x_k) \leq 0]]$$

The natural goal is to try to match the sign of function f to y , that is, to attempt to minimize it [6].

Solution

Data has been preprocessed to model and has given these correlation results:

```
kendall rank correlation coefficient(Close to 1 is better): 0.7174682188508716
Spearman's rank corr coefficient(Close to 1 is better): 0.8813390018550825
```

Usually coefficients must be more than 0.90 to make better prediction from model. It has shown that some parameters was not correlated good.

Random forest

```
randomf_cv.best_score_ #Result is not good
```

```
0.7082047522846117
```

```
y_pred2 = randomf_cv.best_estimator_.predict(X_test)
```

```
print(np.sqrt(mean_squared_error(randomf_cv.best_estimator_.predict(X_train), y_train)))
print(np.sqrt(mean_squared_error(y_pred2, y_test)))
```

1670808.857660936

3018682.8392637796

Adaboost

As model prediction in [4], a weak prediction model for boosting Decision Tree Regression model has been taken.

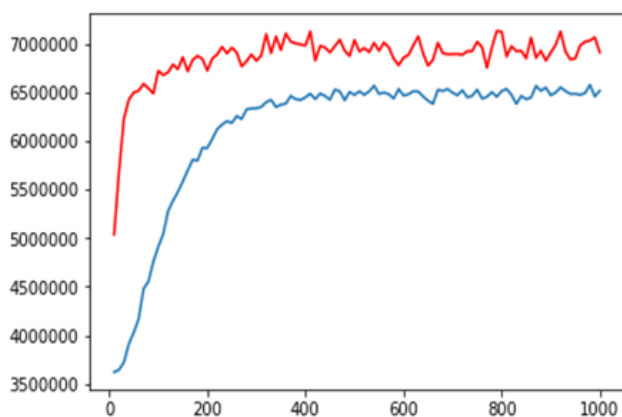


Table 3.1. Max depth is 1

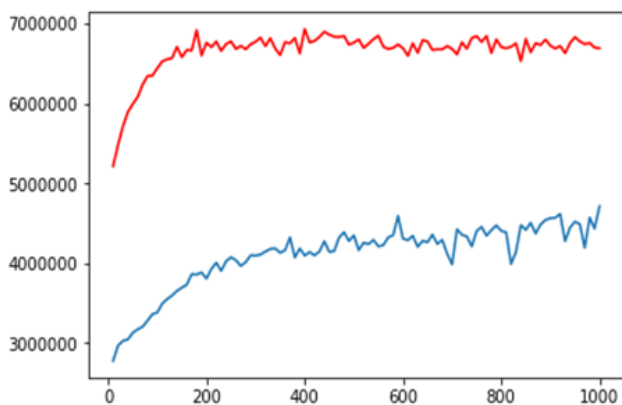


Table 3.2. Max depth is 2

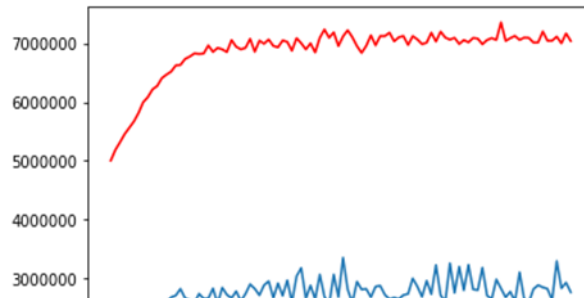


Table 3.3. Max depth is 3

Last results of Adaboost:

```
print('MAE test with GSV: ', mean_absolute_error(y_pred_test_best, y_test))
print('MAE train with GSV: ', mean_absolute_error(y_pred_train_best, y_train))
```

MAE test with GSV: 2743987.1198835857

MAE train with GSV: 2829078.748196364

Conclusion

By the method of reducing the number of outliers and taking the data balanced (outlier detection method) correlation coefficients has shown the better result as usual, but it has affected to the result of first model predictions. Adaboost model has given the better results as random forest, but also we can use another weak models as a base.

References

- 1 Wei, J. L., Lin, D.Y., Weissfeld, L., Regression Analysis of Multivariate Incomplete Failure Time Data by Modeling Marginal Distributions. *Journal of the American Statistical Association*, (1995): pp. 5-6.
- 2 Segal, Mark R. Machine Learning Benchmarks and Random Forest Regression. Division of Biostatistics, University of California, San Francisco, 2003. – pp. 4 -6.
- 3 Breiman L., Statistical Modeling: The Two Cultures. University of California, 2003. – pp. 207-208.
- 4 Liaw, A., Wiener, M. *Classification and Regression by random Forest*, 2002. URL: <http://www.stat.berkeley.edu/users/breiman/>

- 5 Quinlan J.R., Bagging, Boosting and C4.5, University of Sydney, Sydney, 2006. – p. 2-3.
- 6 Solomatine D.P., Shrestha D.L., AdaBoost. RT: a boosting algorithm for regression problems. *IEEE International Joint Conference on Neural Networks*, (2004): pp. 2-3.
- 7 Riccardi A., Fernández-Navarro F., Carloni S., Cost-Sensitive AdaBoost Algorithm for Ordinal Regression Based on Extreme Learning Machine. *IEEE Transactions on Cybernetics*, (2014): pp. 4-6.

IRSTI 28.17.27

G. Yermagambet¹

¹Suleyman Demirel University, Kaskelen, Kazakhstan

MACHINE VISION IN ROBOTIC SYSTEMS

Abstract. The article describes machine vision, its application areas and the use of machine vision view in robotics.

Robot vision refers to the capability of a robot to visually perceive the environment and use this information for execution of different tasks. Visual feedback has been used extensively for robot navigation and obstacle avoidance. In the recent years, there are also examples that include interaction with people and manipulation of objects. In this paper, we review some of the work that goes beyond of using artificial landmarks and fiducial markers for the purpose of implementing vision based control in robots. We discuss different application areas, both from the systems perspective and individual problems such as object tracking and recognition.

Keywords: machine vision, robotics.

Аннотация. В статье описывается машинное зрение, области его применения и использование машинного зрения в робототехнике.

Под зрением робота понимается способность робота визуально воспринимать окружающую среду и использовать эту информацию для выполнения различных задач. Визуальная обратная связь широко использовалась для навигации роботов и обхода препятствий. В последние годы есть также примеры, которые включают взаимодействие с людьми и манипулирование объектами. В этой статье мы рассмотрим некоторые из работ, которые выходят за рамки использования искусственных ориентиров и фидуциальных маркеров с целью реализации контроля на основе видения в роботах. Мы обсуждаем различные области применения, как с системной точки зрения, так и с отдельными проблемами, такими как отслеживание и распознавание объектов.

Ключевые слова: машинное зрение, робототехника.

Аңдатпа. Мақалада машиналық көру, оның қолдану салалары және робототехникадағы машиналық көруді қолдану сипатталады.

Роботтың көзқарасы - бұл роботтың қоршаған ортаны көзбен көріп, әртүрлі тапсырмаларды орындау үшін осы ақпаратты пайдалану мүмкіндігі. Көрнекі кері байланыс роботты навигация және кедергілерді болдырмау үшін кеңінен қолданылды. Соңғы жылдары адамдармен өзара әрекеттесуді және объектілерді басқаруды қамтитын мысалдар бар. Бұл мақалада біз роботтардағы көруді бақылауды жүзеге асыру үшін жасанды бағдарларды және фидуциалдық маркерлерді пайдаланудан тыс кейбір жұмыстарға назар аударамыз. Біз жүйелік тұрғыдан, сондай-ақ қадағалау және объектіні тану сияқты жеке мәселелермен әртүрлі бағдарламаларды талқылаймыз.

Түйін сөздер: машиналық көру, робототехника.

Introduction

Machine vision is the use of computer vision in industrial operations and in production. In that period of time, when computer vision is a common set of methods, allowing computers to see, the field of interest of computer vision as an engineering direction is digital input and output devices, as well as computer networks for monitoring production equipment, such as: robot manipulators or devices for extracting defective parts.

Machine vision is a subdivision of engineering. It is related to computing, optics, engineering and industrial automation. Most common machine vision applications are industrial product inspections. These include: semiconductor chips, cars, food and medicine. People who carried out work on assembly lines, looked at parts of products and made conclusions about the quality of performance. For these purposes, computer vision systems use digital and intelligent camera types, as well as software variations that can process images for similar checks. They are programmed to implementation of highly specialized tasks, such as counting objects on conveyors, reading serial numbers or searching for surface defects [1].

Machine vision helps solve complex industrial tasks reliably and consistently

A typical machine vision solution in robotic systems has several of the following components:

1. One or a number of digital or analog cameras (black and white or color) with suitable optics for obtaining images.

2. Software for making images for processing. For analog cameras, this is a digitizer of images.

3. Software tools for machine vision, which provides tools for the development of individual software applications.

4. Input and output equipment or communication channels for reports on the results obtained.

5. Smart camera: the only device in which there are all the above points.

6. Special light sources (LEDs, fluorescent and halogen types of lamps, etc.).

7. Specific software applications for image processing and detection of relevant properties.

8. A sensor for synchronizing detection parts (often optical or magnetic sensors) for capturing and processing images.

9. Drives of certain shapes that are used for sorting or dropping corrupted parts.

Using a synchronization sensor, it is possible to determine when parts, often moving along a conveyor, are in positions to be inspected. The sensor starts the camera and takes a picture of the part when it passes under the camera and is often synchronized with the light pulses. It is possible to make a clear image.

Lighting, which is used to highlight parts, is intended for highlighting features that represent interests and concealment, or minimizing the appearance of features that are not interesting (for example, shadows or reflections). For this purpose, often used LED panels of suitable size and location.

Machine vision is used in various fields of activity and is not limited to some of them:

- large industrial production;
- accelerated production of original products;
- industrial safety systems;
- control of previously manufactured objects (for example, quality control, the study of errors);
- systems of visual control and management (record keeping, bar code recognition);
- control of automated vehicles;
- quality control and food inspection.

Machine vision should be considered as a much more complex and technological area of scientific and engineering knowledge, which covers all the problems of developing practical systems: selection of lighting schemes of the scene, the choice of sensor characteristics, their number and location

geometry, calibration and orientation issues, equipment selection or development for digitization and processor processing, the development of the algorithms themselves and their computer implementation - that is, the whole range of related tasks.

In addition, there is such a thing as the vision of robots. This is a narrower field of computer vision technology, namely, the part that ensures the functioning of computer vision systems under severe time constraints. For example, equipping new generation robots with mobile cameras and stereovision algorithms, many companies are working to create intelligent robots that can not only freely navigate the apartment and recognize their masters, but also perform certain tasks for remotely submitted teams.

Robotics is the traditional field of application for machine vision. Despite this, the main part of the robots for a long time was in the industry, where the sensitivities of the robots are not were redundant. Due to well-controlled conditions (low non-determinism of the environment), highly specialized types of solutions were possible, including for machine vision tasks. In addition, industrial applications allowed the use of expensive types equipment that had varieties of optical and computing systems.

Modern robotics needs solutions from a wide range of computer vision tasks. This includes:

- a set of tasks that are associated with orientation in external space (for example, the tasks of simultaneous localization and mapping);
- tasks of recognizing different objects and interpreting scenes in general;
- tasks to detect people, recognize their faces and analyze emotions.

Machine vision in robotic systems has every chance to surpass human in the next 10 years. Already, robots can see through walls and for many kilometers ahead.

Machine vision systems have fairly good prospects. The ideal machine vision system will be fully built on digital technologies, will use smart cameras and low-cost equipment that implements a set of standardized functions for image processing and recognition [2].

Object Detection, Initialisation of Tracking Initialisation has the goal to select and possibly identify a target. It is in itself hardly treated as a research topic and commonly relies on object recognition methods or constraints on tracking. As an example, most approaches of visual servoing exploit an initial constraint. Such simplifying constraints are light objects on dark background, LEDs, black and white markers, colored objects, objects with surfaces of different grey values, given correspondences, restriction to a ground plane or manually selected features. Obviously, these constraints limit applicability and

do not allow recovery after loss of tracking. Another example are static tasks, where initialisation is relatively simple and uses techniques such as image subtraction or optical flow calculations. Both techniques highlight areas in the image where a motion has been detected. If a CAD-model of the target is available, an initial pose estimate can be used to project the features into the image, e.g., [3]. A classical technique of initialisation is object recognition. A common approach is to match image features in the initial image to features in a database made for single or multiple objects. The match reports either object hypotheses or hypothesis of a specific view, which are subsequently verified to report the most likely object. Thus, as a by-product of the recognition process, an estimate of the object pose may be provided. For a comparison of different feature detectors we refer to. It should be noted that initialisation differs from recognition in that one specific object has to be found and located, practically reversing the classical recognition process of identifying all objects in the scene. Impressive recognition results have been reported. Nevertheless, object recognition suffers from two common problems: (1) Methods today rely mostly on sets of features. If these features cannot be detected reliably, recognition rates decrease rapidly. The difficulty is that recognition as part of robot vision requires the ability to detect objects under varying viewing angle, significant changes in scale and illumination conditions. Although great improvements have been achieved over recent years, robotic tasks remain difficult (2). Methods are mostly designed for databases, where objects are centred. Hence a first selection of targets has been achieved by the person that took the image, while a robot would need to search and take these images first. This difficulty adds to the problem discussed above. For example, methods require good line features or a perfect segmentation. The latter methods show sensitivity to changing background or lighting (reported are objects on dark or pasted background). Probabilistic handling of the image templates can improve the sensitivity but reduces the likelihood of successful recognition. Grouping requires good feature extraction, which is usually assumed via manual selection or images with special objects. The search tree can be reduced by using attributes of the object model such as surface characteristics but still requires high processing power. Invariant features (invariant to specific perspective distortions or to illumination) claim robustness, however perfect segmentation of the outline is assumed, an equally difficult problem. A promising approach is to use several cues and many local features that are statistically grouped to indicate object existence. The integration of recognition methods into visual servoing systems has not been achieved, since methods are complex and not reliable. Two exceptions are and regularly invokes a recognition scheme for reinitialisation. The idea is to exploit model knowledge.

In most approaches this is done purely for the tracking step. Another typical approach to improve initialisation over the methods using simplifying constraints is to enhance tracking or segmentation methods to enable the initialisation. In summary, the initialisation of tracking is most of the time achieved by using simplifying constraints. Promising roads of work are fast object recognition approaches, methods to reliably extract features using cue integration and the goal directed use of modeling knowledge. Open problems in object detection relate to extraction of shape and structure of objects and relating them to known objects [4].

Visual servoing - arms and platforms The continuous control of a mechanism using visual input is referred to as Visual Servoing. It means to control the pose of a mechanism in a closed loop (e.g., the gaze direction of the end-effector) using the input of a machine vision system. Sometimes the term vision-based control of motion is used. Thus, apart from image processing and computer vision, visual servoing also requires techniques from control theory. Hence, visual servoing consists of two intertwined processes: tracking and control. In addition, the system may also require an automatic initialization procedure which may include figure-ground segmentation and object recognition, as outlined above. In the robotics community, visual servoing has been used to control the movement of robotics arms as well as mobile robots. In terms of camera configurations and their number, there are examples of both single and multiple cameras, that are either fixed in the workspace or are attached to the robot. Cameras fixed in the workspace may additionally be attached to a pan-tilt unit or another robot. The aim of visual servoing is twofold. On the one hand, visual servoing makes it possible to follow arbitrary object motions. On the other hand, it becomes possible to control the motion towards an arbitrary object location when seeing the direct relation between robot end-effector and the object. Hence, visual servoing eliminates the requirement to calibrate the camera robot system. It can be shown that two cameras using standard calibration parameters are sufficient for accurate robot control, This is achieved by either seeing the robot and the object within the images or by mounting the camera(s) directly on the robot end-effector [5].

Conclusion

Machine vision is quite an ambiguous subject. On the one hand, there are impressive results in this area, and many tasks have been solved. Machine vision systems cope with the automation of production, video surveillance, analysis of medical images. On the other hand, machine vision is still far from human. Many heights have been reached, many more to come. Therefore, there are two views on the development of machine vision. Some say that the machines will reach unprecedented heights and will develop tremendous

power, they will be ahead of man. Others argue that cars will never surpass humans, and machine vision will remain unsuitable for solving some problems where human intervention is necessary.

Given the difficulties and open problems in robotics vision, in particular robustness, one has to think about the general approach to robot vision. Possibly a consequence is to rather move towards a [predict-act-sense] approach following the active vision paradigm. While already stated decades ago, the strict consequences are little followed, as the review here indicates. Work on actively using the arm to segment objects or linking affordances to visual features are first starts. A reason is certainly, that in this context vision needs to be treated in a completely different way. It is not a standalone component that delivers valuable input. Vision is one possible sensor modality to achieve a certain robot task. The task of vision is to provide specific information about the environment and its purpose is directly linked with the intended action

The imperfection of machine vision is due to technical reasons, but there is a rapid development of information technology and there are more and more solutions to technical problems [6].

References

- 1 Malcev, D. Setting the task of computer vision. Last modified January 13, 2016. URL: <https://habr.com/ru/post/274725/>
- 2 Manish, Ch. Machine vision: concepts, tasks and applications. Last modified August 21, 2017. URL: <https://towardsdatascience.com/computer-vision-concepts-and-terminology-edd392a6f594?gi=40fe3f0f92de>
- 3 Vinzce, M., Ayromlou, M., Ponweiser, M., Zillich, M. Edge projected integration of image and model cues for robust model-based object tracking. *International Journal of Robotics Research*, 20 (7), (2001): pp. 533–552.
- 4 Sanderson A., Weiss, L. Image-based visual servo control using relational graph error signals. *Proc. IEEE*, (1980): pp. 1074–1077.
- 5 Chaumette F., Hutchinson, S. Visual servo control i: Basic approaches. *IEEE Robotics and Automation Magazine*, 13 (4), (2006): pp. 82–90.
- 6 Bennett, B. Machine Vision for Robot Guidance. Last modified April 06, 2012. URL: https://www.robotics.org/content-detail.cfm/Industrial-Robotics-Industry-Insights/Machine-Vision-for-Robot-Guidance/content_id/34

IRSTI 28.23.29

A. Kim¹

¹Suleyman Demirel University, Kaskelen, Kazakhstan

RECOMMENDER SYSTEM DEVELOPMENT

Abstract. Over the last few decades recommender systems have taken more and more place in industry. Recommender systems are algorithms aimed at suggesting relevant products to users. From suggesting to people the goods that could interest them to suggesting to users the web content matching their preferences, recommender systems are today unavoidable in our daily online journeys. Recommender systems are really important in all industries as they can bring real economic returns or can be competitive advantage.

In this work we provide an approach for increasing click-through rate by suggesting relevant products to users. The algorithm behind the recommender system described in this study is based on matrix factorization.

Keywords: recommender systems, matrix factorization, implicit feedback, explicit feedback.

Аннотация. В последние несколько десятилетий рекомендательные системы занимают все больше места в индустрии. Рекомендательные системы - это алгоритмы, предназначенные для предложения пользователям наиболее релевантных продуктов. Начиная с предложения людям товаров, которые могут их заинтересовать, и заканчивая предложением пользователям контента, соответствующего их предпочтениям, рекомендательные системы сегодня неизбежны в наших ежедневных онлайн-сессиях. Системы рекомендаций действительно важны во всех отраслях, поскольку они могут принести реальные экономические выгоды или могут стать конкурентным преимуществом.

В этой работе мы предлагаем подход, позволяющий повысить показатель кликов, предлагая пользователям наиболее релевантные товары. Алгоритм системы, описанной в этой работе, основан на матричной факторизации.

Ключевые слова: рекомендательная система, матричная факторизация, неявная обратная связь, явная обратная связь.

Андатпа. Соңғы бірнеше онжылдықта өнеркәсіпте ұсынушы жүйелер көбірек қолданысқа енгізілуде. Пайдаланушыларға оларды қызықтыратын элементтерді ұсынудан бастап, олардың қалауына сәйкес қажетті мазмұнды ұсынғанға дейін, ұсынушы жүйелер біздің күнделікті тіршілігіміздің бірден бір бөлігіне айналғаны сөзсіз. Ұсынушы жүйелер дегеніміз пайдаланушыларға тиісті элементтерді ұсынуға арналған алгоритмдер. Ұсынушы жүйелер барлық салада өте маңызды, өйткені олар үлкен табыс әкелуі мүмкін немесе бәсекелестерден айтарлықтай ерекшеленуге мүмкіндік береді.

Бұл жұмыста біз пайдаланушыларға тиісті тауарларды ұсына отырып, шерту трафигін арттыру тәсілін ұсынамыз. Алгоритм матрицалық жіктеуге негізделген.

Түйін сөздер: ұсынушы жүйелер, матрицалық жіктеу, анық емес кері байланыс, анық кері байланыс

Introduction

Today, there are many sites that provide any content, such as news, blogs, music and movies. Each of them contains a huge amount of information, but not all of it may be interesting to a particular visitor of the site. Recommender systems are used to select content that will be useful to a specific user. Unlike search engines, in order to get an answer, the recommendation system does not require an explicit request. The user is invited to evaluate some objects from the collection and, based on his estimates, assumptions are built and the results closest to them are returned. Recommender systems are very popular now since they significantly reduce the time it takes to find useful information.

The task of the recommender system is to inform the user about a product that he may be most interested in at a given time. The client receives information, and the service makes money on the provision of quality services. Services are not necessarily direct sales of the goods offered. The service can also earn on commissions or simply increase user loyalty, which then translates into advertising and other income.

Depending on the business model, recommendations can be its basis, as, for example, with TripAdvisor, or can be just a convenient additional service (such as, for example, in some online clothing store), designed to improve the Customer Experience and make catalog navigation more comfortable.

Personalization of online marketing is an obvious trend of the last decade. According to McKinsey, 35% of Amazon's revenue or 75% of Netflix's revenue comes from recommended products, and this percentage is likely to grow. Recommender systems are about what to offer the client to make him happy. To illustrate the whole variety of recommendation services, we will give a list of the main characteristics with which you can describe any recommendation system.

-Subject of recommendation - what is recommended.

There is a lot of variety here - it can be goods (Amazon, Ozon), articles (Arxiv.org),

news (Surfingbird, Yandex.Zen), images (500px), videos (YouTube, Netflix), people

(Linkedin, LonelyPlanet), music (Last.fm, Pandora), playlists, and more. In general,

you can recommend anything.

-The purpose of the recommendation is why it is recommended.

For example: buying, informing, training, making contacts.

-The context of the recommendation is what the user is doing at this moment.

For example: watching goods, listening to music, talking with people.

-The source of the recommendation is who recommends:

-audience (average restaurant rating on TripAdvisor)

-interested users

-expert community (sometimes when it comes to a complex product, such as, for

example, wine).

-The degree of personalization.

-Non-personal recommendations - when you are recommended the same as

everyone else. They allow targeting by region or time, but do not take into account

your personal preferences.

-A more advanced option is when recommendations use data from your current session. You have looked at several products, and at the bottom of the page you are offered similar ones.

-Personal recommendations use all available information about the client, including the history of his purchases.

-Transparency.

People trust the recommendation more if they understand exactly how it was received. So there is less risk of running into "unscrupulous" systems that promote paid goods or put more expensive goods higher in

the ranking. In addition, a good recommender system itself should be able to deal with purchased reviews and sales cheats. Manipulations, by the way, are also unintentional. For example, when a new blockbuster is released, the first thing the fans go at it is, accordingly, the rating can be very high for the first couple of months.

-The format of the recommendation.

This can be a pop-up window, a sorted list appearing in a specific section of the site, a ribbon at the bottom of the screen, or something else.

-Algorithms

Despite the many existing algorithms, they all boil down to several basic

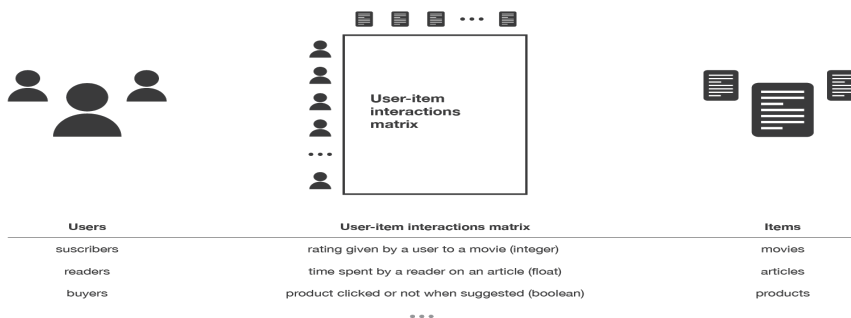
approaches, which will be described later. The most classical are the algorithms

Summary-based (non-personal), Content-based (models based on the product

description), Collaborative Filtering (collaborative filtering), Matrix Factorization

(methods based on matrix decomposition) and some others.

At the center of any recommendation system is the so-called preference matrix. This is a matrix, on one axis of which all the clients of the service (Users) are set aside, and on the other, objects of the recommendation (Items). At the intersection of some pairs (user, item), this matrix is filled with ratings (Ratings) - this is a well-known indicator of the user's interest in this product, expressed on a given scale (for example, from 1 to 5).



Users usually evaluate only a small part of the products that are in the catalog, and the task of the recommendation system is to summarize this information and predict the customer's attitude to other products about which nothing is known. In other words, you need to fill in all the empty cells in the image above.

People's consumption patterns are different, and new products do not have to be recommended. You can show repeated positions, for example, to replenish stock. According to this principle, two groups of goods are distinguished.

- Repeatable. For example, shampoos or razors that are always needed.
- Unique. For example, books or films that are rarely re-acquired.

If the product cannot be explicitly assigned to one of the classes, it makes sense to determine the permissibility of repeat purchases individually (someone goes to the store just for the sake of peanut butter of a certain brand, and for someone it is important to try everything that is in the catalog).

The concept of "interest" is also subjective. Some users only need things from their favorite category (conservative recommendations), while others, on the contrary, are more responsive to non-standard products or groups of products (risky recommendations). For example, video hosting can recommend the user only new episodes of his favorite series, and can periodically throw him new shows or even new genres. Ideally, you should choose a strategy for displaying recommendations for each client separately, using the modeling of a client category.

User ratings can be obtained in two ways:

-explicit ratings - the user puts the product rating, leaves a review, likes the page,

-implicit ratings - the user does not explicitly express his attitude, but an indirect

conclusion can be drawn from his actions: he bought the product - that means he

likes it, read the description for a long time - it means there is interest, etc.

Of course, explicit preferences are better - the user himself says that he liked it. However, in practice, not all sites provide the opportunity to express their interest explicitly, and not all users have the desire to do so. Both types of ratings are most often used at once and complement each other well.

Development of recommender system

Dataset:

- 100000 unique user_id
- 1500000 interactions
- >45000 items , reduced to 600 (explained below)
- 97.5 % sparsity

Feedback:

- implicit (buys)
- explicit (not interesting recommendations)

Databases:

- MySQL(transactions)
- PostgreSQL(recommendation and feedback)

Tools and technologies :

- Python(for modeling and processing)
- CRON(for scheduled tasks)
- SQL(for data manipulations)
- Google analytics(for monitoring)

Dataset is presented as interaction of users and deals. Deals are offers which can be bought by user. Every deal has several categories and subcategories , price and other characteristics. Every deal has limited lifetime ,so we cannot recommend deals which are already closed. In order to overcome this problem, we grouped similar deals into clusters using the following process.

Every deals is presented as one-hot encoded vector of subcategories and price categories .

At the output we have this table (table 1):

	categor y_1	categor y_2	categor y_3	categor y_4	categor y_5	categor y_6	categor y_7
item_1	1	1	0	0	0	0	1
item_2	0	0	1	1	0	0	0
item_3	1	1	0	0	0	0	1

table. 1 One-hot encoded deals

As we can see item_1 and item_3 have similar vector , so they will be grouped into one cluster. Number of clusters equals to number of unique possible combinations.

Now we recommend cluster instead of deals and fetch only active deals from clusters.

This operation reduced size of user-item interactions from (100000*45000 to 100000*600). After showing recommendations user can explicitly give us feedback if items are not relevant.

Matrix factorization

From mathematics we know that any matrix can be decomposed into the product of three matrices. But the assessment matrix is very sparse, 99% is

commonplace. Singular Value Decomposition does not know what gaps are. We don't really want to fill them with an average value. And in general, we are not very interested in the matrix of singular values - we just want to get a hidden view of users and objects, which, when multiplied, will approximate the true rating. We can immediately decompose into two matrices.

What to do with missing values? We can ignore them. It turned out that we can train to approximate ratings by RMSE metric using SGD or ALS, ignoring omissions altogether. The first such algorithm is Funk SVD, which was invented in 2006 during the solution of the competition from Netflix.

Netflix Prize - a famous event that gave a strong impetus to the development of recommendation systems. The goal of the competition is to overtake the existing Cinematch recommendation system for RMSE by 10%. For this, a large dataset containing 100 million ratings was provided at that time. The task may not seem so difficult, but to achieve the required quality it was required to rediscover the competition two times - a solution was received only for 3 years of the competition. If it were necessary to obtain an improvement of 15%, perhaps this would not have been possible to achieve on the data provided.

The main idea of matrix factorization (Fig 1):

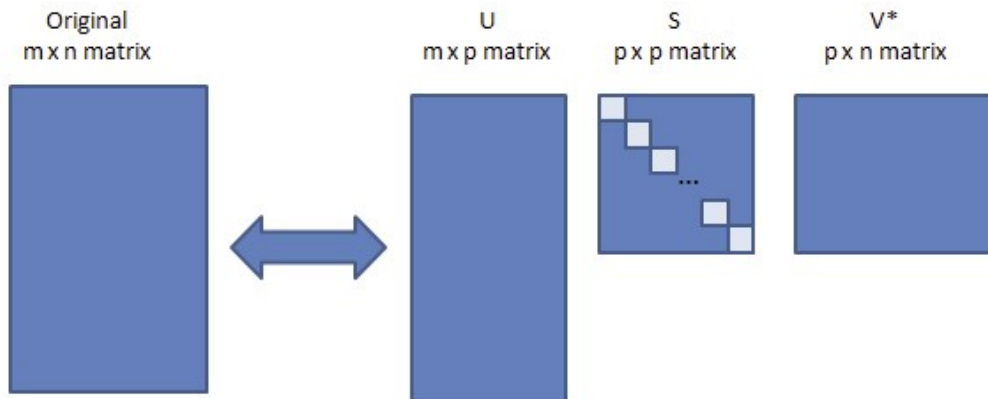


Fig 1 Matrix factorization

Loss functions

To use implicit feedback, we came up with appropriate teaching methods.

Bayesian personalized ranking

It is known what items the user interacted with. We assume that these are positive examples that he liked. There are still many items that the user has not interacted with. We do not know which of them will be of interest to the

user and which are not, but we probably know that not all of these examples will turn out to be positive.

We make a rough generalization and consider the absence of interaction as a negative example.

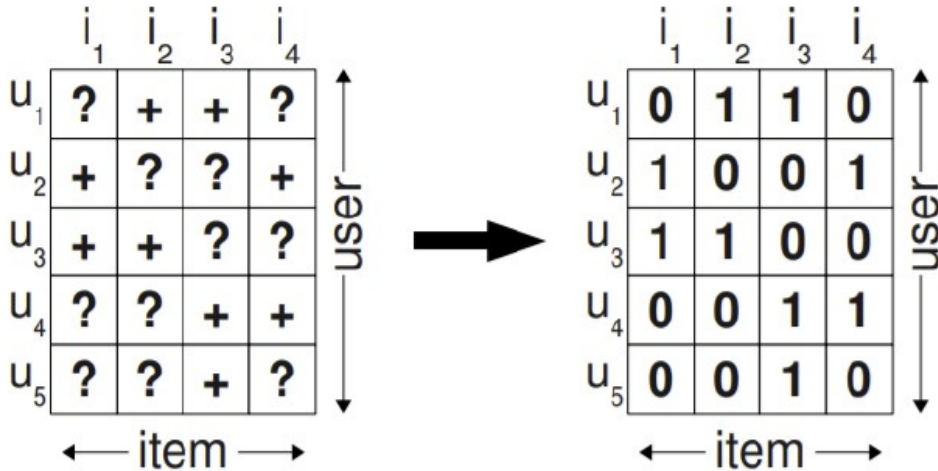


Fig. 2 Implicit feedback interaction matrix

We will sample triples {user, positive item, negative item} and punish the model if the negative example is rated higher than the positive.

$$LBPR(u, i, j) = 1 - \sigma(\hat{r}_{ui} - \hat{r}_{uj})$$

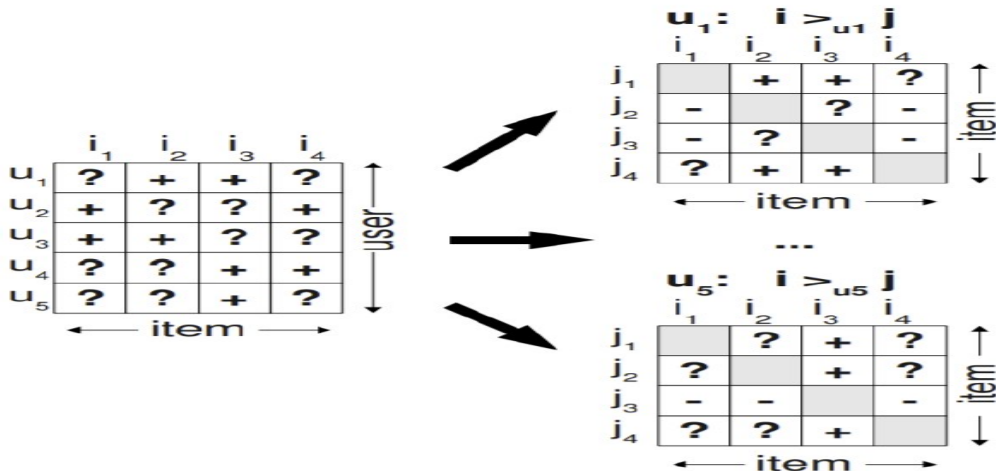


Fig. 3 Sample triples

Quality metrics

-Online evaluation

The most preferred way to evaluate the quality of the system is to directly check on users in the context of business metrics. This can be CTR, time spent in the system, or the number of purchases. But experiments on users are expensive, and we don't want to roll out a bad algorithm even to a small group of users, so they use offline quality metrics before online testing. In this work we used CTR.

-Offline evaluation

As quality metrics, ranking metrics are usually used. MAP@k is used in our case.

Let **R** be the set of recommended objects, **P** the set of objects that the user actually likes.

Then :

$$\text{Precision} = (R \text{ and } P) / R$$

Precision @ k - is the proportion of recommended items in the top-k set that are relevant

$$\text{Precision}@k = (\# \text{ of recommended items @k that are relevant}) / (\# \text{ of recommended items@k})$$

$$\text{Recall} = (R \text{ and } P) / P$$

Recall @ k is the proportion of relevant items found in the top-k recommendations

$$\text{Recall}@k = (\# \text{ of recommended items @k that are relevant}) / (\text{total } \# \text{ of relevant items})$$

Rank	Correct?	Precision	Recall
1	True	1.0	0.2
2	True	1.0	0.4
3	False	0.67	0.4
4	False	0.5	0.4
5	False	0.4	0.4
6	True	0.5	0.6
7	True	0.57	0.8
8	False	0.5	0.8
9	False	0.44	0.8
10	True	0.5	1.0

Fig. 4 Precision and recall calculation

Results and conclusions

During this work recommender system was developed, tested and integrated.

Data was collected, organized and stored. Implicit and explicit feedback were used to improve final result.

The main metrics obtained during testing are : MAP@3 - 0.08, CTR - + 40%.

Cold start problem was solved by sampling users only with purchase history. Interaction matrix dimensionality was decreased by using clusters, instead of items directly.

This work can be improved by using behavioral features and adaptive learning for loss function.

References

1 Maciej Kula. Metadata Embeddings for User and Item Cold-start Recommendations . - 2015. - CEUR Workshop Proceedings № 1448. p 14-21.

2 Bokde, D., Girase, Sh., Mukhopadhyay, D. Matrix Factorization Model in Collaborative Filtering Algorithms: A Survey. *Procedia Computer Science*. 49. 10.1016/j.procs.2015.04.237.

3 Koren, Y., Bell, R., Volinsky, Ch. Matrix factorization techniques for recommender systems. *Computer*, 42 (2009): pp. 30-37.

4 Mehta, R., Rana, K. A review on matrix factorization techniques in recommender systems. (2017). 269-274. 10.1109/CSCITA.2017.8066567.

5 Ilhami, M., Suharjito, S. Film Recommendation Systems using Matrix Factorization and Collaborative Filtering. *2014 International Conference on Information Technology Systems and Innovation, ICITSI 2014 - Proceedings*. 10.1109/ICITSI.2014.7048228.

IRSTI 50.07.03

D. Turanov¹, A. Selbayev²

^{1,2}Suleyman Demirel University, Kaskelen, Kazakhstan

THREAT FOR QKD WITH A TRANSFER OF A MODIFIED CONDITION

Abstract. Quantum key distribution makes it possible to generate a secret key between authenticated users. The security of the process, it is possible to achieve, by using the states of quantum mechanics. To date, the quantum system is in experimental states, although several commercial projects have already been implemented. And in particular, single-photon avalanche photo-detectors. The technical level of devices does not yet allow creating the ideal condition for an ultra-secure system. In this article we will present the attack method and the protocols that are able to detect these attempts.

Keywords: BB84, BB92, photo-detectors, single-photon, cryptosystem, ultra-secure system, QKD, photo-diode.

Аннотация. Квантовое распределение ключей позволяет генерировать секретный ключ между аутентифицированными пользователями. Безопасность процесса можно достичь, используя состояния квантовой механики. На сегодняшний день квантовая система находится в экспериментальном состоянии, хотя несколько коммерческих проектов уже реализованы. И, в частности, однофотонные лавинные фотоприемники. Технический уровень устройств пока не позволяет создать идеальные условия для сверхзащищенной системы. В этой статье мы представим метод атаки и протоколы, которые могут обнаружить эти попытки.

Ключевые слова: BB84, BB92, фотодетекторы, однофотонный, криптосистема, сверхзащищенная система, QKD, фотодиод.

Андатпа. Кванттық кілттерді үлестіру түпнұсқалығы расталған пайдаланушылар арасында құпия кілт жасайды. Процестің қауіпсіздігі кванттық механиканың жағдайын қолдана отырып қол жеткізуге болады. Қазіргі уақытта кванттық жүйе эксперименталды күйде, бірақ бірнеше коммерциялық жобалар іске асырылған. Атап айтқанда, бір фотонды

көшкіні фотоаппарат. Құрылғылардың техникалық деңгейі әлі де ультра қауіпсіз жүйенің мінсіз жағдайын жасауға мүмкіндік бермейді. Бұл мақалада біз осы әрекеттерді анықтай алатын шабуыл әдісі мен хаттамаларды ұсынамыз.

Түйін сөздер: BB84, BB92, фото-детекторлар, бір фотонды, криптожүйе, ультра-қауіпсіз жүйе, QKD, фото-диод.

Introduction

The quantum world is complex from the point of view of the laws of ordinary mechanics, since these laws are limited in the expanses of quantum physics. One of the main limitations of these laws is the immeasurability of quantum states. The limitations of the laws and is the main fundamental link, which makes quantum cryptography one of the most secure systems. There are many ways to take advantage of quantum physics in systems. One of the most realized uses of quantum technologies is the creation of a randomly generated secret key for encryption. There is a vulnerability of the system, due to the imperfection of the devices used. For example, one of the fundamental conditions for the application of quantum technologies in cryptography is the creation of a pure single-photon source. This difficulty will have to be solved in the future when more advanced devices appear. Today, multi-photon devices are used, which, as the study shows, leave unauthorized access.

The quantum key distribution protocol usually means authentication, pre-process preparation, transfer, examination of states, handling errors (eliminating or enhancing secrecy using the compression method), analyzing and verifying the obtained keys. The data transmitted by the system must be absolutely protected from third parties and, if necessary, disclose the audition. When unauthorized access to the transmitted data occurs, the system should detect this attempt using the ratios of valid and resulting error. In other situations, the system is considered unprotected when unauthorized access by a third party goes unnoticed and the key is known to it. For several years, research has been conducted in which the capabilities of quantum cryptography have been demonstrated [1, 2].

Currently, in quantum systems, attenuated laser radiation is used as a source of a single-photon state (which is not purely single-photon), single-photon avalanche photo detectors (which has dark noise), efficiency (whose properties are not rare), communication channels (fiber optic and open space), which are subject to loss and noise. This in turn leads to the emergence of the possibility of a photon-splitting system attack (PNS, Photon Number Splitter attack [7]) and an attack with measurements with a certain outcome

(Unambiguous Measurements [8, 9]). We included these factors in the analysis of the security of protocols [6].

Unauthorized access to a key using photo-detector blinding [10] is one of the new threats to quantum key distribution. In this threat, a third party uses the possibility of affecting a communication channel in which it sends a modified (falsified) state. This allows a third party to control the counts or their absence at the receiving side, and impose their own counting, which does not lead to an error at the recipient (receiving side). As a result, the third party remains unnoticed and informed about the key. This new method of threat significantly reduces the secrecy of the system. Most of the protocols, with no additional parameters, were potentially not resistant to this threat (BB84 [3], SARG04 [13], Six-State QKD [14], DPS (Differential Phase Shift) [5,15], COW (Coherent One Way) [16], E91 [17], Decoy State QKD [18].

One way to solve this problem is to create a strictly single-photon source, which at the present time has proved difficult to implement. Until this difficulty is resolved, the threat will always exist. To date, the search for solutions to these problems. From the basic solutions, it is proposed to complicate and add additional parameters to existing protocols. The proposed solution does not solve the problem, but only complicates access by a third party. The methods of the third party in turn become cleverer.

The best way to create an over-secure system is to create a protocol in which security is achieved through internally-structured methods, rather than an improvement and addition in technical terms [11].

1. Threat with photon modification.

Below we provide information about this new threat on the host device, while not trying to look at all this in terms of technical vision, since all this is in the articles [10, 12, 19].

The more devices are not perfect, the some ways to use these imperfections. One of these ways to influence the receiving side:

1. On avalanche photo-detectors, there is a difference in the sensitivity of temporal dependencies. This allows a third party to modify (falsify) the state and blind the devices of the receiving party.
2. Using the state of the lower threshold of intensity, in order to include only one device, in situations where the bases of the third party and the recipient will be the same. Otherwise, everything happens without counting.

Basically, the possibility of third-party unauthorized access arises from the work of semiconductors (the so-called avalanche photo-detectors InGaAs:P). A blocking voltage is applied to the avalanche photo-diode. At the moment of

arrival of the photon, a gate voltage pulse (typical duration of the order of several nanoseconds and an amplitude of several volts) is applied, which opens the photo-diode. The absorption of a photon leads to the formation of an avalanche of carriers and a voltage pulse, which is recorded.

1. The first blinding attack is based on the following property. If the radiation intensity is increased slightly above the quasi-single-photon mode, this will lead to an increase in the current flowing through the photo-diode at the time of registration. Due to the fact that a photo-diode without illumination is not active (locked), the dynamic increase in current above a certain value will lead to an effective decrease in the bias voltage during the action of the strobe and to lock the diode and, accordingly, decrease, up to its absence, the avalanche current (“no click”). Thus, the photo-diode is effectively blinded.

2. The second attack is connected with the transfer of the photo-diode from the counting mode to the linear classical photo-detection mode, when the current is a function of the radiation intensity (usually proportional to it). If we further increase the radiation intensity, then after blinding the photo-diode (see paragraph 1 above) and the absence of the registration current, starting with a certain threshold intensity value, a signal will appear again on the photo-diode through the photodiode a current proportional to the radiation intensity will flow [4].

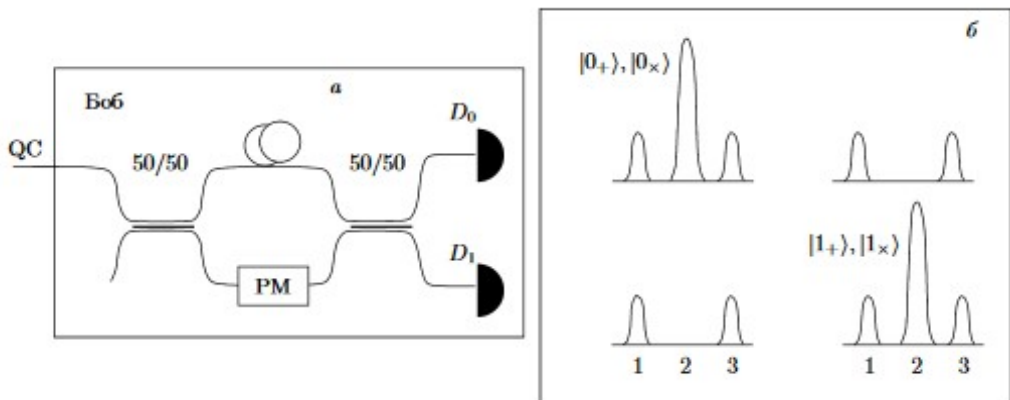


Fig.1 a) Schematic diagram of the receiving part of the fiber optic quantum cryptography system implementing the BB84 protocol. QC - quantum canal, Pm - phase-modulator.

b) Photo-count statistics in two detectors for different information states.

2.1. The use of the difference in the sensitivity.

The first protocol in quantum cryptography BB84 [3] is in any way well suited to explain the main points of opposition to the threats to which some protocols are exposed and their strong and weak aspects [3, 10, 12, 19].

States in basis + from quantum channel:

$$|0_+\rangle = \frac{1}{\sqrt{2}} (|1\rangle + |0\rangle), |1_+\rangle = \frac{1}{\sqrt{2}} (|1\rangle - |2\rangle), \quad (1)$$

and in the basis of $\times$,

$$|0_x\rangle = \frac{1}{\sqrt{2}} (|1\rangle + i|0\rangle), |1_x\rangle = \frac{1}{\sqrt{2}} (|1\rangle - i|2\rangle), \quad (2)$$

where $|1\rangle$ and $|2\rangle$ states localized in the time windows 1 and 2. The distance between the localized states is equal to the difference in travel along the upper and lower arms of the unbalanced interferometer (Fig. 1)

In the process of entering the receiving device, taking into account the selected phase, the quantum state in basis + have the form

$$\begin{aligned} &|0_+\rangle \rightarrow \frac{1}{\sqrt{8}}, \\ D_0: & \\ &|1_+\rangle \rightarrow \frac{1}{\sqrt{8}}, \\ &|0_+\rangle \rightarrow \frac{1}{\sqrt{8}}, \\ D_1: & \\ &|1_+\rangle \rightarrow \frac{1}{\sqrt{8}}, \end{aligned} \quad (3)$$

in basis of $\times$ (value = $\pi / 2$)

$$\begin{aligned} &|0_x\rangle \rightarrow \frac{1}{\sqrt{8}}, (1 + (1 + e^{i\varphi_B(x)}) \sqrt{2} + 3), \\ D_0: & \\ &|1_x\rangle \rightarrow \frac{1}{\sqrt{8}}, (1 + (-1 + e^{i\varphi_B(x)}) \sqrt{2} + 3) \\ &|0_x\rangle \rightarrow \frac{1}{\sqrt{8}}, (-1 + (-1 - e^{i\varphi_B(x)}) \sqrt{2} + 3), \\ D_1: & \\ &|1_x\rangle \rightarrow \frac{1}{\sqrt{8}}, (-1 + (1 - e^{i\varphi_B(x)}) \sqrt{2} + 3) \end{aligned} \quad (4)$$

If the bases on the receiving and transmitting sides of the state coincide, corresponding to 0 in both bases, they will give readings in time window 2 (Fig. 1) only in the D_0 detector. Accordingly, the states corresponding to 1 in both bases will give counts only in the D1 detector [2].

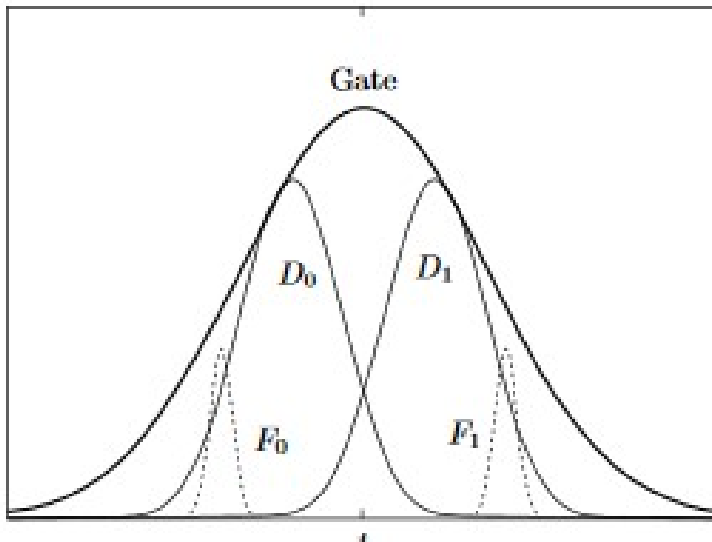


Fig. 2. An example of temporal dependences of the sensitivity of avalanche photo-detectors (D_0 , D_1), gating pulse (Gate) and falsified quantum states (F_0 , F_1).

However, the avalanche photodiodes D_0 and D_1 have different temporal characteristics of sensitivity (Fig. 2). The threat comes down to the following. The third party breaks the quantum communication channel (optical fiber) and carries out measurements similar to those on the receiving side in a randomly chosen basis.

There are two options. Immediately, we note that the third party sends its modified state in the basis opposite to the one in which it carried out its measurements (see details in [12, 19]).

1) *With the coincidence of the bases of the third party and the authenticated participants.* (for example, “+”). Assuming that after the analysis, the third party received a “0”, i.e. the correct result, but the third party does not know about it until the end of the process between the sender and the recipient, and therefore she prepares the falsified state “1” in the opposite basis “x”, but more localized (narrow) and slightly shifted in time so that it does not fell into the sensitivity curve of the photo-detector D_1 (Fig. 2). And the third party re-sends:

$$|1_{F_0x}\rangle = \frac{1}{\sqrt{2}} (|1_{F_0}\rangle - i |2_{F_0}\rangle), \quad (5)$$

After passing through the interferometer and phase modulator with the phase in the basis + (F), the states in front of the entrance to the photo-detectors are:

$$D_0: \quad \frac{1}{\sqrt{2}} (|1_{F_0}\rangle - (i+1)|2_{F_0}\rangle + |3_{F_0}\rangle), \quad (6)$$

$$D_1: \quad \frac{1}{\sqrt{2}} (-|1_{F_0}\rangle - (i-1)|2_{F_0}\rangle + |3_{F_0}\rangle),$$

The falsified state does not fall in time in the sensitivity curve of the photo-detector D_1 , and will not give an erroneous reading of the detector D_1 in the central time window 2 (Figure 1,2). As a result, it turns out an error-free reading in the D_0 detector. It does not matter that the number of counts in the detector D_0 and the ratio of the false state and the correct one decrease.

I would like to mention that the error ratio is influenced not only by device perfection and the appearance of unauthorized access, but also due to the loss in the channel itself, which no longer depends on the technological component of the system.

2) *If there is no coincidence of the bases of the third party and the authenticated participants.* In this case, which would not be the outcome, the probability of a chance of getting the correct result for a third party is 50%. Given that if a third party does not apply the correct basis for the analysis, it will spoil not only the result, but also the state itself.

2a) suppose that the third party guessed the basis of the analysis. Then the third party re-sends the modified state in the wrong state, which remains unnoticed in time in the sensitivity curve of the receiving device D_0 (formula 6). This will not result in a readout in the D_1 host device. And the ratio of errors will be in the normal range.

2b) suppose that the third party did not guess the basis. The same as in the first case, everything repeats, except that the action remains noticed and will be shifted in time, but does not involve the rest of D_0 :

$$|0_{F_0}\rangle = \frac{1}{\sqrt{2}} (|1_{F_1}\rangle - i |2_{F_1}\rangle), \quad (7)$$

The correct state transforms the count after the sensitivity of the D_0 detector falls into the curve, but this does not happen because the modified state is shifted in time. And this leads to the fact that on D_0 , produces a count and errors in D_1 . All this is caused by the interference of the state, which constructively extends over the different arms of the interferometer for D_0 , and is extinguished on the D_1 state, along the upper and lower arms.

And this whole process not only allows the third party to remain unnoticed in relation to the recipient (reducing the error to a valid one), but also in the end to intercept real information about the registered keys, which the recipient will not suspect.

In the real world, of course, it is difficult to carry out this threat, but it is quite provable and feasible. When it comes to analyzing the strength limit of any cryptographic system, it is taken into account that the third party will have the most advanced equipment and will have an ideal condition for implementing unauthorized interception and access to an encrypted and secure channel.

2.2. Threat to key with transfer from one mode to another.

This threat consists of stages in which a third party re-sends the state of the sender (intercepted in the quantum channel). In this case, the third party after analyzing in a random basis and increases the intensity so as to transfer the detector to the classic mode. This thin line between the modes is retained by the method of insufficient intensity, which is used so as not to lose the blinding mode [10, 12, 19], [20]).

There are moments:

1. With the coincidence of third party bases and authenticated participants. This leads to a complete constructive interference, the reason for this is to capture the detector full intensity, and that leads to the count in time.
2. If there is no coincidence of the bases of the third party and the authenticated participants. In this case, the detector is transferred to the blinding mode, the cause of which is not enough intensity in time.

The intensity with which the detector exits the blinding mode registers the signal as a linear device, and is equal to I_{th} , and the intensity with which the detector is blinded (lies in the “no click” zone) is equal to I_{bl} , ($I_{bl} < I_{th}$).

The intensity of the falsified state is equal to I_{faked} . The intensity in the side time windows (see Fig. 2) does not depend on the choice of third party bases and authenticated participants and is equal to $I_{faked}/8$ (see Fig. 2 and formulas (3) - (7)). In this case, two situations are possible:

a) The intensity of I_{faked} is such that in the side time windows, where the intensity does not depend on constructive or destructive interference, it is equal to $I_{faked}/8$. At the same time, $I_{faked}/8$ is obviously less than the threshold intensity I_{th} , at which the detector works as linear, but more than the intensity I_{bl} , which causes the blinding effect: $I_{bl} < I_{faked} < I_{th}$. There will be no counts in the side time windows (Fig. 1).

b) The intensity I_{facked} in the side time windows is equal to $I_{facked}/8$, less than the threshold intensity I_{th} , and the intensity I_{bl} causing the blinding effect: $I_{facked}/8 < I_{bl}, I_{th}$. In this case, counts in side time windows (Fig. 1) will take place. The detector is not blinded and works as a single-photon counting mode.

The whole point of the threat from the third party comes down to what she is trying to guess, but at the same time minimizes the ratio of permissible and received errors as a result of the distribution process, if attempts to guess will be in vain, and she will reveal herself about her presence.

3. Conclusion

Many QKD protocols as already mentioned in this article are not protected from certain threats due to imperfections of the devices used. Such threats, which were described above, allow unauthorized access to data, and at the same time remain unnoticed. These vulnerabilities referring to imperfections of the device have been proven in many research studies.

Considering that a lot of effort is being made to counter the vulnerabilities of the received devices, with the improvement and addition of additional devices, this is not an output for quantum cryptography. Since unauthorized access can be implemented with improved devices and capabilities in an ideal environment with application against the vulnerability of imperfections, which is not acceptable for this system. Indeed, in essence, quantum cryptography, even when used in an ideal environment and with devices that provide for all the needs of the system, must remain unattainable for unauthorized access.

The security of the entire system can be achieved only by relying on the protocol component itself, and not on the technical limitations of a third party. Indeed, in our time, these restrictions remain only a temporary obstacle to unauthorized access.

References

- 1 Wootters, W.K., Zurek, W.H. A Single quantum cannot be cloned. *Nature*, 299 (1982): pp. 802-803.
- 2 Weisner, S. Conjugate Coding. *ACM SIGACT News* (New York), (1983): pp. 78-88.
- 3 Bennett, C.H., Brassard, G. Quantum Cryptography: Public-Key Distribution and Tossing. *Proceedings of IEEE International Conference on Computers, Systems and Signal Processing, Bangalore, India, IEEE Press*, (1984): pp. 175-179.
- 4 Bennet, C.H. Quantum cryptography using any two nonorthogonal states. *Physical Review Letters*, 68, (1992): pp. 3121-3124.

- 5 Gisin, N., Ribordy, G., Tittel, W., Zbinden, H. Quantum Cryptography. *Physical Review Letters*, 74 (2002): pp. 145-190.
- 6 Scarani, V., Bechmann-Pasquinucci, H., Cerf, N.J., Dusek, M., Lutkenhaus, N., Peev, M. The security of practical quantum key distribution. *Physical Review Letters*, 6 (2009): pp. 1301.
- 7 Brassard, G., Lutkenhaus, N., Mor, T., Sanders, B., Limitations on practical quantum cryptography. *Physical Review Letters*, 85 (2000) pp. 1330.
- 8 Dieks, D. Overlap and distinguishability of quantum states. *Physical Review Letters*, 126 (1988): pp. 303.
- 9 Chefles, A. Quantum state discrimination. *Journal Contemporary Physics*, 6 (2010): pp.401-424.
- 10 Lydersen, L. Wiechers, C. Wittmann, C. Hacking commercial quantum cryptography systems by tailored bright illumination. *Nature Photonics*, 4 (2010): pp. 686.
- 11 Kolokov, A., Katamadze, G., Kulik, C. On the passive probing of fiber optic quantum communication channels. *Journal of Experimental and Theoretical Physics*, 137 (2010): pp. 637.
- 12 Makarov, V., Anisimov, A., Sauge, S. Controlling an actively quenched single photon detector with bright light, September 19, 2008. URL: arXiv:quant-ph/0809.3408.
- 13 Scarani, V., Acin, A., Ribordy, G., Gisin, N., Quantum Cryptography Protocols Robust against Photon Number Splitting Attacks for Weak Laser Pulse Implementations. *Physical Review Letters*, 057901-1 (2004): pp. 92.
- 14 Bruss, D. Optimal eavesdropping in quantum cryptography with six states, May 7, 1998. URL: arXiv:quant-ph/9805019.
- 15 Inoue, K., Waks, E., Yamamoto, Y. Differential Phase shift quantum key distribution. *Physical Review Letters*, 037902 (2002): pp. 89.
- 16 Gisin, N., Ribordy, G., Zbinden, H., Stucki, D., Brunner, N., Scarani, V. Towards practical and fast Quantum Cryptography, November 3, 2004. URL: arXiv:quant-ph/0411022.
- 17 Ekert, A. Quantum Cryptography Based on Bell's Theorem. *Physical Review Letters*, 6 (1991): pp. 661-663.
- 18 Won-Young, H., Observation of a Broad structure. *Physical Review Letters*, 057901-1 (2003): pp. 95.
- 19 Lydersen, L., Wiechers, C., Wittmann, C., Elser, D., Skaar, J., Makarov, V., Thermal blinding of gated detectors in quantum cryptography, September 14, 2010. URL: arXiv:quant-ph/1009.2663.
- 20 Yuan, Z.L., Dynes, J.F., Shields, A.J. Avoiding the blinding attack in QKD. *Nature Photonics*, 4 (2010): pp.800-801.

IRSTI 20.53.19

A. Aipenova¹, G. Altajanova

Suleyman Demirel University, Kaskelen, Kazakhstan

ANALYSIS OF FILMS SHOWN IN CINEMAS IN KAZAKHSTAN

Abstract. This research work about the analysis and information about 100 films shown in Kazakh cinemas in 2010-2018. In particular, the level and development of Kazakh films have been shown. In what genre films are shot in Kazakhstan, its interest rate. Mutual comparison of box office of Kazakhstan films and production companies has been done. In this paper, the percentages of the languages of the films have been shown. The countries of films shown in cinemas of Kazakhstan and their percentage are determined. The analysis of genres of foreign films has been presented. It was also reported about the budgets and box offices of foreign films, and their mutual verification. Countries of films with a high cash register. Well-known manufacturing companies and their percentage has been demonstrated. Awards of the films and their analysis shown in cinemas of Kazakhstan are defined.

Keywords: film, percentage, box office, analysis, genre, budget.

Аңдатпа. Зерттеу жұмысы 2010-2018 жылдары Қазақстан кинотеатрларында көрсетілген фильмдерді талдау және ақпараттарды көрсету туралы. Атап айтқанда, қазақстандық фильмдердің деңгейі мен дамуы көрсетілді. Қазақстанда Фильмдер қандай жанрда түсіріледі, олардың пайыздық көрсеткіші. Қазақстандық фильмдер мен өндірістік компаниялардың кассалық алымдарын өзара салыстыру жүргізілді. Бұл мақалада фильмдер тілдерінің пайыздық үлесі көрсетілді. Қазақстан кинотеатрларында көрсетілетін фильмдердің елдері және олардың пайыздық үлесі анықталды. Шетелдік фильмдердің жанрларына талдау жасалды. Сондай-ақ шетелдік фильмдердің бюджеттері мен кассалары, сондай-ақ олар өзара салыстырылды. Жоғары кассалық алымы бар фильмдердің елдері мен белгілі өндіруші компаниялар және олардың пайызы көрсетілді. Қазақстан кинотеатрларында көрсетілген фильмдердің марапаттары мен оларды анализдеу анықталды.

Түйін сөздер: фильм, пайыздық көрсеткіш, кассалық алым, анализ, жанр, бюджет.

Аннотация. Статья об анализе и информации о 100 фильмах, показанных в казахстанских кинотеатрах в 2010-2018 годах. В частности, был показан уровень и развитие казахстанских фильмов. В каком жанре снимаются фильмы в Казахстане, его процентная ставка. Проведено взаимное сравнение кассовых сборов казахстанских фильмов и производственных компаний. В этой статье были показаны процентные доли языков фильмов. Определены страны показа фильмов в кинотеатрах Казахстана и их процентная доля. Представлен анализ жанров зарубежных фильмов. Также сообщалось о бюджетах и кассах зарубежных фильмов, а также об их взаимной проверке. Страны фильмов с высоким кассовым аппаратом. Были продемонстрированы известные компании-производители и их процент. Определены награды фильмов и их анализ, показанных в кинотеатрах Казахстана.

Ключевые слова: фильм, процентный показатель, кассовый сбор, анализ, жанр, бюджет.

Introduction

The dynamic development of the Kazakh film industry attracts the attention of the world film market. More and more domestic films are being released internationally. Kazakhstan's products are gaining recognition at major international festivals and competitions.

At the moment, the domestic film Studio "Kazakhfilm", which was founded in 1934 in Almaty, is the only and largest center of film production in Central Asia, providing a full range of services for the production of feature, documentary and animated films.

Film production is carried out both in film and digital format and allows Kazakh filmmakers to make films that become the property of the country.

The main topics of the paintings of the Studio is the best of the human qualities of the modern Kazakhs, friendship and unity of the people, complex historical path of the country, today Kazakhstan, as well as the preservation of historical and cultural heritage, the importance of the achievements of the country's independence [1].

According to official statistics, there are 35 film production organizations producing more than 250 films per year, including television and private projects. There are 93 theaters and 247 cinemas. Box office fees are more than 14 billion tenge, of which only 10% - from Kazakh paintings. Of the 400 films in the box office, only 6% or about 24 films are produced in Kazakhstan.

The volume of services for the production of films, TV programs and music records in Kazakhstan increased by 58.5 percent over the year. In monetary terms, the figure amounted to 18 billion tenge. [2]

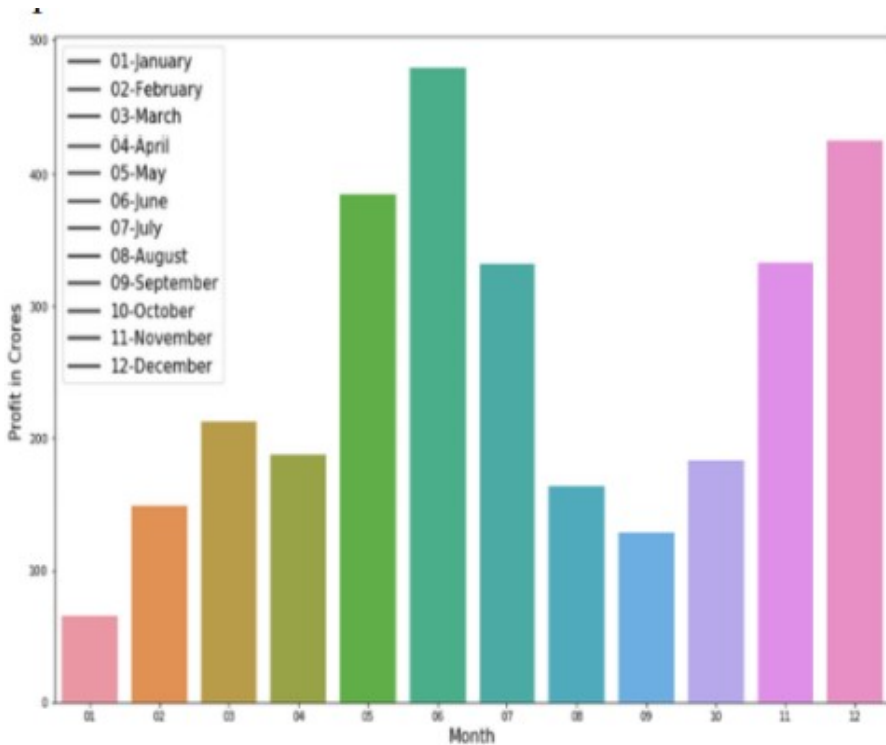
The locomotive of the Kazakh cinema in the first half of the year is the cultural capital. The share of Almaty increased to 59.8 percent from Kazakhstan, the volume of services increased more than twice, to 10.8 billion tenge.

Another 25.4 percent of all services in film and video production accounted for Astana - 4.6 billion tenge, plus 23.6 percent for the year [3].

Today we have three main trends. On the one hand, it is an ideological film, addressed to some specific ideas of power, including the ideology of state patriotism. There are also Directors who are, as it were, the official representatives of such a movie. This is primarily Rustem Abdrashev and akan satayev, balancing on a rope between the author's cinema and ideologically biased cinema.

The second direction, which today has acquired a certain clarity, is commercial cinema. Here the genre of Comedy has been gaining momentum for a number of years and now has gained visible features of commercial cinema, designed for cash, for audience demand. Here only the last films from this series: "Glamour is for fools", "Business Kazakh", "Brother or marriage", "Kalinka Sabina". And the third trend is the author's cinema.

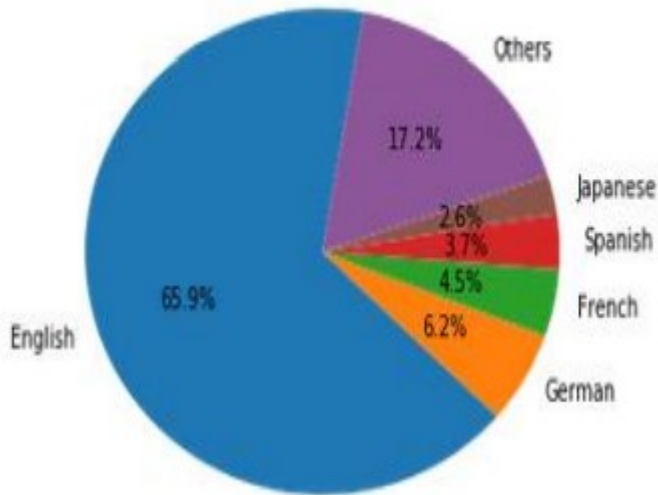
There are approximately 190 countries all over the world. Every year in each month, more number of movies are released in many different languages in many different countries the world. Though more number of movies are released every year, not all the movies acquires success and brings profit. There are specific months in year which gives higher profit rate than the other months. The studios always keeps an eye on the historical box office performance for every month and weekend of the year. V. Vaneetha, V.P. Sumati, V. Soundarya conducted an analysis on the most profitable month of the year of the film [4].



The above graph infers that among all the months in the year, the sixth month, June has the higher number of profit and June month is the most profited month all over the world in the movie production. Also, from this analysis, it is concluded that on an average, mid of the year during the summer seasons i.e., from May to July is the period where the profit gets increased more. It's been true that a strong turnout is a reflection of demand or overall consumer behaviour. This is why you will see an action blockbuster on the first weekend of summer. Holidays are vital for obvious reasons. The December month is the second profited month. During these month a more number of holidays and family movies are released more when family time is more. The May month is third most profited month which is the month for summer holiday seasons for schools. Maybe during holidays, people turn out to movies more often for the entertainment. More people buying ticket and watching movies during these seasons increases the revenue of the movie, which in turn increases the profit of the movie. This may be a reason for movie released in mid of the year getting more profited [5].

They also analyzed the language With More Number Of Movie Releases.

Language vs Number of movie releases:



In each and every language, a large number of movies are releasing annually. For instance, a Hollywood film typically takes 36 months to plan and 12 months to execute. From the dataset, the total languages is considered and top five languages with highest percentage of movies and other remaining languages are analysed and represented in pie-chart. This representation depicts which language has highest number of movies.

Working on this project, I found similar articles. One of them is “Analysis of the current state of the domestic film industry”. The authors of this work Spivakova Karina samvelovna, Arakelyan Arthur movsesovich [6].

They compared domestic and foreign films of 2004-2014.

Dynamics of distribution of domestic and foreign films 2004-2014

Год	Прокат фильмов			Годовой прирост			Доля отечественных фильмов
	Всего	Отечественные	Зарубежные	Всего	Отечественные	Зарубежные	
2004	283	50	233	4,4%	25,0%	0,9%	17,7%
2005	289	60	229	2,1%	20,0%	-1,7%	20,8%
2006	310	69	241	7,3%	15,0%	5,2%	22,3%
2007	369	85	284	19%	23,2%	17,8%	23,0%
2008	378	81	297	2,4%	-4,7%	4,6%	21,4%
2009	324	82	242	-14,3%	1,2%	-18,5%	25,3%
2010	363	80	283	12%	-2,4%	16,9%	22%
2011	373	95	278	2,8%	18,8%	-1,8%	25%
2012	451	84	367	20,9%	-11,6%	32%	18,6%
2013	520	65	426	2%	-22,6%	7,3%	18,2%
2014	521	84	437	6,1%	29%	2,6%	18,01%

In the period from 2005 to 2010, the period of relative stability in the country's economy as a whole and the conditional rise in domestic film production in particular, the share of domestic films in the repertoire of cinemas fluctuated around 20–23%. However, since 2012, this figure has dropped to 18%, despite the increase in the total number of Russian films produced. From 2012 to 2014 recovery of this indicator to the former level did not happen.

They also analyzed the Attendance of cinemas in Russia, 2004-2014

Attendance of cinemas in Russia, 2004-2014

Год	Число посещений, млн чел.	Годовой прирост
2004	73,7	12,9%
2005	84,5	14,7%
2006	86,9	2,8%
2007	115,1	32,5%
2008	120,0	4,3%
2009	132,3	10,3%
2010	155,9	17,8%
2011	160,0	2,6%
2012	160,4	0,3%
2013	176,3	9%
2014	176	-0,2%

As can be seen from the table, attendance at cinemas, until recently, grew at a rather high rate. However, in 2011, the first sharp decline occurred, and in 2014, for the first time, a slight decrease in visits was recorded compared to the previous year. Among the many possible reasons for this are two main ones: an increase in the average cost of tickets for film shows and a decrease in real household income due to a sharp jump in exchange rates. Nevertheless, the number of visits to cinemas in 2015 increased again, the data for the first half of the year recorded a rather sharp jump in this indicator.

This indicates that the potential for growth in the capacity of the film distribution market remains quite high.

The author studied the Network of commercial cinemas and the number of cinemas in Russia, as the features of the cinema in the country.

Network of commercial cinemas the number of cinemas in Russia

Год	Количество кинотеатров	Количество кинозалов	Кинотеатры с цифровыми залами	Цифровые кинозалы
2009	778	2101	272	338
2010	834	2395	532	941
2011	914	2704	709	1495
2012	1025	3100	871	2094
2013	1101	3479	1010	2967
2014	1122	3540	1040	3144

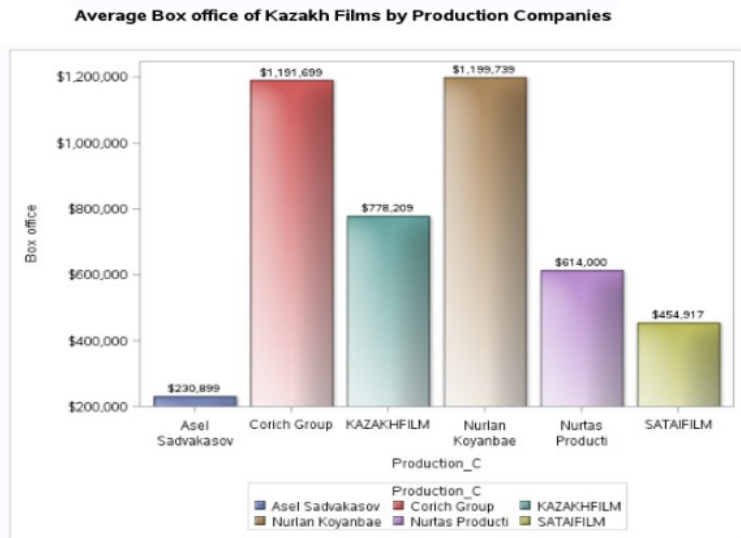
In 2014, the number of settlements with a high degree of equipment with modern cinema halls is quite large, however, the problem with the payback and investment attractiveness of domestic film projects remains. From these data we can conclude that Russian cinematography has reserves of growth and improvement. The commercial potential of the film business is quite high.

Author the main economic indicators of the industry are analyzed and the main development trends and their positive and negative traits. The author carefully studies such indicators as the dynamics of film distribution in the Russian film market, divided by the percentage of domestic and foreign films, the attendance of cinemas in Russia, the number of cinemas and especially the cinema in the country, shooting Russian and foreign film projects, production facilities of film studios.

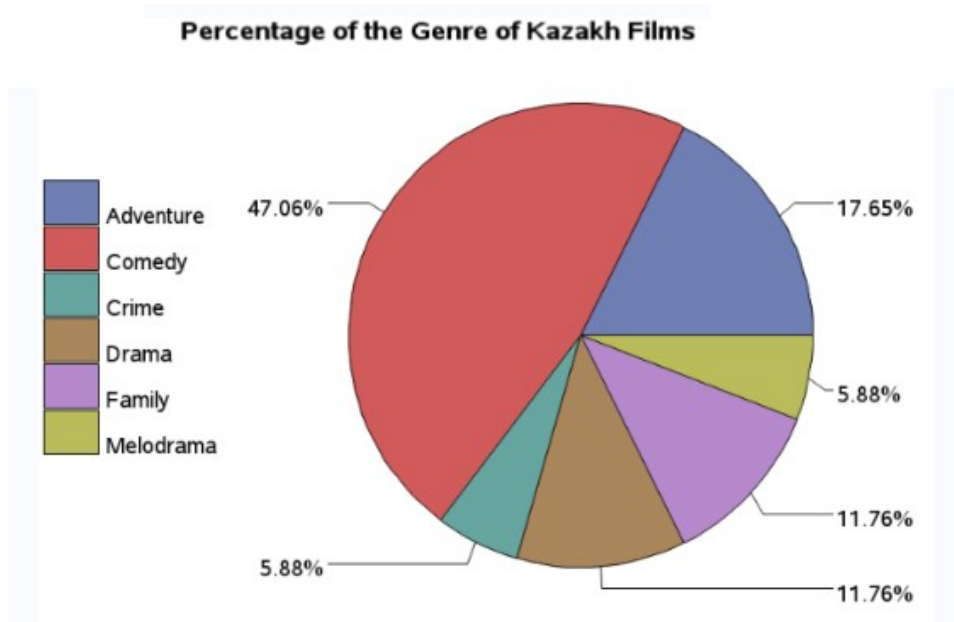
Main part

The dataset is captured from kaggle dataset and it contains 100 movies. It contains nearly 8 years (between the years 2010 to 2018) of movies data. The dataset accommodates nearly 18 attributes. The dataset holds attributes such as movie id, original title, the duration of film, production companies, the type of movie genre, revenue of the movie, movie budget, languages of the movie, country name of the movie, release date of the movie, movie languages count. Also names of awards.

The analysis of films shown in cinemas in Kazakhstan as a whole can be judged by the following indicators: the percentage of countries of films in cinemas, information about the genre of films, the average budget and the average box office of films. Information about the highest film production companies and film awards.



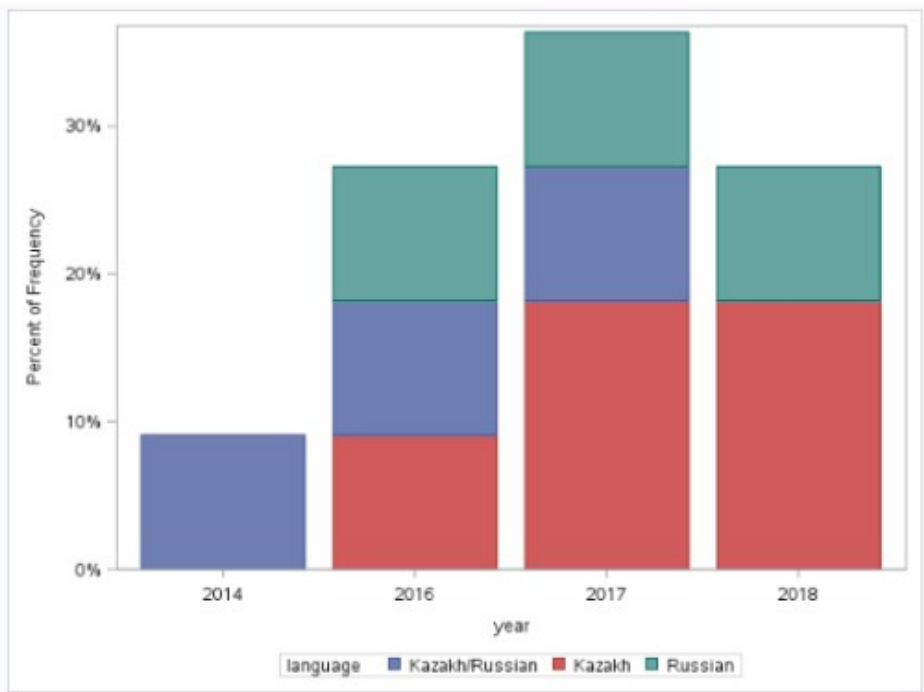
The chart displays the average box office of Kazakhstan films by production companies. The highest box office-this movie Corich Group and Nurlan Koyanbaev. Average box office of the film Nurlan Koyanbaev is \$1,199,739 and the film Corich Group is \$1,191,699. There is a slight difference in the box office of the films Nurtas Production, KazakhFilm, SataiFilm. Movies of Asel Sadvakasova low box office. The film Asel Sadvakasova is \$230,899.



This bar chart gives information about the genre of Kazakh films. 47% of Kazakhstan films are in the Comedy genre, 17.65% in the adventure genre are in the second place. There is a slight difference in the percentage of the genres Drama, Family. Minimum 5.88% in melodrama and criminal.

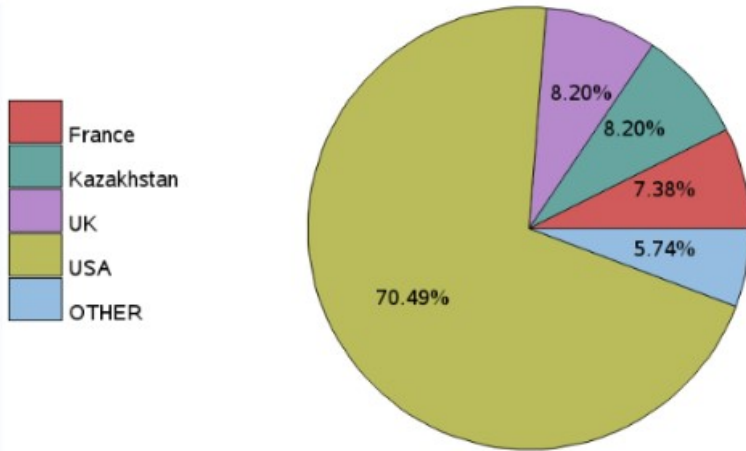
To high rating films in Kazakhstan include : “Бизнес по-казахски” , “Брат или Брак”, “Ұлы Дала Комедиясы”. The genre of these films is comedy.

Language of Kazakh Films by year



In this chart, 10% of Kazakh films shot in the Kazakh language in 2016. In 2017-2018, the growth was up to 19%. In the Kazakh and Russian languages (bilingual) for 2016-2017 was 10%. Also in the Russian language for 2016-2017 was 10%.

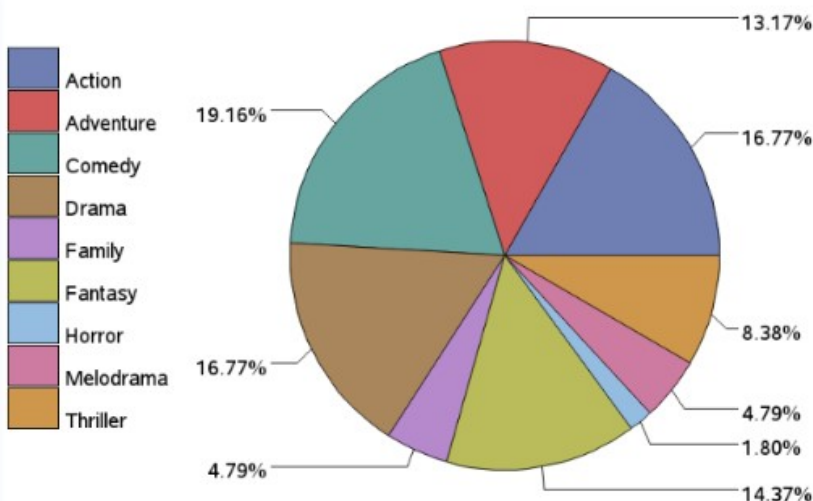
Percentage of countries of the films in 2010-2018



The success of the film contributes to major changes in the world economy. Every country produces films every year. There countries that produce films on a large scale compared to other countries. The analysis is done to portray which country produces more films.

The chart displays the Percentage of countries of the films shown in cinemas of Kazakhstan in 2010-2018. Most of the movies are from USA, 70.49% , and 7.38% of films are from France. Also 8.20% of films are from UK.

Percentage of the Genre of Films



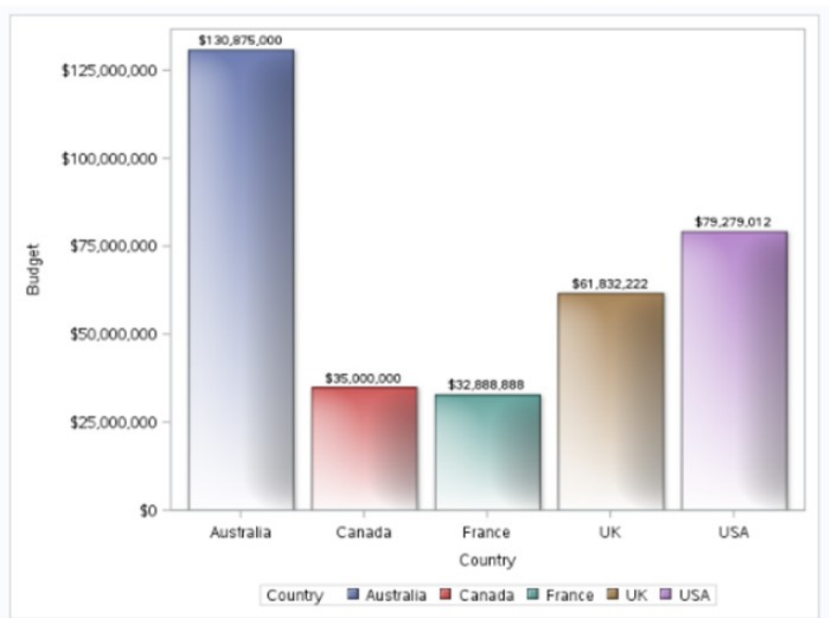
This bar chart gives information about the genre of films shown in cinemas of Kazakhstan in 2010-2018 years.

There are shown 9 genre: Action, Comedy, Adventure, Drama, Family, Fantasy, Horror, Melodrama, Thriller.

19.6% of films are in the Comedy genre, 16.77% in the adventure genre and drama genre. There is a slight difference in the percentage of the genres Fantasy, Adventure, Thriller. Minimum 1.80% in the horror genre.

Obs	Country	Budget
1	USA	\$79,279,012
2	UK	\$61,832,222
3	France	\$32,888,888
4	Australia	\$130,875,000
5	Canada	\$35,000,000

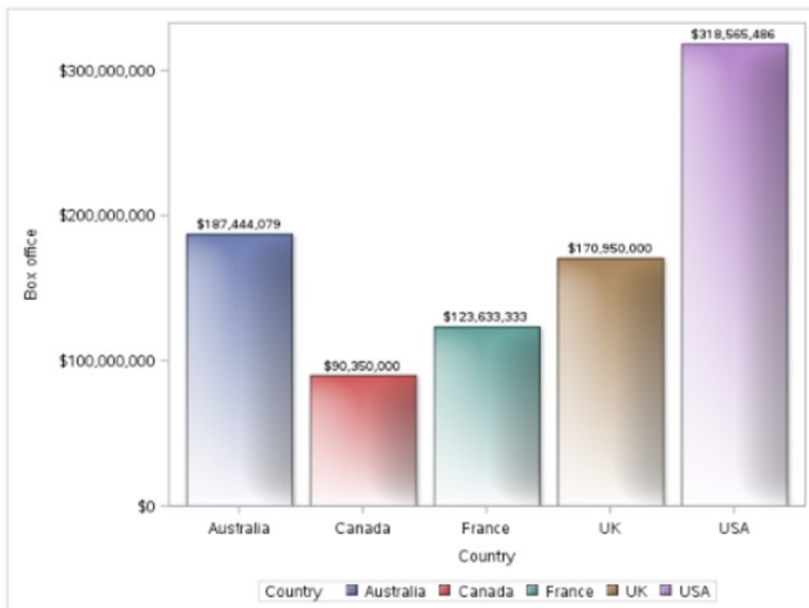
Average Budget of the Films by Country



The chart displays the Average budget of the films by country. The highest average budget is in Australia is \$130,875,000. There is a slight difference in the average budget are in USA and UK. Movies of USA average budget is \$79,279,012. Films of UK is \$61,832,222.

Obs	Country	Box_office
1	USA	\$318,565,486
2	UK	\$170,950,000
3	France	\$123,633,333
4	Australia	\$187,444,079
5	Canada	\$90,350,000

Average Box office of the Films by Country

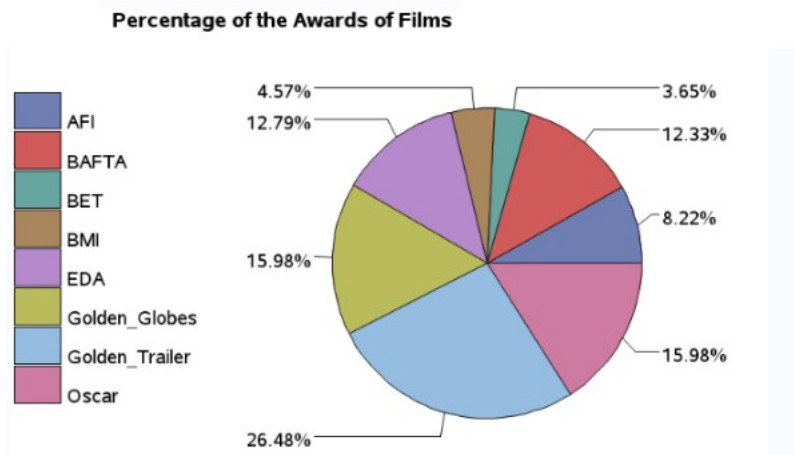


Here we see that average box office of films of USA more 4 times than average budget. Also average box office of films of UK more 2.75 times than average budget.

Average box office of films UK and Australia are slight difference.

Percentage of Awards

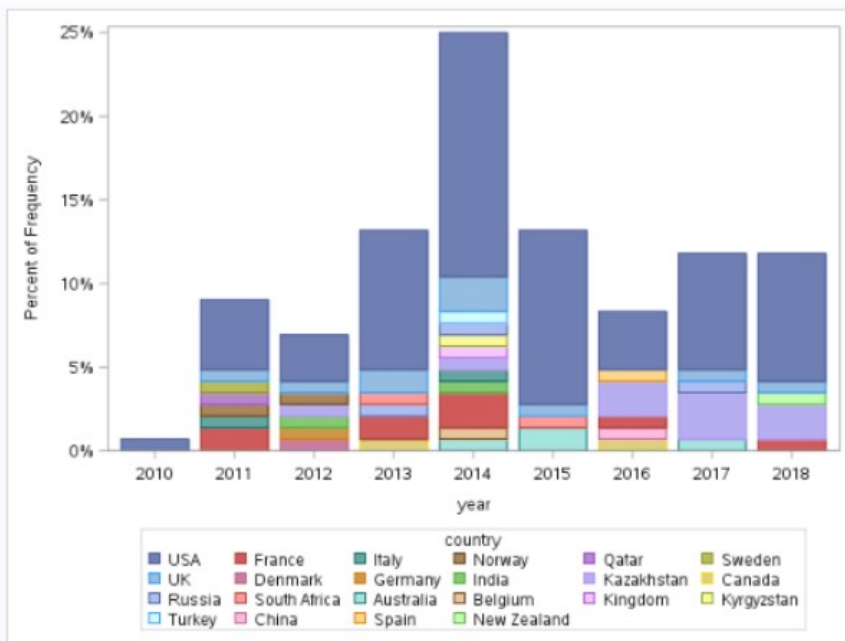
Obs	Awards	Count
1	Oscar	35
2	Golden_Globes	35
3	EDA	28
4	Golden_Trailer	58
5	BET	8
6	BAFTA	27
7	AFI	18
8	BMI	10



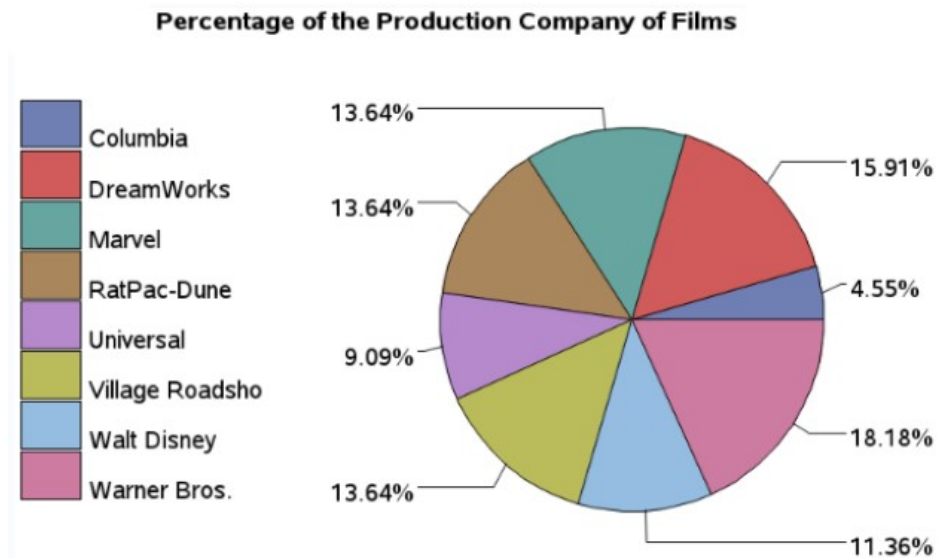
This bar chart gives information about the awards of films shown in cinemas of Kazakhstan in 2010–2018 years. There are shown 8 most popular awards: Oscar, Golden Trailer, Golden Globes, EDA, BMI, AFI, BAFTA.

The highest 26.48% of the film was awarded the Golden Trailer, 15.98% of the film were awarded the Golden Globes and Oscar. Also 12.79% of the film were awarded the EDA.

Country by Year



From this data we can conclude that the level of the United States is large. The largest poker was 27% in 2017. There is a slight difference in the India, Norway, Turkey, Canada, New Zealand.



This bar chart gives information about the Production Companies of films.

There are shown 8 most popular Production Companies: Worner Bros. Pictures, Walt Disney Pictures, Columbia Pictures, Universal Pictures, DreamWorks, Marvel, RatPac-Dune, Village Roadshow. The highest 18.18% of the film Production Company is Warner Bros. Picture, In the second Production Company is DreamWorks Picture with 15.91%.

Conclusion

We analyzed Kazakh and foreign films in cinemas in Kazakhstan. We showed information about their genres, average budgets and average box office. 47% of Kazakhstan films are shot in the Comedy genre. Among the films with a high rating, and box office, includes films Corich Group (Brother or Marriage), Nurlan Koyanbaev (“Business in Kazakh”), Kazakh Film (“Zhauzhurek myn Bala”). In recent years, the production of Kazakh films in the Kazakh language has increased. In 2010-2018, about 70% of USA films are shown in cinemas of Kazakhstan. In addition, most of the films were shot in the genre of Comedy, adventure, drama. The highest average box office movies USA.

The highest percentage of the films Production Companies are Worner Bros. Pictures, Walt Disney Pictures, Dreamworks Pictures.

Upon analysing , the movie success is independent to the factors like the budget of the movie, it doesn't make profited movie even when lot of budget is invested in a movie. From this analysis, it's clear to the point that to make a movie to be successful, the studios, releasing the movie has to release the favourable genre movie of people's interest.

References

- 1 Mendybaeva, A. Development of Kazakhstani cinema for 25 years of independence. Today.kz. November 19, 2016. URL: <http://today.kz/news/kino/2016-11-19/729477-razvitie-kazahstanskogo-kinematografa-za-25-let-nezavisimosti/>
- 2 Mukanova, A. Cinema today is an industry. Kazpravda.kz. January 20, 2017. URL: <https://www.kazpravda.kz/articles/view/kino-segodnya--eto-industriya1/>
- 3 The film industry in Kazakhstan is booming - research. Tengrinews.kz. November 13, 2017. URL: https://tengrinews.kz/kazakhstan_news/kinoindustriya-v-kazahstane-perejivaet-podyem-issledovanie-330868/
- 4 Vanitha, V. Sumathi, V.P., Soundariya, V. An Exploratory Data Analysis of Movie Review Dataset. *International Journal of Recent Technology and Engineering (IJRTE)* ISSN: 2277-3878, 7 (4S), (November 2018): pp. 381-383.
- 5 Jain, V. Prediction of movie success using sentiment analysis of tweets. *The International Journal of Soft Computing and Software Engineering*, 3(3), (2013): pp. 308-313.
- 6 Spivakova, K.S., Arakelyan A.M. Analysis of the current state of the domestic film industry. *Service Plus Journal*, 10 (3), (2016): pp.43-46.

ПЕДАГОГИКА ЖӘНЕ ОҚЫТУ ӘДІСТЕРІ

PEDAGOGY AND TEACHING METHODS

МРНТИ 14.35.07

Г.И. Чемоданова¹, М.В. Федяева², Н.Г. Павловская³
Северо-Казахстанский университет им. М. Козыбаева,
г. Петропавловск, Казахстан

ФОРМИРОВАНИЕ ИССЛЕДОВАТЕЛЬСКИХ КОМПЕТЕНЦИЙ ОБУЧАЮЩИХСЯ В УСЛОВИЯХ ВУЗА

Аннотация. Современный рынок труда предъявляет требования к выпускникам вуза, владеющим исследовательской компетентностью, позволяющей ориентироваться в постоянно изменяющейся социальной, трудовой среде, анализировать и оценивать свой профессиональный уровень. В статье рассматриваются возможности образовательной и проектной деятельности в развитии исследовательских компетенций обучающихся в условиях вуза. Представлены принципы эффективного формирования исследовательских компетенций.

Ключевые слова: исследовательская компетентность, развитие исследовательской компетентности, образовательная деятельность, проектная деятельность, принципы.

Abstract. A modern labour-market produces requirements to the graduating students of institution of higher learning, owning a research competence, allowing to be oriented in a constantly changing social, labour environment, analyse and estimate the professional level. In the article possibilities of educational and project activity are examined in development of research competences student in the conditions of institution of higher learning. Principles of the effective forming of research competences are presented.

Keywords: research competences, development of research competences, educational activity, project activity, principles.

Андатпа. Қазіргі еңбек нарығы үнемі өзгеріп отыратын әлеуметтік және еңбек жағдайларында жүруге, олардың кәсіби деңгейлерін талдауға және бағалауға мүмкіндік беретін зерттеу құзыреттілігіне ие жоғары оқу орындарының түлектеріне сұраныс туғызады. Мақалада ЖОО-да студенттердің зерттеу құзыреттілігін дамытуда оқу және жобалық жұмыстардың мүмкіндіктері қарастырылады. Зерттеу құзыреттілігін тиімді қалыптастыру принциптері ұсынылған.

Түйінді сөздер: зерттеу құзыреттілігі, зерттеу құзыреттілігін дамыту, білім беру қызметі, жобалау қызметі, принциптері.

На современном этапе развития социума, которое характеризуется процессами демократизации, интеграции культур, усилением позиции Казахстана в мировом пространстве, происходит реформирование системы высшего образования, изменяющее структуру и содержание деятельности вузов в соответствии с запросами постоянно обновляющегося рынка труда.

Изменение идеологии подготовки специалиста привело к изменению роли научно-исследовательской работы в формировании профессиональных компетенций. В логике компетентного подхода возникает необходимость в новом понимании сущности профессиональной подготовки, немаловажной частью которой является овладение системой общенаучного, методологического и профессионального знания о методах научного познания, исследовательских и творческих умений, ценностных ориентаций на творческую самореализацию. Развитие исследовательских компетенций обучающихся становится все более важным показателем уровня их профессиональной подготовки.

Акцент на формирование и развитие исследовательских качеств обусловлен общим направлением, сформулированным как одна из задач системы образования – интеграция образования, науки и производства [1].

По мнению Коваленко И.А. «Исследовательская компетентность студентов - это интегральное личностное образование, отличающееся устойчивой мотивацией. Оно формируется в процессе учебно- и научно-исследовательской деятельности обучающихся и выражается в наличии у них знаний об организации исследовательской деятельности, владении специальными умениями и навыками, опытом творческой деятельности, обогащении субъектного опыта личности в целом, что является

необходимым условием для личностно-профессионального развития» [2, С.32].

Силакова Л.В., выделяет качествами, которыми должен обладать выпускник: сформированное инновационное мышление и креативность; самостоятельная организация профессионального роста; владение интегрированными междисциплинарными знаниями; способность работать в команде над проектами; практический опыт разработки и внедрения исследовательских решений [3].

Для формирования представления о развитии исследовательских компетенций обучающихся через образовательную и проектную деятельность комиссией была изучена и проанализирована учебно-методическая документация, в которой, как предположили мы, должно найти отражение указанных компетенций:

- через какие формы организации деятельности обучающихся развитие исследовательских компетенций;
- отражение в РУП (силлабус) исследовательских компетенций;
- наличие заданий (отражение в МУ по выполнению СРО/ РУП (силлабус)), направленных на развитие исследовательских компетенций;
- организация проектной деятельности обучающихся (как в рамках, так и вне образовательного процесса), на каком уровне осуществлялся /осуществляется проект уровень самостоятельности выполнения/разработки проектов.

Проверка показала, что эффективность процесса развития исследовательских компетенций достигается через ориентацию на систему принципов:

- сочетание обязательности и добровольности участия студента в научно-исследовательской работе;
- приоритет научных интересов субъектов деятельности, согласованность выбора тематики исследования;
- возможность предложений по улучшению организации научно-исследовательской работы;
- профессиональная направленность научно-исследовательской работы;
- значимость научно-исследовательской работы для университета;
- возможность участия в различных конференциях по теме исследования;
- возможность публикации результатов научно-исследовательской работы. [4, С.6-7].

Развитие исследовательских компетенций обучающихся СКУ им. М. Козыбаева осуществляется через:

- исследовательскую деятельность обучающихся, встроенную в учебный процесс.

Следует отметить, что на 1-2 курсах основной задачей является развитие интереса к научно-исследовательской работе, привитие первичных навыков проведения мини-исследований в рамках изучения дисциплин. На старших курсах эта работа продолжается и развивается. Большинство дисциплин, осваиваемых обучающимися на 3-4 курсах предусматривают самостоятельное выполнение заданий проектно-исследовательского характера.

В ряде дисциплин, изучаемых на 3-4 курсах, отражена ориентация на развитие исследовательских компетенций через описание ожидаемых результатов: умения и навыки самостоятельного анализа процесса обучения, исследования методических проблем, навыки постановки и решения исследовательских задач в своей профессиональной деятельности; анализа и обобщения передового педагогического опыта; умения самостоятельного проектирования учебного процесса ориентированного, на решение конкретной педагогической проблемы; умения интегрировать информацию, полученную из различных источников.

Установка на развитие исследовательских компетенций репрезентируется в ожидаемых результатах обучения по дисциплинам: знать технологии планирования, организации и проведения педагогического исследования, специфику педагогического эксперимента в методическом исследовании, методов сбора, обработки и интерпретации данных, приемов оформления полученных результатов исследования, основных направлений научно-педагогических исследований в РК и за рубежом; уметь: выполнять теоретический анализ научной проблемы, проводить научное педагогическое (методическое) исследование на материале учебного предмета; демонстрировать навыки владения приемами изложения научных текстов, оформления научных работ.

Данное направление также подразумевает следующие формы организации деятельности обучающихся:

- внедрение элементов научных исследований в лабораторный практикум, в практические занятия, в задания СРО, в педагогическую практику.

В МУ по выполнению лабораторных работ и СРО этих дисциплин присутствуют как отдельные задания исследовательского характера, так и задания в виде целостных проектов.

На практических занятиях и СРО/СРОП, в методических указаниях (МУ) также предлагаются задания, формирующие исследовательские компетенции обучающихся, дающие установку на формирование самостоятельной исследовательской позиции, самообразование:

- подготовка докладов с самостоятельным анализом научного и эмпирического материала и защитой собственной позиции;
- защита продуктивных рефератов, предполагающая самостоятельный поиск и выбор материала;
- защита презентаций, развивающая творческий подход к исследованию;
- эвристическая беседа;
- научно-обучающая и научно-методическая конференция;
- участие в научной дискуссии, защита и обоснование собственной позиции;
- аргументированное сопоставление традиционной и обновлённой программы обучения дисциплинам в современной школе Республики Казахстан;
- самостоятельная разработка инновационных уроков с применением современных методических форм и приёмов.

Например, при изучении темы «Методология педагогической науки» обучающимся предлагается работа в группе «Исследование, которое хотелось бы провести». Предлагаются темы педагогического исследования (проблемное поле):

- педагогические условия организации обучения и воспитания в вузе;
- организация индивидуальной работы на практических занятиях;
- совершенствование навыков самостоятельной работы студентов бакалавриата.

Задание: Проанализируйте предложенные темы, сформулируйте основные методологические характеристики исследования (актуальность, объект, предмет, цель) и обоснуйте набор адекватных им методов исследования. Представьте варианты решения обозначенного исследования.

Освоение специальных курсов студентами различных ОП (образовательных программ): «Технология и организация научно-педагогического исследования», «Технология и организация научно-педагогического исследования», «Современные методы биологических исследований», «Методика научно – педагогического исследования», «Основы исследовательской работы», «Методологии научного

исследования культурно-досуговой деятельности», «Исследовательская и проектная деятельность в образовательном учреждении», «Исследовательская культура социального педагога». В процессе изучения которых, развитие исследовательских компетенций обучаемых организуется в соответствии с принципом постепенного усложнения задач исследовательской деятельности и увеличения доли самостоятельности обучающихся от курса к курсу.

В ходе педагогических практик студенты получают задания, связанные с освоением технологий осуществления поиска, анализа и систематизации информации необходимой для диагностики состояния педагогического процесса в конкретной школе, проведения педагогического эксперимента в рамках написания дипломной работы.

В результате у обучающихся формируются система знаний о технологии планирования, организации и проведения исследования, о методах сбора и обработки, интерпретации данных, об оформлении полученных результатов, общие и специальные навыки проведения исследования; развиваются умения по выполнению теоретического анализа научной проблемы, выбору методики исследования, оформлению научных работ; развиваются элементы критического мышления.

Формирование исследовательских компетенций осуществляется через дуальные занятия - осуществляется подготовка совместных проектов, научных статей.

Исследовательскую деятельность обучающихся, дополняющую учебный процесс.

Результатом формирования исследовательских компетенций обучающихся является научная и проектная деятельность студентов.

Следует выделить следующие направления развития исследовательских компетенций:

- исследовательская деятельность в рамках студенческих научных коллективов (кружков, СНО);
- научные мероприятия (дни науки, конференции, круглые столы, конкурсы, научные семинары) и т. д.;
- республиканские конкурсы НИРС;
- работа в архиве, исследование документальных источников;
- конкурсы научных проектов на грант ректора для молодых ученых;
- Start-up проекты;
- Техника Джон Дир;
- выполнение научных исследований по запросу принимающей стороны в рамках прохождения производственных практик;

- прохождение научных стажировок;
- написание дипломных работ/проектов;
- акты внедрения в производство.

Формы и методы развития исследовательских компетенций в деятельности, дополняющей учебный процесс, также зависят от уровня подготовки обучающихся. На 1-2-х курсах это, прежде всего, информационный поиск и реферирование, научные обзоры, которые в дальнейшем переходят в полноценную научную работу, результатом которой становится публикация статей, участие в республиканских и международных конференциях и конкурсах научных работ.

Исследовательская и проектная деятельность студентов находится в тесной взаимосвязи. Образовательный и проектный виды деятельности одинаково важны для развития исследовательских компетенций. Однако, как показало исследование формирование исследовательских компетенций преобладает в рамках образовательной деятельности.

В ходе теоретического исследования мы подтвердили наше предположение о том, формирование исследовательских компетенций обучающихся заложено в цели, в конечных результатах изучаемых дисциплин, методах и формах контроля. Исследовательский характер носят предлагаемые задания в рамках различных видах занятий: практические занятия, СРО, СРСП.

Таким образом, исследовательские компетенции обучающихся развиваются как в рамках образовательной, так и в рамках проектной деятельности. Эффективность развития исследовательских компетенций обучающихся определяется их активным участием в указанных видах деятельности в процессе изучения дисциплин ОП и поддержкой этой деятельности через работу СНО, организацию конференций, научных конкурсов, проектов, прохождения практик.

Список использованной литературы:

- 1 Республика Казахстан. Закон «Об образовании» от 27.07.2007 года, № 319-III// <http://adilet.zan.kz>.
- 2 Коваленко И.А. Педагогические условия развития исследовательской компетентности студентов в образовательном процессе вуза: диссерт. ... к. п. н.:13.00.01. - Благовещенск, 2005 – 185с.
- 3 Силакова Л.В. Профессиональные компетенции и способы их формирования в вузе//Научный журнал НИУ ИТМО. - №2 (17). - 2014. – С.78-86.

4 Нужнова С.В. Организация научно-исследовательской деятельности студентов при формировании готовности к профессиональной мобильности. – Троицк, 2010. – 49с.

IRSTI 18.41.51

M.D. Yeskendir¹

¹ Suleyman Demirel University, Kaskelen, Kazakhstan

THE USE OF ELEMENTS OF THE HISTORY OF MATHEMATICS IN TEACHING

Андатпа. Кез-келген мектеп пәндерінің тарихын зерттеу білім беру үдерісінің маңызды құрамдастарының бірі және оқушының жеке басын қалыптастыру болып табылады.

Бұл ғылыми мақалада тарихи материалдарды мектеп математикасын оқытуда тек сыныпта және сыныптан тыс уақытта ғана емес, сондай-ақ бағдарламалар негізінде өткізілетін элективті курстарда да пайдалануға болатыны туралы айтылады. Осы мақалада оқушыларды математика тарихының элементтерін пайдалануды үйренеміз. Зерттеу сауалнама түрінде 5-9 сынып оқушыларымен және оқытушыларымен жүргізілді.

Зерттеу нәтижелері тарихи материалды пайдалану қажеттілігін және оның маңыздылығын көрсетті. Бұдан басқа, зерттеу нәтижелерімен анықталған міндеттердің бірі математика тарихы элементтерінің презентация нысандарын іздеу және тарихи материалдарды пайдалану мақсаттарын анықтау болды.

Түйін сөздер: тарихи деректерді қолдану, математика педагогикасы, математика.

Аннотация. Изучение истории любого школьного предмета является одной из важнейших составляющих учебного процесса и формирования личности ученика.

Статья посвящена применению исторических материалов в школьной математике, не только на уроках и во внеклассное время, но и на элективных курсах, которые проводятся на основе программ. В этой работе мы исследуем использование элементов истории математики в обучении школьников. Исследование проводилось в форме анкет, интервью. В них приняли участие школьники 5-9 классов и учителя.

Результаты исследования показали необходимость использования исторического материала и его актуальность. Более того, одной из задач, выявленных по результатам исследования, стал поиск форм изложения элементов истории математики и определение целей использования исторического материала.

Ключевые слова: применение исторических данных, математическая педагогика, математика.

Abstract. The study of the history of any school subject is one of the most important components of the educational process and the formation of the student's personality. In this paper, we explore what is the use of elements of the history of mathematics in teaching schoolchildren. The study was conducted in the form of questionnaires, interviews with, schoolchildren of 5-9 grades and teachers.

The results of the study showed the need for the use of historical material and its relevance. Moreover, one of the tasks identified by the results of the study was the search for forms of presentation of elements of the history of mathematics and the definition of the purposes of using historical material.

Keywords: application of historical data, mathematics pedagogy, mathematics.

“...Who wants to limit himself to the present, without knowledge of the past, he will never understand ...” Leibniz.

The study of the history of any school subject is one of the most important components of the education process and the formation of the pupil's personality. The use of elements of the history of mathematics in school, the relevance of this work has been repeatedly discussed in the methodology of teaching by famous scientists.

One of the great scientists says that the history of mathematics allows us to see “living mathematics”, and not frozen abstract - deductive system, a deeper understanding of the epistemological process of knowledge in mathematics, methods of scientific knowledge, characteristic of each stage, to understand the dynamics of their development.

The question of using elements of history in teaching mathematics is not new. This issue has been repeatedly discussed at seminars of teachers of mathematics. The mathematician E.I. Popov said: “the usual way of teaching geometry with its theorems and proofs causes in children in the vast majority of cases, such invincible disgust and boredom. Few who have completed a secondary school, will retain at least some tendency to engage in geometry outside of school”.

At different times, scientists and methodologists have differently defined the purpose of introducing elements of the history of mathematics in teaching. However, the following goals have almost always been and still remain common:

1. Increasing students' interest in the study of mathematics and deepening their understanding of the material under study.

2. Expanding the mental outlook of students and increasing their overall culture.

Of course, these are the objectives of every teacher. But it is much easier to the teacher of geography, biology, history, literature to inculcate the interest of students in their subject.

What should a math teacher do?

The teacher needs to overcome two difficulties:

1. The difficulty of the subject itself.

2. The presumption of "boredom".

However, the program does not contain specific indications on what information on the history of mathematics should be communicated to students in the teaching process, in which classes, to what extent and in which sections of the school curriculum. In order to answer these questions, on the one hand, an empirical study of the requests of teachers and students in the historical material was conducted and, on the other hand, the existing school textbooks in mathematics were analyzed.

The study was conducted in the form of questionnaires, interviews, interviews with students and teachers. It was attended by students of 5, 6, 7, 8, 9 classes (300 people) in the schools of Karasay district. The results showed that teachers see the need to involve elements of the history of mathematics in the learning process as a means of increasing interest in the subject (30%), expanding the horizons of students (27%), a deeper understanding of the topic (24%). Teachers working in intellectual technologies (12%), pointed out the role of elements of the history of mathematics in creating sustainable ideas about the concepts studied, in expanding the ways of coding information in the development of the meanings of the terms studied.

Let us now turn to the students' answers. They would like to have such historical materials which: "would contain history of an origin of terms, their designations", "would show how in the history of science approached this or that conclusion of formulas, rules", "would show how great discoveries as mathematics arose and developed shared". Thus, students are interested in active forms of presentation of historical material. Consequently, schoolchildren need not just historical facts in mathematics lessons, as facts, but such educational texts, tasks that would have to analyze the materials of history, enriched by mental experience, which established temporary connections.

The results of the study showed the need for the use of historical material and its relevance. Moreover, one of the tasks identified by the results

of the study was the search for forms of presentation of elements of the history of mathematics and the definition of the purposes of using historical material. In this regard, the appeal to the educational and methodical literature containing historical materials was of interest. In particular, what is the nature of the use of historical material in existing textbooks on mathematics.

Today in many textbooks you can find material with elements of the history of mathematics. For example textbooks [2], [3], [4], [5].

The analysis of textbooks showed that most often historical materials are represented by special sections, or notes, which contain stories about ancient ways of solving problems, about the contribution of individual scientists to the development of a particular branch of mathematical knowledge, the history of mathematical concepts and mathematical disciplines.

It should be noted that the presentation of historical material is mainly narrative in nature, it is often offered as additional material, while performing an informative function, that is, provides students with information about a certain area of scientific knowledge within the subject.

Students are rarely asked to correlate their own experience of studying mathematics with the history of the relevant issue. They are mainly passive observers of historical processes, and are not included in active activities.

The original and rather controversial approach of acquaintance with the results of the activity of scientists-mathematicians was proposed by M.I. Bashmakov. In the Preface to the textbook, he gives the characteristics of individual scientists:

Al-Khwarizmi: an Arab mathematician of the VIII century, from which algebra began and whose name became the ancestor of the name of the most important mathematical concept - algorithm.

René Descartes: the French mathematician and philosopher of the XVII century, who owns the most important idea: using a coordinate system to establish a correspondence between pairs of numbers and figures (arithmetic and geometry).

Newton: English mathematician and physicist of the XVII century, who discovered the most important laws of nature and wrote them in the form of formulas and equations.

Euclid: the legendary Greek mathematician who lived more than 2300 years ago and laid the Foundation of mathematics as a science that formulates and proves its claims.

Diophantus: the great representative of the ancient mathematicians of the 3rd century, whose writings were the basis for reflection on the mysteries of the world of numbers until recently.

Euler: German mathematician of the 18th century, who lived most of his life in Russia and made so many mathematical studies that his works continue to publish until now.

Then in the section “Tasks to choose from” the author classifies them in accordance with the contribution of the scientist in the development of mathematics. For example, “al-Khorezmian Algorithms”, “Descartes Correspondences”, “Newton’s Formulas”, “Euclid’s Proofs”, “Diophantine Calculations” and “Euler’s Investigations”.

School textbooks, as a rule, contain little such information. One message of information on the history of mathematics does not always contribute to the achievement of the goals mentioned above. The acquaintance of students with history of mathematics means:

- Thoughtful systematic use of facts from the history of science in the lessons;
- Their close interlacing with the systematic study of the entire material of the program.

Only such a combination can contribute to the achievement of these goals. Coordinating the study of mathematics with other subjects, in particular with history, emphasizing the role and influence of practice on the development of mathematics. By specifying the condition, and sometimes the reasons for the origin and development of certain ideas and methods, we thereby contribute to the development of logical thinking among students; contribute to the process of their mental maturation and their conscious assimilation of educational material.

What sort of difficulties may arise?

1. Acquaintance of students with the history of mathematics should be carried out mainly in mathematics lessons and only secondarily in extracurricular activities. And we cannot count on any additional hours.

This raises a question. How to find the necessary time? But it can be found – it’s 5 -12 minutes, especially since on average for every 6 lessons there is one conversation. Material for some conversations may be redundant for use in a single lesson. In this case, the teacher himself selects from the material that, at his discretion, the most important and interesting, or distributes it to 2 – 3 lessons.

For example, the technology of using EDU (enlargement of didactic units) gives a positive result - additional hours. Interest in the subject and the effectiveness of classes do not appear immediately after the first lesson, the first conversation, but the result will be positive. Let it happen in a month or at the end of the semester. The time used to present facts from the history of mathematics in a lesson cannot be considered lost if the teacher is able to

present a historical fact in close connection with the program material presented in the lesson.

2. A great methodological difficulty is the decision on the selection of specific material on the history of mathematics and the order of its use in a particular class.

- In this matter it is necessary to be guided by the Mathematics Program.

- Take into account the age characteristics of students.

Naturally, the content and volume, style of presentation of questions on the history of mathematics cannot be the same in different classes.

For example, in grades 5-6 should be limited to the initial information from the history of mathematics and draw students' attention to the basic issues of the set and numerical algorithms, mathematical terminology and symbols. The emergence of measures, the creation of measurement methods and simple tools that accompany the measurement.

Partially touch on some core issues of the history of mathematics such as: - the development of the concept of number:

- the origin and some aspects of the development of geometry and algebra;
- it is advisable to give initial information from the history of equations;
- geometric tools;
- the origin of fractions, etc.

Large field of activity! There are many questions that are returned to the course of high school more than once.

3. The main methodological difficulty is the question of how to actually combine the study of a certain section of the program of mathematics with the presentation of the relevant historical material. Certainly, there are no specific proposals here. Every teacher will do it as he sees fit. Each will have their own methods and techniques. This difficulty can be overcome only gradually, in the course of systematic and scrupulous work.

Forms of work on the use of elements of the history of mathematics in the classroom.

- A brief conversation.
- Excursion.
- Laconic reference.
- The solution of historical problems.
- Display and explanation of the figure.
- Speech with the message of the student.

It should be widely used to get acquainted with the history of mathematics lessons consolidate the material, which will contribute to the revitalization of these lessons. If you start this work from grade 5 and carry it

out systematically, then over time the historical element will become for the students themselves a necessary part of the lesson.

Thus, the main purpose of educational texts on the history of mathematics we see the following: the use of specially designed learning materials in the teaching of mathematics will enable students to expand the methods of information coding, to motivate the need for the introduction of concepts, develop the value of the entered terms, to take the initiative, etc. Such materials as shown in the experiment, help students to be successful in the study of mathematics, teach them to think critically.

References

- 1 Ivanova, T.A. *Humanitarianization of general mathematics education*. N. Novgorod, 1998. – 158-161 p.
- 2 Bashmakov, M.I. *Algebra: Textbook for 7 grade of general education institutions*. // – 2003. – 264 p.
- 3 Bell, M.I. *The creators of mathematics are the forerunners of modern mathematics*. 1979. – 178 p.
- 4 Vilenkin, N.A. *Manual for schoolchilds in 5-6 grades*. Prosveshenie, 1989. – 294 p.
- 5 Nikolskii, S.M. *Mathematics for 6 grade*. 2015. – 41 p.

МРНТИ 27.01.45

А.Т. Каргабаева¹, А.К. Ешпанова²

^{1,2} Университет имени Сулеймана Демиреля, Каскелен, Казахстан

ИСПОЛЬЗОВАНИЕ ПРОГРАММЫ GEOGEBRA ДЛЯ РЕШЕНИЯ ГЕОМЕТРИЧЕСКИХ ЗАДАЧ

Андатпа. Мақалада геометрия сабақтарында шығарылатын есептердің сызбаларының дұрыс, тиянақты орындалуының маңыздылығы негізделген. Математиканы оқытуда геометриялық сызбаларды жасауға арналған бағдарламалық орталарды қолдану потенциалы ашылып жазылған. Аталған бағытта Geogebra бағдарламасы кеңінен қолданылатын бағдарлама ретінде сипатталған. Кейбір геометриялық есептердің Geogebra бағдарламасы арқылы шешу жолдары көрсетілген. Геометрияны оқытуда оны қолдану жолдары көрсетілген.

Түйін сөздер: математика, геометрия, GeoGebra, динамическая среда, интерактивные геометрические чертежи.

Аннотация. В работе обоснована важность выполнения правильного, аккуратного чертежа в ходе решения задач на занятиях по геометрии. Раскрыт потенциал использования программных сред, предназначенных для изучения математики, при построении геометрических чертежей. Охарактеризована свободно распространяемая программная среда GeoGebra как одна из популярных компьютерных программ данного направления. Проиллюстрированы решения геометрических задач с помощью программы GeoGebra. Намечены пути её использования при изучении геометрии.

Ключевые слова: математика, геометрия, GeoGebra, динамикалық орта, интерактивті геометриялық сызбалар.

Abstract. The importance of the correct, accurate drawing in the course of solving problems in geometry classes is grounded in the paper. The potential of using software environments designed for studying mathematics has been revealed in the construction of geometric drawings. The freely distributed GeoGebra software environment is described as one of the popular computer programs of this direction. The solutions of the geometric problems with the

help of the GeoGebra program are illustrated. The ways of its use in the study of geometry are outlined.

Keywords: mathematics, geometry, GeoGebra, dynamic environment, interactive geometric drawings.

Геометрия – наиболее уязвимое звено школьной математики. Даже у хорошо успевающих учеников решение задач по геометрии часто вызывает значительные трудности. Это связано с тем, что в отличие от алгебры, которая в изобилии содержит готовые алгоритмы и широко используемые методы решения задач, в геометрии готовых алгоритмов решения задач мало, их практически нет. Почти все задачи в геометрии нестандартные и требуют для своего решения «индивидуального» подхода, основанного на умении делать логические выводы и оперировать изученными геометрическими утверждениями.

Пробелы в решении геометрических задач у учеников очевидны. Они проявляются прежде всего в неумении правильно изобразить геометрические фигуры, провести дополнительные построения, исследовать построенный чертеж. Известный российский математик и педагог, специалист по элементарной геометрии И.Ф. Шарыгин пишет: «Главным действующим лицом Геометрии должна быть фигура (на плоскости треугольник и окружность), а главным средством обучения рисунок, картинка. Правильный рисунок и красивая картинка!» [1]. В связи с этим считаем, что необходимо на занятиях по геометрии акцентировать внимание учащихся на построении правильного и аккуратного чертежа, формировать у них культуру работы с чертежом при решении задач.

В этом направлении сильными помощниками учителя являются компьютер и специальные компьютерные программы, предназначенные для изучения математики. Компьютер является полезным инструментом в геометрических исследованиях. С его помощью можно экспериментально обнаружить новые интересные геометрические факты. Человеку же остается важнейшая роль – эти факты доказать.

В настоящее время существует несколько десятков программных сред для работы с математическими объектами. Все они отличаются только деталями. В России наиболее известными такими средами являются Живая математика, Математический конструктор, GEONExT, GeoGebra. Две последние среды являются свободно распространяемыми программными продуктами, что способствует их широкому использованию пользователями.

Особую популярность сегодня имеет программа GeoGebra. GeoGebra – это программная среда, которая дает возможность создавать динамические («живые») чертежи для использования в обучении геометрии, алгебры, физики и других смежных дисциплинах [2]. Основная идея данной программной среды заключается в интерактивном сочетании геометрического, алгебраического и числового представления.

Программа GeoGebra позволяет создавать всевозможные конструкции из точек, векторов, отрезков, прямых, позволяет строить графики элементарных функций, которые можно динамически изменять варьированием некоторого параметра, входящего в уравнение. В ней доступно построение перпендикулярных и параллельных прямых заданной прямой линии, серединных перпендикуляров, биссектрис углов, касательных. В данной программе можно определять длины отрезков, площади многоугольников и замкнутых кривых и т. д. Кроме того, в этой среде координаты точек могут быть введены вручную на панели объектов, а уравнения кривых, касательных – в строке ввода при помощи соответствующих команд. Программу GeoGebra можно использовать для демонстрации теорем по геометрии, для просмотра в режиме презентации решенных с ее помощью задач. Созданные файлы в данной программе можно экспортировать как интерактивный чертеж в формат web-страницы (для ее корректного отображения следует предварительно установить JavaRuntimeEnviroment) [3, 4].

В данной статье мы рассмотрим использование программы GeoGebra для решения геометрических задач. Решение геометрических задач с помощью интерактивной геометрической среды GeoGebra при подготовке к основному государственному экзамену позволяет акцентировать внимание учащихся на важности построения правильного и аккуратного чертежа к задаче, способствует формированию графической культуры учащихся и, как следствие, повышает результативность правильного решения задач по геометрии.

Задача 1. В прямоугольном треугольнике ABC с прямым углом C известны катеты: $AC=6$, $BC=8$. Найдите медиану CK этого треугольника. Инструкция для построения чертежа к задаче с помощью программы GeoGebra представлена в таблице 1.

Таблица 1

Инструкция построения чертежа к задаче 1

№ п/п	Инструменты	Комментарии к построению
1		Отметьте точки A, B, C. Подсказка: задайте координаты точкам A(0;6), C(0;0), B(8;0)
2		Создайте многоугольник по трём точкам ABC
3		С помощью инструмента «Середина или центр» постройте точку K, середина AB
4		Постройте отрезок CK
Мы можем видеть на рисунке 1, что медиана CK (k) равна 5 см		

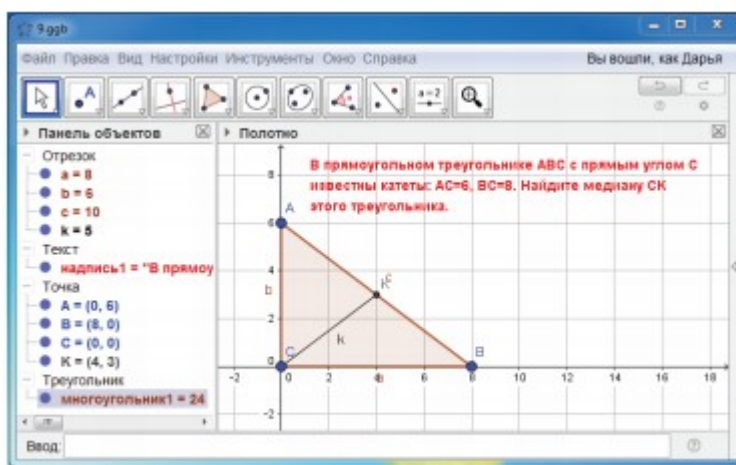


Рис. 1. Чертеж к задаче 1

Задача 2. Радиус OB окружности с центром в точке O пересекает хорду AC в точке D и перпендикулярен ей. Найдите длину хорды AC, если $BD = 1$ см, а радиус окружности равен 5 см.

Таблица 2

Инструкция построения чертежа к задаче 2

№ п/п	Инструменты	Комментарии к построению
1		С помощью инструмента «Окружность по центру и радиусу» постройте окружность с центром в точке O (0;0) и $r=5$ см
2		Отметьте точки D и B. Подсказка: задайте координаты точек D (4, 0), B (5;0)
3		С помощью инструмента «Перпендикулярная прямая» постройте перпендикуляр через точку D
4		Отметьте точки A и C как пересечение окружности и перпендикуляра
5		Постройте отрезок OA, OB, AC
Мы можем видеть на рисунке 2, что хорда AC (i) равна 6 см		

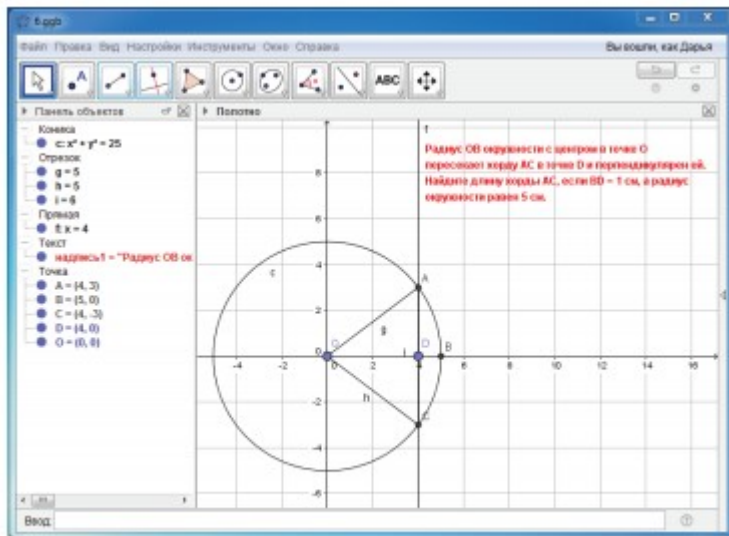


Рис. 2. Чертеж к задаче 2

Задача 3. Точка Н является основанием высоты ВН, проведенной из вершины прямого угла В прямоугольного треугольника АВС. Окружность с диаметром ВН пересекает стороны АВ и СВ в точках Р и К соответственно. Найдите ВН, если РК=15. Инструкция для построения чертежа к задаче с помощью программы GeoGebra представлена в таблице 3.

Таблица 3

Инструкция построения чертежа к задаче 3

№ п/п	Инструменты	Комментарии к построению
1		Отметьте точки А, В, С (угол В=90°)
2		Создайте прямоугольник по трем точкам АВС
3		Проведите высоту ВН с помощью инструмента «Перпендикулярная прямая»
4		Постройте отрезок ВН
5		Отметьте середину отрезка ВН
6		Постройте окружность с центром в точке Е и диаметром, равным ВН
7		Отметьте точки Р и К как пересечение окружности и сторон АВ и СВ соответственно
8		Постройте отрезок РК

Мы можем видеть на рисунке 3, что $PK=BH$ (угол $PBK=90^\circ$ вписан в окружность, РК является диаметром), так как из условия задачи $BH=15$, то и $PK=15$.

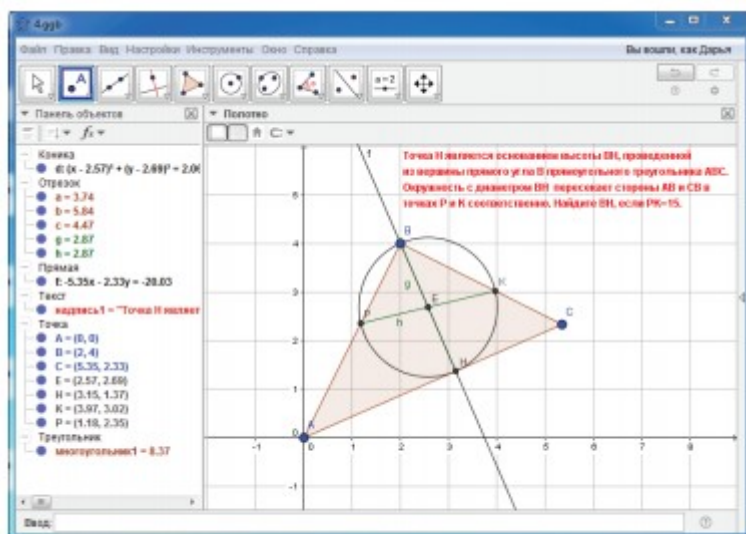


Рис. 3. Чертеж к задаче 3

Приведенные решения геометрических задач нельзя назвать классическими, но они позволяют продемонстрировать аккуратные, правильные чертежи, с помощью которых решение задачи находится очень быстро. Такие красивые геометрические чертежи выступают мощным средством в борьбе с халатным отношением к построению чертежей на бумаге. Конечно, построение чертежей на бумаге имеет свои особенности, которым нужно уделять большое внимание, но и преимущества интерактивной геометрической среды GeoGebra здесь неоспоримы. Таким образом, программа GeoGebra выступает как универсальный программный продукт, в котором сочетаются свойства систем динамической геометрии и систем вычислительной математики, которая дает основания для использования ее в обучении геометрии. Применение программной среды GeoGebra позволяет по-новому строить методику подготовки к основному государственному экзамену, повышая наглядность, увеличивая долю эмпирической составляющей в процессе познания геометрических теорий и расширяя сферу предметных и учебных задач.

Список использованной литературы:

- 1 Шарыгин, И.Ф. Нужна ли школе XXI века геометрия? Математическое просвещение, 2004. — Вып. 8. — С. 37-52.

- 2 Шабанова М.В., Безумова О.Л., Ерилова Е.Н. и др. Обучение математике с использованием возможностей GeoGebra.— Москва : Перо, 2013. — 128 с.
- 3 Безумова, О.Л. Обучение геометрии с использованием возможностей GeoGebra : учебно-методическое пособие. — Архангельск : Изд-во «КИРА», 2011. — 140 с.
- 4 Официальный сайт программы GeoGebra [Электронный ресурс]. — Режим доступа: <http://www.geogebra.org> (дата обращения: 20.05.19).
- 5 Высоцкий, И.Р. ОГЭ 2017. Математика. 9 класс. 3 модуля. Основной государственный экзамен. Типовые тестовые задания. — Москва : Экзамен: МЦНМО, 2016. — 168 с.

МРНТИ 27.01.45

Ш.Т. Темирбеккызы¹

¹ Университет имени Сулеймана Демиреля, Каскелен, Казахстан

ОСНОВНЫЕ ЭЛЕМЕНТЫ МОДУЛЬНОЙ ТЕХНОЛОГИИ ПОВЫШАЮЩИЕ ЭФФЕКТИВНОСТЬ УЧЕБНО- ВОСПИТАТЕЛЬНОГО ПРОЦЕССА НА УРОКАХ МАТЕМАТИКИ

Аңдатпа. Мақала математиканы оқыту-тәрбиелеу үдерісінің тиімділігін арттыратын модульді технологияның негізгі элементтерін анықтауға негізделген. Зерттеу нысаны ретінде модульдік технологияның ұйымдастырушылық, мазмұндық элементтері қарастырылған. Модульдік оқыту 11-сыныптар базасында педагогикалық, методикалық әдебиеттерге анализ жасалып, модельдеу, анкета алу, бақылау алынып, салыстырмалы анализ жасалу арқылы жүргізілді.

Түйін сөздер: оқыту технологиясы, модуль, модульдік оқыту, математика, әдістеме.

Аннотация. В статье определены и обоснованы основные элементы модульной технологии, повышающие эффективность учебно-воспитательного процесса на уроках математики. А также охарактеризованы основные элементы модульной технологии. Сделан анализ педагогической и методической литературы, школьной документации, моделирование, тестирование, анкетирование, наблюдение, сравнительный анализ на базе исследований 11-классов.

Ключевые слова: технология обучения, модуль, модульное обучение, математика, методика.

Abstract. The article identifies and substantiates the main elements of modular technology that increase the efficiency of the educational process in mathematics lessons. And also described the basic elements of modular technology. The analysis of the pedagogical and methodical literature, school documentation, modeling, testing, questioning, observation, comparative analysis on the basis of studies of 11-classes was made.

Keywords: technology of training, module, modular training, mathematics, methodology.

Каждому новому этапу развития общества соответствуют новые задачи образования. Именно общество определяет тот социальный заказ, который выполняет школа. На каждом повороте истории возникают различные школьные реформы, дискуссии о стандартах, попытки создать различные модели «человека будущего». Однако провозглашение целевых установок на «повышение качества знаний», на «развитие мышления учащихся» и т.д. чаще всего остаются на уровне деклараций, существенно не меняя реального положения дел.

Долгое время конечной целью образовательного процесса считался выпускник, в полной мере овладевший знаниями в пределах школьной программы, а также умениями и навыками учебного труда. Центр тяжести переносится на формирование способности личности учащихся, особенно способности ее к самообразованию, к самостоятельному получению знаний, умений и отработке навыков. Все эти категории входят в понятие «компетентность». Воспитание компетентного человека и должно служить главной конечной целью образовательного процесса в средней школе.

В связи с этим предъявляются новые требования к системе организации и проведения учебно-воспитательного процесса, предпринимаются попытки его «технологизации».

Модульная технология известна с 1972 года. Теория модульного обучения подробно изложена в работах И.Б. Сенновского [1], П.И. Третьякова, Т.И. Шамовой, П.А. Юцявичене и др.

Наиболее глубоко и системно дидактическую специфику модульного обучения удалось исследовать и описать П.А. Юцявичене. Согласно взглядам данного автора, модульная система организации учебно-воспитательного процесса имеет некоторые отличия принципиального характера от традиционной системы [2].

Содержание обучения представляется в законченных, самостоятельных модулях, одновременно являющихся банком информации и методическим руководством по его применению. В основе такого обучения лежат субъект-субъектные отношения между учителем и учеником. Обеспечивается самостоятельное, осознанное достижение определенного уровня в учении. Наблюдается высокая степень адаптивности элементов к условиям педагогического процесса.

К целям модульного обучения П.А. Юцявичене относит комфортный темп работы обучаемого, определение им своих возможностей, гибкое построение содержания обучения, интеграцию различных его видов и форм, достижение высокого уровня конечных

результатов. Последняя цель представляется главной целью модульного обучения.

К ведущим принципам модульного обучения можно отнести:

- мобильность;
- структуризацию содержания обучения;
- динамичность;
- действенность и оперативность знаний;
- гибкость;
- осознанную перспективу;
- разносторонность методического консультирования;
- паритетность.

Модуль — это целевой функциональный узел, в котором объединены учебное содержание и приемы учебной деятельности по овладению этим содержанием.

Это инструкция по достижению цели учебно-познавательной деятельности, индивидуальная программа, содержащая целевой план действий, банк информации, указания по осуществлению самоконтроля, самооценки, самоанализа.

В модуль входят:

- 1) план действий с указанием конкретных целей;
- 2) банк информации;
- 3) методическое руководство по достижению указанных целей.

Чтобы составить план действий, нужно:

- 1) выделить основные научные идеи предмета на данном этапе его изучения;
- 2) объединить учебное содержание в определенные блоки;
- 3) сформулировать комплексную дидактическую цель (общую цель обучения);
- 4) выделить из комплексной дидактической цели интегрирующие дидактические цели и сформировать модуль;
- 5) разделить каждую интегрирующую дидактическую цель на частные дидактические цели и выделить в модуле учебные элементы.

Банк информации - это учебное содержание. Оно выстраивается в соответствии с дидактическими целями и должно быть таким, чтобы ученик эффективно его усваивал.

Методическое руководство по усвоению учебного содержания - это письменные советы учителя ученику: как лучше выполнить задание, где найти нужный материал, как выполнить проверку и т.д. [3]. При составлении модуля используют следующие правила:

1) В начале модуля проводят входной контроль умений учащихся, чтобы определить уровень их готовности к дальнейшей работе. При необходимости проводится коррекция знаний путем дополнительного объяснения.

2) Обязательно осуществлять текущий и промежуточный контроль в конце каждого учебного элемента. Чаще всего это взаимоконтроль, сверка с образцами и т.п. Его цель - выявить уровень пробелов в усвоении учебного элемента и устранить их.

3) После завершения работы с модулем осуществляется выходной контроль. Его цель - выявить уровень усвоения модуля с последующей доработкой.

Сущность модульного обучения состоит в том, что обучаемый самостоятельно достигает целей учебно-познавательной деятельности в процессе работы над модулем.

Основными мотивами внедрения в учебный процесс модульной технологии могут быть:

- гарантированность достижения результатов обучения;
- паритетные отношения учителя и учеников;
- возможность работы обучаемых в парах, в группах;
- возможность общения с товарищами;
- возможность выбора уровня обучения;
- возможность работы в индивидуальном темпе;
- раннее предъявление конечных результатов обучения;
- «мягкий» контроль в процессе освоения учебного содержания.

Приступая к разработке модульного урока, необходимо помнить, что он должен занимать не менее двух академических часов, так как на подобном занятии необходимо определить исходный уровень знаний и умений учащихся по изучаемой теме, дать новую информацию и отработать учебный материал.

При составлении плана модульного урока, учитель, на наш взгляд, может придерживаться следующего алгоритма:

1. Формулировка темы урока.
2. Определение и формулировка цели урока и конечных результатов обучения.
3. Разбивка учебного материала на отдельные логически завершённые учебные элементы и определение цели каждого из них
4. Подбор необходимого фактического материала.
5. Определение способов учебной деятельности учеников.
6. Выбор форм и методов преподавания и контроля.
7. Составление модуля данного урока, его распечатка.

Модульные уроки имеют свои особенности. Одна из них заключается в том, что каждый такой урок целесообразно начинать с процедуры мотивации — это может быть обсуждение эпиграфа к уроку, использование входного теста самопроверкой, небольшого математического диктанта и т.п.

Модульные занятия отличаются от обычного урока тем, что они строятся в логике процесса усвоения знаний и представляют собой полный цикл познания, совпадающий по своей структуре с циклом учебной деятельности — описание, объяснение, проектирование (обычные же уроки строятся в такой логике: проверка домашнего задания, изучение нового материала, его закрепление, задание на дом).

Начинается модульное занятие с целеполагания. Следующий этап в модульном занятии — мотивация на усвоение содержания и учебную деятельность. Это различного рода интеллектуальные разминки, математические диктанты, небольшие тесты. Далее идет информационный блок: содержание в виде рассказа учителя, лекции, фильма, сообщений учащихся, чтения учебника или комбинаций этих компонентов. Далее — отработка материала: практические работы, решение учебных задач, проблем, ответы на вопросы, выполнение заданий, игры, конференции и др. На этом этапе используются "мягкие" формы контроля — само- и взаимоконтроль.

Заканчивается модульное занятие экспертным контролем (контроль преподавателя), коррекцией знаний и умений с постоянной рефлексией относительно целей учебной деятельности. Экспертный контроль - это обычная проверочная работа, зачет, устный опрос или итоговый тест.

Особенность коррекции в модульном обучении заключается в том, что она проводится сразу же после контроля, на том же уроке, а не на следующем, как при традиционном обучении.

На каждом модульном занятии как обязательный элемент проводится рефлексия (оценка себя, своей деятельности). В конце каждого урока ученики возвращаются к целям занятия и оценивают степень их достижения и свою работу на уроке.

В ходе модульного занятия определяется исходный уровень знаний и умений учащихся, затем они получают информацию по изучаемой теме, отрабатывают учебный материал, в конце урока проводятся контроль и коррекция знаний и умений. Поэтому, модульные занятия по времени проводятся не менее чем за пару.

На модульных уроках учащиеся могут работать индивидуально, парами, в группах постоянного и переменного состава. Форма посадки

свободная, каждый из них имеет право выбора: один он будет работать или с кем-либо из товарищей.

Роль преподавателя на уроке заключается в управлении процессом обучения, консультировании, помощи и поддержке учеников.

Достоинства модульного обучения

1. Цели обучения точно соотносятся с достигнутыми результатами каждого ученика.

2. Разработка модулей позволяет уплотнить учебную информацию и представить ее блоками.

3. Задается индивидуальный темп учебной деятельности.

4. Поэтапный - модульный контроль знаний и практических умений дает определенную гарантию эффективности обучения.

5. Достигается определенная «технологизация» обучения. Обучение в меньшей степени становится зависимым от педагогического мастерства учителя.

6. Обеспечение высокого уровня активизации учащихся на уроке.

7. Первоочередное формирование навыков самообразования.

Дидактические условия, при которых достигается высокая эффективность модульного обучения:

1. Качественная разработка модулей, отбор и конструирование содержания учебного материала, учитывающие интересы, возрастные особенности и другие личностные качества обучающихся.

2. Последовательная реализация модулей, которые позволяют интенсифицировать учебную деятельность на всех ее этапах.

3. Разработка и предъявление модулей позволяют сочетать изучение теории и формировать практические умения и навыки.

4. Варьирование проблемных задач и заданий с типовыми, требующими репродуктивной воспроизводящей деятельности обучающихся.

5. Применение наряду с основными дидактическими материалами вспомогательной справочной литературы.

6. Сочетание контроля с самоконтролем обучающихся, который сравнительно легко достигается на основе модульного обучения [4].

Недостатки и ограничения модульного обучения:

1. Большая трудоемкость при конструировании модулей.

2. Разработка модульных учебных программ требует высокой педагогической и методической квалификации, специальных учебников и учебных пособий.

3. Уровень проблемных модулей часто невелик, что не способствует развитию творческого потенциала обучающихся, особенно высокоодаренных.

4. В условиях модульного обучения часто остаются практически не реализованными диалоговые функции обучения, сотрудничество обучающихся, их взаимопомощь.

5. Если к каждому новому уроку, занятию учитель имеет возможность обновлять содержание учебного материала, пополнять и расширять его, то «модуль» остается как бы «застывшей» формой подачи учебного материала, его модернизация требует значительных усилий.

Для перехода на модульное обучение необходимы определенные условия:

1) достаточная подготовка учителя, его желание осваивать новые технологии обучения;

2) готовность школьников к выполнению самостоятельной учебно-познавательной деятельности, сформированности у учеников минимума знаний и общих учебных умений;

3) возможность тиражирования модулей, так как каждый ученик должен быть обеспечен программой действий.

Эта система обучения требует от учителя большой предварительной работы, от ученика - напряженного труда. Но она приносит хорошие результаты, мотивируя образовательные потребности школьника, обеспечивая их и учитывая при этом индивидуальные возможности.

По результатам проведенного анкетирования, на вопрос «Что же дает вам модульное обучение?», ученики отвечают таким образом: главное - это то, что каждый работает самостоятельно, предоставляется возможность получить консультацию у учителя, помощь у товарища, значительно глубже осознается учебное содержание, все время можно себя контролировать.

Сравнив результаты обучения 11А работающего по данной системе обучения, и 11В обучающегося по традиционной системе, пришли к следующим выводам.

1. оба класса находятся на одном уровне в плане сформированности общеучебных умений и навыков;

2. результаты контрольных работ показывают более высокий уровень успеваемости и качества обученности учеников 11А:

Результаты контрольных работ

Таблица 1

Контрольная работа №	% успеваемости		% качества	
	11А	11В	11А	11В
1.	82	81	57	50
2.	76	81	68	50
3.	100	95	71	59
4.	100	90	70	56
5.	100	86	86	47

3. при модульной технологии выше уровень сохранения знаний, т.к. при повторном проведении мониторинга «Логарифм» по ранее изученным темам ученики 11А класса показали лучшие результаты;

Мониторинг

Таблица 2

Мониторинг №	Месяц	11А класс % качества	11В класс % качества
1.	январь	80	57
2.	Май	81	59

4. по результатам наблюдения активность учеников на уроке примерно одинаковая у обоих классов, но способность высказывать свою точку зрения, умение поставить цель и проанализировать уровень ее достижения более развиты у учащихся 11А.

Таким образом, можно утверждать, что модульная технология обучения математике достаточно эффективна. По сравнению с традиционной технологией обучения модульная технология гарантирует рост качественной успеваемости, повышение прочности знаний, повышение общей эффективности.

Список использованной литературы:

1 Третьяков П.И., Сенновский И.Б. Технология модульного обучения в школе: Практико-ориентированная монография / под ред. П.И. Третьякова. – М.: Новая школа, 1997. – 352 с.

2 Юцявичене П.А. Теория и практика модульного обучения. – Каунас, 1989. – 286 с.

3 Селевко Г.К. Современные образовательные технологии: Учебное пособие. – М.: ЮНИТИ-ДАНА, 1998. – 344 с.

4 Голощёкина Л.П., Збаровский В.С. Модульная технология обучения: Методические рекомендации. – СПб: ЮНИТИ-ДАНА, 2004. – 135 с.

IRSTI 27.01.45

A.M. Shamshayeva¹, S. Borambayeva²

^{1,2}Suleyman Demirel University, Kaskelen, Kazakhstan

USING INFORMATION TECHNOLOGY AT TRAINING TO MATHEMATICS AT COMPREHENSIVE SCHOOL

Abstract. Perfection of methods of training to mathematics occurs in the tideway of the general approaches to perfection of general didactic training methods. Achievements of such sciences as mathematics and cybernetics, features of a computerization of human activity and use of information technology influence this process. Currently, the main objective of the education sector is to update the content of education through the use of technology. High-quality education now requires a wider use of new methods and technologies in organizing the work and training of students. The use of new educational technologies in the educational process will inevitably lead to an increase in the quality of education, therefore the use of new technology by each teacher is a necessity. By the decision of the United Nations “XXI century - the century of informatization”.

Keywords: training to mathematics at comprehensive school, information technology, information culture, a program-methodical complex, the interactive geometrical environment.

Аннотация. Совершенствование методов обучения математике происходит в русле общих подходов к совершенствованию общедидактических методов обучения. использование информационных технологий влияют на достижения таких наук, как математика и кибернетика. В настоящее время основной задачей сектора образования является обновление содержания образования за счет использования технологий. Качественное образование в настоящее время требует более широкого использования новых методов и технологий при организации работы и обучения студентов. Использование новых образовательных технологий в образовательном процессе неизбежно приведет к повышению качества образования, поэтому использование новых технологий каждым преподавателем является необходимостью. По решению «ООН XXI век - век информатизации».

Ключевые слова: обучение математике в общеобразовательной школе, информационные технологии, информационная культура, программно-методический комплекс, интерактивная геометрическая среда.

Аңдатпа. Математиканы оқыту әдістемесін басқару жалпы білім беру әдістерін жетілдірудің жалпы тәсілдеріне негізделеді. Ақпараттық технологияларды қолдану математика және кибернетика секілді ғылым түрлерінің дамуына зор ықпалын тигізеді. Қазіргі уақытта оқытудың негізгі міндеті білім беру технологиясын қолдану есебінен оқытудың жаңа нұсқаларын жасау. Қазіргі таңда білім беруде жаңа технологияларды кеңінен қолданылуын талап етеді. Жаңа оқу технологияларын қолдану білім беру процесінде білім алуды жақсартуға мүмкіндік береді. «БҰҰ-ның шешімі бойынша ХХІ ғасыр – ақпараттандыру заманы»

Түйінді сөздер: математиканы жалпы білім беретін мектептерде оқыту, ақпараттық технологиялар, ақпараттық мәдениет, бағдарламалық-әдістемелік кешен, интерактивті геометриялық орта.

The implementation of the modern concept of education requires new approaches to the content of academic disciplines and educational areas, to the entire organization of the educational process.

The effectiveness of the educational process depends on the form of interaction of the subjects of the educational process. In traditional education, teacher reports the information, student reproduces it, and the assessment is largely determined by the completeness and accuracy of the reproduction; in doing so, it is overlooked that the assimilation of the material is connected with its comprehension. The problem is to find convenient organizational forms, to preserve and develop the openness of the educational process at different levels of the system, and not only at the level of teacher – student.

Informatization of general education is a complex, multidimensional, resource-intensive process, in which both students and teachers participate. This includes the introduction of a complex of educational management programs, the use of information technologies in educational disciplines, the development of integrated lessons, project activities, and the active use of Internet education.

The introduction of information and communication technology suggests a solution such specific management tasks as the introduction of electronic

educational resources in connection with the achievement of a new modern quality of education; building a multi-model space using information and communication technologies in the educational system.

Table 1. The actions of students and teachers in the use of electronic resources of various types

<i>Type of electronic resources</i>	<i>Student's actions on the use of software product</i>	<i>Teacher's management action</i>
Information Reference	Perception references supporting information (text, image, music) for solving traditional educational (extracurricular) tasks	Creating a space for choosing electronic resources, organizing their search, consulting students in the course of information perception
Instrumental – practical	Practical construction of information objects, creation and analysis of models of real processes	Counseling and pedagogical support of students in their interaction with software products
Training -evaluation	Perform actions on a computer command. Reflection and control of actions taken based on the results of computer testing	Organization pedagogically expedient use digital electronic resource
Complex	Self-learning based on a combination of digital electronic resources of various types for solving educational (extracurricular) tasks	Synchronization of the use of electronic resources with the development of curricula and additional education programs

The solution of the managerial task related to the introduction of electronic educational resources into the information space of the education system

requires streamlining the methods of their use in educational activities. Indeed, managers and educators need an indicative basis for their actions to make appropriate management decisions. For this, the types of electronic educational resources are distinguished depending on the content of the actions performed by students and teachers using this or that software product. Typology of electronic educational resources allows you to streamline managerial actions of the teacher. A bunch of “type of resource - the actions of the student - managerial actions of the teacher” is presented in the table 1 [2].

As a result, both teachers and managers receive a tool for managing the processes of mastering and using electronic educational resources. In recent years, electronic resources of a certain class have been used - digital educational resources. This allows you to expand the sphere of influence of information and communication technologies in the educational space. Teachers can now consciously and more reasonably plan the use of electronic educational resources, including digital, in developing work programs for courses and disciplines.

When developing new educational materials, three types of digital educational resources are distinguished, differing in the degree of their innovativeness.

The first type of educational materials - sets of digital educational resources. These training materials are best integrated into the existing education system. They represent an important and modern digital component of the CMD for most textbooks on the Federal List. The teaching materials expand the content of textbooks, teach to use information and help to create a “habit” for the use of ICT in teachers, encourage them to use modern educational technologies aimed at creating conditions for students to achieve new educational results. The second type of educational materials - information sources of a complex structure - is a private solution based on the use of ICT and aimed at introducing local changes in the educational process. This type includes specialized electronic encyclopedias, determinants, educational environments based on a set of digital geographical maps, virtual laboratories and many others.

Finally, the third type of educational materials - innovative educational and methodological complexes - claims for drastic changes in the content and organization of the educational process. They include a complete set of training tools necessary for its organization. These materials are aimed at teaching the teacher to work in a new way and fully prepare students for life in the information society [1].

All developed educational materials of the new generation, and in particular innovative educational and methodological complexes, create in the

Russian school a new educational environment in which the independence and activity of the student is formed, in which he masters ICT literacy.

The improvement of teaching mathematics in the framework of the information approach is carried out primarily by the active use of new information technology training: this is teaching students algorithms, raising their algorithmic culture in teaching mathematics, and building algorithms for learning mathematics itself, and using algorithmic languages for these purposes, and implementation of their technical means of computers.

With the development of multimedia technology, the computer becomes a learning tool that is able to visualize the most diverse information. As a result, the development of the student's creative potential, the ability to communicate, the skills of experimental research work; culture learning activities; the intensification of the educational process, increasing its efficiency and quality. Among the promising areas for the introduction of information technology in the process of teaching mathematics will highlight the use of an interactive geometric environment. The idea of dynamic geometry, or interactive geometric systems (IGS), has been around for about 20 years. Today, programs based on it are recognized worldwide as the most effective means of teaching mathematics using information and computer technologies. IGS means software that allows you to perform geometric constructions on a computer in such a way that when one of the geometric objects of the drawing changes, the others also change, keeping the ratios set between them unchanged. For example, if you move a straight line, perpendicular to it will also move, remaining perpendicular to it. Thus, a drawing created in an interactive geometric environment is a model that preserves not only the result of the construction (ie, the drawing itself), but also the source data (the algorithm of this construction).

Currently, there are several interactive geometric environments, each of which has both its strengths and disadvantages.

The program "Live Mathematics" (until 2006 – "Live Geometry") is the Russian version of the popular American IGS "Geometer's Sketchpad", developed by Key Curriculum Press. This is one of the oldest GCI. Its first version was released in 1995. In Russia, its translation and distribution is carried out by INT - the Institute of New Technologies. The program has good demonstration capabilities that allow you to visually control the behavior of complex models. The visual construction of complex mathematical expressions (using only themouse) is also a strong point of this program. Transformation operations (such as parallel transference, rotation, reflection, changing proportions) are another strength. Similar operations areabsent in the majority of IGS.

At the same time, “Live Mathematics” is somewhat complicated to manage and has an outdated interface. There is a lack of some standard for IGS operations (for example, the construction of a circle through 3 points). The absence of the function of automatically hiding/showing geometric objects by the condition (also quite typical) leads to the need to use complex tweaks in order to ensure this behavior of the models.

“Live Mathematics” is designed to work on a local computer; therefore, models exported from it to an Internet-compatible format do not have full functionality for editing and allow only to demonstrate the created model. Combined with the lack of the ability to prohibit the use of some tools, this feature significantly limits the scope of Living Mathematics for creating interactive construction tasks. Currently, the development of the program is almost discontinued.

Another GCI - “Mathematical Designer” - has been developed since December 2006 by IC by order of the Federal Agency for Education (as part of the Federal Target Program for the Development of Education for 2006-2010).

Software environment “1C: Math Designer” is designed to create interactive drawings in mathematics, combining design, modeling, dynamic variation, experiment. The software environment is designed to meet the requirements of the Russian school and the Russian tradition of teaching mathematics. Software environment “1C: Math Designer”:

- can be used both at home and at school with various forms of conducting classes and with various computer equipment of the classroom;
- allows you to quickly and efficiently master the school course in mathematics, increases the memorability of the material;
- provides the opportunity to study mathematics on the basis of the activity approach due to the introduction of the elements of the experiment and research into the educational process;
- increases the degree of emotional involvement of students, provides the possibility of setting creative tasks and organizing project work;
- shows how modern technologies are effectively applied to the modeling and visualization of mathematical concepts.

Software environment “1C: Math Designer”:

- supports automatic verification of geometric constructions and symbolic responses, transfer of evaluation to the electronic journal of modern educational process management systems; It has a convenient, intuitive graphical interface, allows you to customize interface of the created training models;

- provides for the export of created training models in the form of Internet-compatible java applets, independent of the editor program, but allowing using all the possibilities of the constructive environment;
- provides the ability to work on computers running Windows, Linux, MacOS;
- allows arbitrary empowerment of the constructive environment and training models through the use of macros and the built-in scripting programming language.

Practical approbations confirm: after a brief acquaintance with the program, teachers and students can effectively use “1C: Math Designer” in the classroom and at home. The software environment allows you to organize various forms of educational activities.

A constructor can serve as a tool environment for independent work of students in a lesson (or at home) “from scratch”. At the same time, students are given the task of building and researching certain objects, in the course of solving which certain educational goals should be achieved. The use of the constructor in this quality corresponds to the most modern pedagogical concepts. However, this presupposes a qualitative restructuring of the educational process, including the preparation of new textbooks and manuals designed for project and search activity of students, and the retraining of teachers. For educational institutions having state accreditation, under the terms of the license agreement, installation and simultaneous use of one purchased set of “1C: Mathematical Designer” on several computers of an educational institution is allowed.

The constructor can be used by the author (for example, a teacher) to create specific task models containing an explanation of the material, preparation of geometric objects, texts with conditions and drawings with data, step-by-step construction plans, etc. information. After that, the students work not with the designer as such, but with these ready-made models.

When developing an interface model for a designer, it is possible to create with it full-featured and ready-made models that work independently of the program designer. Such “rejected” model applets can be generated in other programs of dynamic geometry. The most important difference between the “Mathematical constructor” models is that they can contain any tools and commands of the full version of the program, including construction tools, and not only the possibility of moving drawing elements.

Unlike the previous ones, IGS “GEONExT” has no restrictions on use - the product is freely distributable. It has been developed since 1999 at the Department of Mathematics and Didactics at the University of Bayreuth (Germany).

“GEONExT” works in any operating system (since it is written in Java), has a convenient, externally attractive interface and contains a set of tools typical of most IGS.

Some disadvantage is the designation of points by a cross, adopted in the program by default. This is different from the traditional notation adopted in geometry. Also in the program there is no tool for calculating the area of figures, available in other IGS.

Currently GEONExT is developing slowly: the interval between the latest versions (containing only minor differences) was about two years.

The main characteristics of the GEONExT program are as follows:

- visual appeal and aesthetics;
- simplicity and ease of development and use, which is important both for students and for teachers;
- free software;
- works in any operating system;
- interface in Russian;
- used in the educational practice of other countries (Bulgaria, Germany, Ukraine, Czech Republic);
- has built-in tools for graphing functions and calculating trigonometric functions.

Accordingly, it can be used in the study of certain sections of algebra.

Modeling and monitoring the process of changing the studied geometric objects using an interactive geometric environment allows us to distinguish their characteristic features, establish patterns, make generalizations and even put forward hypotheses on their own..

In connection with the above, it can be noted that the use of interactive environments in the process of teaching mathematics helps to conduct a computational or graphical experiment with a mathematical model, helps stimulate the motivation, interest and curiosity of students, visualize abstractions and dynamize mathematical objects, educate basic skills and abilities theory, the expansion of mathematical practice, the awakening of primary interest.

Thus, new information technologies play an important role in the process of informatization of education. The introduction of ICT in the training of schoolchildren and students is an innovative process that organizes personality-oriented training, a differential transition to optimizing the process of training and education.

The role of a teacher in a general education school in an information society transitions from a source of primary information to an intermediary, which facilitates its receipt.

In an computerized society, without mastering basic computer literacy and the ability to use computer tools to solve certain problems, the realization of human creative potential in modern science, culture, manufacturing, business and other spheres of life is inconceivable.

References

- 1 Avdeeva, S. Educational materials of a new generation in the ISO project // Public education. 2007. № 9. S. 187-194.
- 2 Kuzibetsky A., Smykovskaya, T. Information and communication technologies in education management. *Popular Education*, 8 (2008): pp. 105-112.

IRSTI 27.01.45

D. Sabyrbayeva¹, S. Borambayeva²

^{1,2}Suleyman Demirel University, Kaskelen, Kazakhstan

STUDY OF SQUARE EQUATIONS IN THE 8TH GRADE USING MODULAR TECHNOLOGY

Abstract. The article gives a description of one embodiment of the modular technology in teaching students math. The analysis of the requirements for learning outcomes, the study objectives and data integration capabilities in the process of the study. Just a list of tasks and issues for study in each of the lessons in both integrated classes, and the framework of the modular study. The question of the use and visualization tools as well as the combination on of this material and other items.

Keywords: multilevel education, educational technology, modular technology, modular training.

Аннотация. В статье дается характеристика одного из вариантов реализации модульной технологии при обучении школьников математике. Анализ требований к результатам обучения, задачам исследования и возможностям интеграции данных в процессе обучения. Также представляется разработка учебного модуля по изучению неполных квадратных уравнений в 8-м классе.

Ключевые слова: многоуровневое образование, образовательные технологии, модульные технологии, модульное обучение.

Аңдатпа. Мақалада орта мектеп математикасының модульдік технология жүйесімен оқытудың характерлік сипатамасы мен сабақта қолданысының бір мысалы келтірілген. Және де 8 сынып математикасындағы толық емес квадратты тендеулер тақырыбының модульді оқыту әдістемесі көрсетілген.

Түйін сөздер: көп деңгейлі білім беру, білім беру технологиялары, модульдік технологиялар, модульдік оқыту.

The reform of the modern secondary school is aimed at creation of pedagogical conditions for the development and self-determination of the

student's personality. To achieve this goal, it is necessary to create an adaptive atmosphere based on multi-level learning.

Currently, the information boom has caused the teacher to stop be the main source of knowledge. In connection with this, the nature of his activity is changing: it is not enough just to teach in the traditional sense; in the flow of information, send students to the original sources. Therefore, the traditional explanatory and illustrative process is being replaced by new pedagogical technologies. Although pedagogy today has the richest Arsenal of learning technologies, their effectiveness largely depends on the emotionally positive attitude of students to the material being studied.

Mathematical education contributes to the formation of a common culture man tours. Educational and educational tasks of teaching mathematics should be addressed in a comprehensive manner, taking into account the age characteristics of students, fictions of mathematics as a science and academic subject, defining its role and place in the general system of schooling and education. An important role in the course of high school algebra is played by quadratic equations. Material somehow related to quadratic equations is significant part of the school course of mathematics.

Indeed, quadratic equations not only have an important theoretical value, but also serve purely practical purposes. Overwhelming majority of tasks about spatial forms and quantitative relations of the real world is reduced to solving various types of quadratic equations. Mastering their ways solutions, we find answers to various questions of science and technology (transport, agriculture, industry, communications, etc.). Also for the formation of solving equations is of great importance independent work of the student.

The problem of learning independent work is relevant for teachers all school subjects, including for teachers of mathematics. Its decision is important but also from the point of view that for successful mastering the modern content of school mathematics education it is necessary to increase the efficiency learning process in the direction of enhancing students' independent activities. This requires a clear definition of the system of skills, mastering which leads to the independent performance of works of a different nature.

The problems mentioned above can be successfully solved by using modular technology, which is a collection of various forms and ways of joint activities of teachers and students, as well as independent work of students, organized in special units of the learning process with the goal of maximizing mastery of program material and improving quality education.

The main objectives of the modular learning technology are: comfortable the pace of the student; definition of their capabilities; flexible

construction learning content; integration of its various types and forms; formation of learn self-education skills and achieve a high level of final results.

Despite the fairly substantial age of this technology, there are different points of view both on the content of the very concept of “module” and on the approaches to the design of modular programs.

The basic concepts that reveal the essence of modular learning are. The following are: “module”, “modular program”, complex didactic goal (CDC), integrated didactic goal (IDC), private didactic purpose (PDP), training element (TI), etc.

The module is the main organizational and content unit of the modular learning system, covering educational material that has a relatively independent meaning and includes, as a rule, several topics or sections of the course that are close in content. The module is characterized by such features as integrity, relative independence and logical completeness of its content, flexibility of the structure, speed of control and evaluation of learning outcomes. The module has a specific goal and determines the best ways to achieve it.

The educational element is a part of the educational material reflecting any aspect professional or other tasks. It is the main carrier of educational information and can be primary, supplementary or reference; content - theoretical, practical or mixed.

The main modular learning tool is the modular program (MP). It consists of separate modules.

The preparation of a modular program and separate relevant modules is a time-consuming work requiring great substantive and pedagogical competence.

In the modular program it is necessary to consider:

- purpose of information material;
- a combination of complex, integrating and private goals;
- completeness of educational material in the modules;
- relative independence of the elements of the module;
- implementation of feedback;
- optimal transfer of informational and methodological material.

The modules corresponding to all integrated didactic goals represent a single integrated didactic goal and are combined with a modular program. Each integrated didactic goal consists of particular didactic goals, which in the module corresponds to one element of learning.

We have developed and tested a modular program on the topic “Square Equations”, intended for 8th grade students and student’s textbook edited by S. A. Telyakovsky. Classes were held with students School number 9,

Omutninsk, Kirov region. The program contains seven modules each of which is implemented in two lessons.

We give a description and content of one of the developed modules (Table 1).

Lesson number 1, 2 “Definition of a quadratic equation. Incomplete quadratic equations. Type of lesson - the study of a new topic.

Integrating goal.

1. To acquaint with a new kind of equations with one variable.
2. To study the method of solving incomplete quadratic equations.
3. Continue work on the development of student speech.
4. Learn to compose an algorithm for solving a task according to a sample.
5. To develop the ability to work with the textbook, to independently acquire knowledge.

The work of students consists of several stages, the so-called learning elements. Each element contains or instructions of the teacher about what you need to know and be able to, or a brief explanation of the assignments, or references to where in the textbook you can find the necessary explanations, as well as a list of tasks. Having read the instructions of the teacher, the student performs independent work, which is included in the training elements, makes conclusions, constructs questions, checks the correctness of the assignments.

At the beginning of the class, an introduction to the learning elements takes place; attention to the fact that students must adhere to a specified amount of time. In the educational element UE-0, students' attention is fixed on setting the lei classes.

The following training element is aimed at repeating the basic concepts: equation, root of the equation. The second element introduces the concept of square equations, incomplete quadratic equations, types of incomplete quadratic equations. In this case, an instruction is given to independently study the material and discuss it in pairs. If necessary, you can contact the teacher. After performing UE-1 and UE-2 is monitored (talk with students), definitions are pronounced quadratic equation, incomplete quadratic equation, examples are given.

When you perform the next learning element, students disassemble the examples given in the textbook, follow the instructions of the teacher, while working mainly on their own. Further, using them as a model, solve incomplete square the equations. The result of the decision should be the filling of the table (Table 2).

After completing all the learning elements, students are required to complete small independent work (output control), containing 5 tasks (tab. 3).

The last training element of the module involves reflection - an independent assessment of the achievement of the goal of the training element. At the end of the lesson the teacher suggests homework.

Training module

<i>№</i>	<i>The name of the training element</i>	<i>Content, forms, methods (teacher's advice)</i>
<i>TI -0</i>	Integrating goal: 1. Learn the concepts of a quadratic equation, an incomplete quadratic equation. 2. Obtain methods for solving incomplete quadratic equations. 3. To be able to find the roots of incomplete quadratic equations. 4. Mastering this module will contribute to the development of training skills and skills in independent work with a textbook, the ability to generalize and draw conclusions.	
<i>TI -1</i>	Knowledge update Private didactic goal - to prepare for the study of new material. In the process of working with UE-2 and UE-3, you must: - learn the definitions of a quadratic equation, an incomplete quadratic equation; - learn how to solve incomplete quadratic equations using the examples in the textbook; - be able to solve incomplete quadratic equations in general, select coefficients	1. Complete the sentences. 2. Equality containing a variable is called ... The value of a variable in which the equation becomes a true equality is called ... Solve the equations orally (on the board): $4x = -2$; $5x - 4 = 2x + 8$; $3x(x + 2) = 0$; $0,5x^2 = 32$
<i>TI-2</i>	A private didactic goal is to	Task 1 ([1], p. 105, p. 19):

(10 min)	study the new material of this topic and begin its primary assimilation.	a) read the definition of a quadratic equation; b) write down the definition in a notebook, give your examples (2–3 square equations); c) tell the definition of each other. Task 2: a) read the definition of an incomplete quadratic equation; b) write the definition in a notebook and give 2–3 of your own examples of incomplete quadratic equations; c) tell the definition to each other; d) write down in general form 3 types of incomplete quadratic equations; e) whether the comments are significant: 1) $c \neq 0$; 2) $b \neq 0$. When you have finished studying the definitions, let the teacher know about the readiness for the conversation. Questions for conversation with the class. 1. Give the definition of a quadratic equation, call coefficients (why $a \neq 0$), give examples. 2. Give a definition of an incomplete quadratic equation, give examples. 3. Write 3 types of incomplete quadratic equations (in general). № 505 (orally) [1]. Specify its coefficients in a quadratic equation: a) $5x^2 - 9x + 4 = 0$;
----------	--	---

		5, -9, 4 are the coefficients of the quadratic equation (5 is the first coefficient, -9 is the second, 4 is the free term). Using this example as a model, perform the tasks orally under the letters b – e
TI -3 (15-20 min)	Private didactic goals: - learn how to solve incomplete quadratic equations; - learn how to write the decision correctly	Task 3: 1. Disassemble in the textbook example 1, example 2. 2. Disassemble the solution in the general form of an incomplete quadratic equation of the form $ax^2 + c = 0$. 3. Does this quadratic equation always have roots? 4. Solve the equation: № 509 a, v, e 5. Prepare to answer at the blackboard (start filling out table 1). Task 4: 1. Disassemble example 3 in the textbook. 2. Disassemble the solution in the general form of incomplete quadratic equations of the form $ax^2 + c = 0$ и $ax^2 = 0$. 3. What method is used when solving a quadratic equation of the form $ax^2 + bx = 0$? 4. Conclude on the number of roots of these two quadratic equations. 5. Solve the equations: № 510 a, b, d; № 511 d, e.

		6. Prepare for the answer at the blackboard (fill in the table). Task 5 If you have completed the tasks from the textbook correctly, then decide from the textbook: № 512 б, г; № 513 б, г, е
TI – 4 (25–30 min)	Private didactic purpose - check the completeness and quality of the material learned	Exercise 1 According to table 1 answer the questions: a) Is an incomplete quadratic equation of the form $ax^2 + c = 0$ has roots? If so, how much? b) How many roots does an incomplete square equation of the form $ax^2 + bx = 0$? Why? c) How many roots have an incomplete quadratic equation of the form? $ax^2 = 0$? Why? The task. d) Perform independently the options for work using table 2. After 15 minutes, hand it over to the teacher
TI -5	<i>Reflection</i>	Spend self-control by answering the question: have reached Are you a goal in class? To do this, go back to the beginning of the UE-2 module, to the integrating goal of the lesson
TI -6	<i>Homework</i>	Write down your homework: tutorial, p. 19. Learn definitions, a table in a notebook, perform assignments under the numbers № 511 а, б, с, d; № 514 а, с; №. 488; № 496, б, d

Table 2

Card for individual student work

<i>№ n/n</i>	<i>Equations</i>	<i>Conditions for the existence of roots of the equation</i>	<i>Roots incomplete square equations</i>
1	$ax^2+c=0$		
2	$ax^2+bx=0$		
3	$ax^2=0$		

Table 3

Outputcontrol

<i>Option 1</i>	<i>Option 2</i>
<i>Solve equations</i>	
1. $-2x^2+18=0$	1. $3x^2+5=0$
2. $36-x^2=0$	2. $25-4x^2=0$
3. $3x^2=12x$	3. $5x^2=10x$
4. $1/3x^2=0$	4. $-2,5x^2=0$
5. № 512, a	5. № 512, B

Experienced teaching has shown that the use of modular technology contributes to an increase in the level of knowledge and skills on the topic “Square Equations”.

In this case, students form:

- the ability to set a learning goal and to plan ways to achieve it;
- the ability to evaluate and analyze their activities;
- skills to work with sources of information;
- skills of self-control, mutual control, educational, business communication, self-learning;
- the ability to work in pairs, groups, independently by algorithm and creatively;
- adequate self-assessment of the results of the activity regarding the level of learning material mastering.

Thus, with the systematic use of modular technology of learning, students form and improve the skills of independent learning activities. At the same time, practice has shown that students are not sufficiently prepared and motivated to work independently.

References

- 1 Atanasyan, L.S., Butuzov V.F., Kadomtsev S.B., etc. Geometrija. 7—9 klassy [Geometry. 7—9 classes]: uchebnikdljaobshheobrazovatel'nyhuchrezhdenij. M.: Prosveshhenie, 2013. 384 p.
- 2 Burmistrova, T.A. Programmyobshheobrazovatel'nyhuchrezhdenij. Geometrija. 7—9 klassy [Programs of educational institutions. Geometry. 7—9 classes]. M.Prosveshhenie, 2011. 159 p.
- 3 Makarychev, Yu.N., Mindyuk, N.G., Neshkov, K.I., Suvorova, S.B. Algebra [Algebra]: uchebnikdlja 9 klassovobshheobrazovatel'nyhuchrezhdenij. M.: Prosveshhenie, 2012. 271 p.
- 4 Otkrytyj bank zadaniyEGJe [Open bank of the USE tasks]. URL: <http://mathege.ru/or/ege/Prikazot17dekabrja2010goda№1897> «Ob utverzhdeniifederal'nogogosudarstvennogoobrazovatel'nogostandartaos novnogoobshhegoobrazovanija» [The order of December 17, 2010 № 1897 “About the approval of the federal state educational standard of the main general education”].

IRSTI 81.79.11

Y. Nurshanov¹

¹Suleyman Demirel University, Kaskelen, Kazakhstan

HYPNOSIS AS A STRESS MANAGEMENT TOOL FOR TEACHERS

Аннотация. В статье рассматривается гипноз как элемент обучающего комплекса управления стрессом для учителей. Автор попытался использовать технику гипноза в качестве инструмента преодоления стресса и профилактики для учителей.

На основе практического опыта и исследований, предоставленных с учителями, директорами и другими школьными сотрудниками, автор включил и запатентовал гипноз как элемент психолого-педагогического комплекса «Защита от стресса и повышение стрессоустойчивости». Гипноз как элемент упомянутого комплекса дает возможность основательно избавиться от влияния накопленного стресса, травм и депрессий. Также методы гипноза помогают создать мотивационную базу и активировать внутренние ресурсы для эффективного управления любыми жизненными ситуациями. Рассмотрены преимущества и сложности при применении гипноза и самогипноза.

Ключевые слова: стресс, гипноз, стрессоустойчивость, управление стрессом, мотивация.

Abstract. The article considers the hypnosis as an element of stress management educational complex for the teachers. The author attempted to use the hypnosis technics as a stress coping and prevention tool for the teachers.

Based on practical experience and research provided among the teachers, directors and other school stuff author included and patented the hypnosis as an element of psychological pedagogical complex “Stress defense and increasing the stress coping ability”. Hypnosis as an element of mentioned complex provides an opportunity to deeply clear the influence of accumulated stress, trauma and depression. Also hypnosis methods helps to create a motivational base and activate inner resources to effectively manage any life situations. The advantages and difficulties in the application of hypnosis and self-hypnosis are considered.

Keywords: stress, hypnosis, stress-resistance, stress management, motivation.

Аңдатпа. Мақала гипнозды мұғалімдер үшін стресс-менеджмент оқу кешенінің элементі ретінде қарастырады. Автор гипноз техникаларын мұғалімдер үшін стрессті жеңу және алдын-алу құралы ретінде қолдануға тырысты.

Практикалық тәжірибесін және оқытушылар, директорлар және басқа да мектеп қызметкерлері арасында өткізілген зерттеуді қолданып автор «Стрестен қорғану және стресстік төзімділікті арттыру» психологиялық-педагогикалық кешенінің құрамында гипнозды енгізді және патенттеді. Гипноз аталған комплексінің бөлігі ретінде жинақталған стресстің, жарақаттар мен күйзелістердің әсерінен толықтай құтылуға мүмкіндік береді. Сондай-ақ, гипноз әдісі кез-келген өмірлік жағдайды тиімді басқару үшін мотивациялық базаны құруға және ішкі ресурстарды белсенді етуге көмектеседі. Гипнозды және өзін-өзі гипнозды қолданудың артықшылықтары мен қиындықтары қарастырылады.

Түйін сөздер: стресс, гипноз, стресстік төзімділік, стрессті басқару, ынталандыру.

In this study author observes the researches on a hypnosis and applies on different groups the hypnotic methods of coping with stress to identify its effect. Teachers are defined as a main target group for the study. Stress as a term generally used to explain the physical and psychological state of individual affected by outer factors. Most popular studies on stress done by H. Selye [1] define it as a process of the physical adaptation for the changes. Teachers as a group face many changes last decades related to technological, social and economic development. As Chris Kyriacou (1987) [2] shows in his study, stress may significantly impair the working relationship a teacher has with his pupils and the quality of teaching and commitment he is able to display. There has also been a recent increase in the number of teachers claiming early retirement pensions on grounds of ill-health precipitated by stress and attempts by teacher unions to include an element in their salary claims to cover stress. Stress for teachers works as a trigger for the further problems as depression, psychosomatic problems, psychological dysfunctions, Ashley Trautman & Molly McDonald (2012) [3].

For Schools, as an organizations stress directly effects stuff and reflects in:

1. Productivity decrease
2. Conflicts between teachers and pupils, parents.
3. Sick leaves
4. Professional mistakes

Tom Cox , Neil Boot , Sue Cox & Sue Harrison (1988) [4], investigated the nature of stress in schools and provided the strategies related to the school as an organization, and did not focus on the individual teachers. Author uses the same steps in working with stress in schools. Firstly defining the level and factors of stress. Studying the reasons causing the stress in schools, Masilonyana Motseke (2013) [5] defines 30 main stress factors for the teachers. Mainly low salary is thought to be a stress factor, but it is surprising to find that pupils' poor attitudes towards work, and too heavy a workload, have been generally found to be the main sources of stress.

Scientists all over the world trying to define, measure and find the most effective stress coping methods for the organizations, because negative effect of stress growing rapidly.

Based on scientific researches author combined the stress coping and prevention methodologies, In 2018 based on literature and practical tests developed and patented the stress management program for the school teachers, which include the hypnosis as a stress coping and prevention tool. Analysis of scientific literature shows that hypnosis mostly used individually and in medical areas, but also can be applicable in other areas and for group works as a tool.

American Psychologies Association Division 30 defines hypnosis as: “A state of consciousness involving focused attention and reduced peripheral awareness characterized by an enhanced capacity for response to suggestion”, Gary R. Elkins, Arreed F. Barabasz, James R. Council & David Spiegel (2015) [6].

Authors research was done in different pedagogical groups in Semey Medical University, Astana Medical University, Astana Garden Schools and 54 school in Astana. More than 100 teachers joined the trainings provided by the author, using the hypnosis technics.

As a first step to identify the stressors and factors teachers were interviewed and asked a main question

“What are the outcomes of stress you face?”

Most mentioned problem and requests for training based on following reasons:

1. Constant fatigue. Inability to rest, even on holidays
2. Insomnia. Job responsibilities, pupil results, expectations and overload leads to difficulties with sleep.
3. Irritability. Very sensitive reaction for any changes and surroundings.
4. Overstrain of muscles of neck and shoulders
5. apathetic mood

Each of the factor can be a fundament for depression or lead to psychosomatic reaction.

As a second step for the given groups a short term, 2-3 hour hypnotic training was done for 2 days. Training passed in a group format, what is investigated in researches of Daniel L. Araoz (1979) [7], proving the effectiveness and showing the methodology that can be used to conducts the hypnotic reactions in groups.

Group therapy, as a way of psychological treatment, offers its participants an opportunity to experience life in a safe and non- judgmental environment. Through group therapy, people grow in self- understanding, refine their relationships, and receive feedback on their behaviors and beliefs. They also have a chance to test new modes of acting and to express different opinions, ideas, and attitudes.

Main idea during the training using hypnosis is not only helping the members to overcome the stress, but also to teach the self hypnosis methods, so that any given technique can be used freely long after the training. Effectiveness of self hypnosis is discussed in studies of PaulSacerdote (1981) [8]. Here we discuss only basic methods, used for working with groups. A brief description of each of the techniques follows.

Relaxation

When patients learn to relax through hypnosis, they improve their general functioning and consequently, through hypnorelaxation, they increase self-control and self-confidence and become more positive in their outlook on life.

Positive Revivification

Revivification of a pleasant event is a beneficial technique when group members are depressed or when the group finds itself in a plateau of indifference. Revivification provides and energy inflow from the historical events.

Hand Levitation

Technique of E. Rossi using the levitation of hands allows to investigate any problem for the cause and integrate it with the solution.

Age Progression and Mental Rehearsal

Croup members find this technique very helpful when goals have to be set , preparation for future events are done. Age regression help members to get alone with past traumatic events in life.

Finally, teachers are asked to give feedback immediately and in 1-2 days period. Immediate reactions are as follows:

1. I relaxed very depply
2. Tension in muscles released

3. Thinking stopped
4. Strong desire to sleep
5. Will to cry
6. Deep breathing started

Result that were obtained during the training directly reflect the current state of each participant. Those who were affected slightly are mostly tightened by the cultural and social limitations. That is why self-performance is critical in authors training. All participants need to continue practicing self-hypnosis to get and fix the desired results.

Only difficulty that sometimes occurs with continuation is the barriers in hypnotizing themselves. Participants learn exercises in heterohypnosis, when there is a trainer leading and participant following. Participants may not be sure being in hypnosis or just fall a sleep. To avoid described difficulties, additional material is distributed with the concrete instructions. Instructions consist of 8 steps given in study of Richard B. GarverEd D. (1984) [9] Eight Steps to Self-Hypnosis. Steps are:

1. Plan the suggestion first and keep it positive
2. The entry cue
3. Neutral imagery
4. Move to suggestive imagery
5. Return to neutral imagery
6. Re-orient.
7. Post-hypnotic suggestion for post-trance feeling
8. Exit cue

Following the instructions participants easily get the result and continue practicing the exercises after training.

In a 2-3 daysperiod of self-practice, participants notice the following results:

1. Deep relaxation after a techniques and deep night sleep without any thinking and dreams
2. Release of irritability, attitude to many factors change, what decreases the stressor factors
3. Pain reduction, psychosomatic illnesses passes, body tensions decrease. Erich Flammer&AssenAlladin (2007) [10].

All of the given result directly lead to positive mood what effects personal and professional parts of the teacher's life.

As a conclusion, author recommends to include the hypnotic techniques as a part of stress management program for teachers. Main deep analysis is being conducted and researches continue.

References

- 1 Selye, H. Experimental evidence supporting the conception of «adaptation energy». *American Journal "Physiology"*, 123 (1938), pp. 758-765.
- 2 Kyriacou, C. Teacher stress and burnout: an international review. *Educational Research*, 29 (2), (1987): pp.146-152.
- 3 Borntrager, C. ,Caringi, J.C., Crosby, L., O'Connell, K., Trautman, A., McDonald, M. Secondary traumatic stress in school personnel. *Advances in School Mental Health Promotion*, 5 (1), (2012): pp. 38-50.
- 4 Cox, T., Boot, N., Cox, S., Harrison, S. Stress in schools: An organizational perspective. *Work & Stress: An International Journal of Work, Health Organisations*, 2 (4), (1988): p. 353-362.
- 5 Motseke, M., Stressors of Township Secondary School Teachers: A Management Issue. *Journal of Psychology*, 4 (1), (2013): pp.19-24.
- 6 Elkins, G.R., Barabasz, A., Council, J., Spiegel, D. Advancing Research and Practice: The Revised APA Division 30 Definition of Hypnosis. *American Journal of Clinical Hypnosis*, 57 (4), (2015): pp. 378-385.
- 7 Araoz, D.L. Hypnosis in group therapy. *International Journal of Clinical and Experimental Hypnosis*, 27 (1), (1979): pp. 1-13.
- 8 Sacerdote, P., Teaching self-hypnosis to adults. *International Journal of Clinical and Experimental Hypnosis*, 29 (3), (1981): pp. 282-299.
- 9 Richard, B., Garver, E.D. Eight Steps to Self-Hypnosis. *American Journal of Clinical Hypnosis*, 26 (4), (1984): pp. 232-235.
- 10 Flammer, E., Alladin, A. The Efficacy of Hypnotherapy in the Treatment of Psychosomatic Disorders: Meta-analytical Evidence. *International Journal of Clinical and Experimental Hypnosis*, 55 (3), (2007): pp. 251-274.

IRSTI 20.01.45

R.T. Auyeskhan¹

¹ Suleyman Demirel University, Kaskelen, Kazakhstan

THE INTRODUCTION OF LINUX-BASED CLASSES IN SCHOOLS

Abstract. This beginning Linux class covers the fundamentals of using Linux and Unix. The class trains students to use different file systems, tables, and graphs for data organization, command line functions, and text editors. They practice basic user operations and learn the beginning steps of many of the more difficult parts of using Linux. Through this intermediate class, students study the tools hackers use to break into a computer network and begin learning methods that can prevent this. They learn how to create and maintain firewalls and set up notifications to find intruders. In addition to protecting the systems from hackers, they also learn ways to protect them from malicious software.

Keywords: Linux, school, OS, terminal, code, class.

Аннотация. Этот начальный класс Linux охватывает основы использования Linux и Unix. Класс обучает студентов использовать различные файловые системы, таблицы и графики для организации данных, функций командной строки и текстовых редакторов. Они практикуют основные пользовательские операции и изучают начальные этапы многих более сложных частей использования Linux. В этом промежуточном классе учащиеся изучают инструменты, используемые хакерами для проникновения в компьютерную сеть, и начинают изучать методы, которые могут этому помешать. Они учатся создавать и поддерживать брандмауэры и настраивать уведомления для поиска злоумышленников. Помимо защиты систем от хакеров, они также изучают способы защиты их от вредоносного программного обеспечения.

Ключевые слова: Linux, школа, ОС, терминал, код, класс.

Андатпа. Бұл Linux классы Linux және Unix пайдалану негіздерін қамтиды. Класс студенттерді деректерді ұйымдастыру, пәрмен жолы функциялары және мәтін редакторлары үшін түрлі файлдық жүйелерді, кестелерді және графиктерді пайдалануға үйретеді. Олар негізгі

пайдаланушы әрекеттерін тәжірибе жүзінде пайдаланады және Linux-ды пайдаланудың көптеген қиын бөліктерінің алғашқы қадамдарын үйренеді. Бұл аралық сынып арқылы студенттер хакерлердің компьютерлік желіні бұзу үшін қолданатын құралдарын зерттеп, оны болдырмауға болатын оқыту әдістерін бастайды. Олар брандмауэрлерді қалай жасау және қолдау туралы біледі және зиянкестерді табу үшін хабарландырулар орнатады. Жүйені хакерлерден қорғауға қоса, олар зиянды бағдарламадан қорғайтын жолдарды да үйренеді.

Түйін сөздер: Linux, мектеп, OS, терминал, код, сынып.

Introduction to the Linux. Linux is an open-source computer operating system originally developed for use on personal computers but now broadly used on smartphones, servers, mainframe computers, supercomputers and more. Created by Linus Torvalds at the University of Helsinki in 1991, the operating system is free to install and redistribute for any purpose, which has helped to make it the most popular computer operating system in use today. Versions of the Linux operating system are used on tablets, smartphones and other devices using the Android OS, web servers, smart TVs, gaming devices and much more. The Linux Foundation was created in 2000 to promote the use and development of Linux. The Foundation sponsors the further development of the Linux OS by Torvalds and conducts Linux training certification courses, manages open source projects and hosts Linux conferences and events around the world.

The Linux Foundation offers extensive training and certification courses, some of which are available here. Many courses including Introduction to Linux are self-paced and students can audit them for free or choose to pursue a verified certificate. Gain a strong working knowledge of Linux including an understanding of major Linux distributions. Learn about various system configurations, Linux commands and how to navigate the Linux graphical interface. Learn how to improve IT operations with Linux Foundations Introduction to DevOps, a ten-week course that teaches best practices and principles for optimal development problem solving, workflow, delivery and more. Other courses available provide introductions to Openstack, cloud infrastructure and Apache. Explore all Linux programming courses on edX and start learning today.

Indeed.com lists over 2000 open Linux jobs with the most popular being for Linux system administrators at an average salary of 75K per year. If you are just starting out, the most common entry-level position is Junior Linux System Administrator and you can expect a starting salary of over \$50K per year. Other positions include Linux DBA, Linux Technical Support Specialist

and Linux Engineer. You can also pursue a specialization in a particular Linux distribution such as Red Hat. Red Hat is a software company in Raleigh, NC that created and maintains a popular enterprise-level version of Linux. You will find multiple job postings specifically mentioning Red Hat Linux or other popular versions of the operating system. Red Hat is an edX member organization and offers a free, 9-week self-paced course on the Fundamentals of Red Hat Enterprise Linux. If you are seeking a role as a Linux administrator, having an understanding of Red Hat will be an excellent addition to your CV.

Develop a good working knowledge of Linux using both the graphical interface and command line, covering the major Linux distribution families.

Linux powers 100% of the world's supercomputers, most of the servers powering the Internet, the majority of financial trades worldwide and over two billion Android devices. In short, Linux is everywhere. It appears in many different architectures, from mainframes to server to desktop to mobile and on a staggeringly wide variety of hardware.

Moreover, 80 percent of hiring managers reported that they will prioritize hiring Linux talent relative to other skills areas, and 47 percent of hiring managers say they're more likely to hire a candidate with Linux certification.

This course explores the various tools and techniques commonly used by Linux system administrators and end users to achieve their day-to-day work in a Linux environment. It is designed for experienced computer users who have limited or no previous exposure to Linux, whether they are working in an individual or Enterprise environment.

Upon completion of this training you should have a good working knowledge of Linux, from both a graphical and command line perspective, allowing you to easily navigate through any of the major Linux distributions. You will be able to continue your progress as either a user, system administrator or developer using the acquired skill set.

While many schools invest in Chromebooks and iPads, a growing flock of Linux-forward institutions is mapping an alternate route. I recently caught up with one innovative educator and IT leader from Pavlodar region. Shyngys Burkhan is the network administrator at Bilim Innovation School, a high school located in Pavlodar region. Shyngys told me how Linux and open source software is transforming teaching and learning at Bilim Innovation Schools over the Kazakhstan and explained the role of OS, his custom Linux distribution for schools.

Rauan Auyeskhani: How did you find your way into educational technology?

Shyngys Burkhan: In high school, I worked under the school's technology director, Suleyman Demirel College, as a technology assistant. I was able to see firsthand the challenges and opportunities that a school IT department presented. It was a great experience, and I went to college aiming to work in a school or university eventually. Shortly after getting my degree, I was hired at Bilim Innovation School and got to put it all into practice.

RA: What problems has Linux solved for your school? Why is it a superior choice for students?

SB: Initially, Linux helped revive a significant number of legacy computers—many of them more than five years old. The computers slowed with every Windows release and became more of a nuisance than a helpful tool. Today, 80% of our computers run Linux. There is far less time wasted on troubleshooting the operating system and more time getting work done. The technology change became coupled with a new curriculum that focuses on teaching kids higher-level skills, not how to use a specific version of proprietary software. Education is about exploration and freedom to experiment, which makes it a perfect fit with open source software.

RA: What barriers to classroom instruction, if any, have you encountered with Linux?

SB: I still think the biggest hurdle is shifting the focus away from teaching a specific software tool to teaching the craft. We've noticed more and more teachers starting to embrace the open classroom concept—with teacher buy-in comes student buy-in.

RA: Tell us about Linux OS. Why did you decide to create a new distribution?

SB: Linux OS came out of a need to create a simple Linux spin for our roaming laptop carts. We had previously tried Edubuntu, Xubuntu, and UberStudent. They were all great but lacked some functionality we needed; specifically, a self-cleaning, kiosk-like device that would be quick to get on, quick to work on, and ready for the next student. I figured, maybe it would be best to take the bits we liked from each of those distros and piece together a solution. I took Xubuntu, loaded it with education software, tweaked config files, and made scripts that would give us the functionality we wanted.

I didn't plan on packing and releasing it until I started working with Bakytzhan Myktybayev, a teacher at SDK(Suleyman Demirel University), Almaty, and his great Tech Stewardship initiative. I saw a need for a super-simple, ready-to-go education distro that a non-Linux guru could easily install and run.

RA: What do students and teachers think about Linux OS?

SB: The simplicity and usability have been well-received by staff in both elementary and high school. I noticed a sharp increase in laptop usage to the point where we had to start buying replacement batteries for a lot of older devices.

RA: Lagertha is your custom software management suite for Linux OS. Why not build upon existing tools like Ansible or Puppet?

SB: We had tested Ansible, Puppet, and Salt. They are incredibly robust, but overkill for what we needed. I had in mind a non-programmer teacher who would want to quickly push software to his or her lab from a simple web-based GUI. After we got that part working, we figured it could also serve as a means of hostnaming and pushing new wallpapers to a group of machines.

I had virtually no Python experience going into it, so Lagertha also served as a fun learning experience. I'm not sure if we'll stick with it going forward or move to one of those major automation platforms, or possibly use a mix of both.

RA: What other schools are using Linux OS and Lagertha?

SB: In Almaty, just SDK and Bilim Innovation Schools as far as I know. Working with Bakytzhan Myktybayev, we've estimated there are more than 100 machines around Almaty and a few in Kaskelen. Bakytzhan and his fellow teachers have been extremely helpful in giving feedback. Often, Bakytzhan will message me with a teacher request, and we work together on how best to implement it.

RA: Tell us a Linux student success story.

SB: Two come to mind: First, one of our awesome technology apprentice students created jailed Minecraft servers in FreeBSD this year. He also used his student laptop to create a fully scripted Greek oracle world in Minecraft for his history class project.

And just a few weeks ago, a handful of nine-graders who just got their hands on Makey Makeys made custom controllers to play SNES games on a school cart laptop. Seeing those kids get excited to experiment with the school technology is a great feeling. I see a bright and open future here, and that's due to the great staff and students here at Bilim Innovation Schools.

This is an excellent guest Ismail Gesen (head of ICT department) on the use of Linux in K-11 schools, including strong evidence that school districts that do not have students using the Linux operating system are placing their students at a disadvantage, as well as a description of one outstanding success story in Astana.

Linux in Schools

Ismail Gesen

What computer operating system should students learn at school? Most schools use MS Windows or Mac, but a number have switched or are in the process of switching to Linux. For schools the advantages are lower costs, greater security, no viruses or spyware, easier upgrades and better reliability. Lastly, there are very few licensing hassles or concerns about pirated software. What about the students? One of the arguments frequently presented in favour of Windows is that students should learn on the systems they will be using after they graduate. But the computer world is changing rapidly, and it is difficult to determine if Windows will still dominate computer desktops to the extent it does today. More importantly, Windows in 2015 will almost certainly look different than Windows 7.

The key question is whether Linux is relevant today and in the future. After all, if it's just a fringe operating system with few real-world applications, then why burden the students with it?

Consider the following breakdown for market share by operating system as of June 2010.

“A”91%

“B”4.4%

“C”1%

One could easily assume that “A” is Microsoft Windows, “B” is Mac and “C” is Linux. This list, however, does not include family computers purchased at your neighborhood electronics store. Rather it looks at what's happening among supercomputers – the fastest 500 computers on the planet. Now let's identify the OS.

“A”91%.....Linux

“B”4.4%....Unix

“C”1%.....Windows

(source)

What's even more astonishing is that just twelve years ago, in June 1998, Linux first made the list with a single computer in the top 500.

Typically, these computers are custom built by IBM, HP or Cray. Number one on the list is the Cray Jaguar from the Oak Ridge National Laboratory in Tennessee. Think your quad-core desktop system is fast? This one has 224,162 cores. And yes, it runs on Linux. As expected, many of the Top 500 computers are used by universities and research organizations, especially in science.

Let's look at a few examples of Linux in the real world.

The Film Industry – Weta Digital

The film industry is dominated by Linux. Even Pixar, the company started by Apple's Steve Jobs, does its production on Linux. But for creating

realistic fantasy worlds in 3D, there's little doubt that Avatar sets the current standard. To achieve this, James Cameron collaborated with a New Zealand company, Weta Digital, which also did the digital work for Lord of the Rings and King Kong.

One of the biggest challenge in Avatar was to make the facial expressions of the Na'vi people photo realistic. Weta solved the problem by creating a facial capture system with helmet-mounted cameras directly in front of the actors' faces. Using small painted dots on the faces Weta was able to render the human actors' into their Na'vi counterparts in almost real time, allowing Cameron to check on the finished look as each scene was completed. (see How Weta Digital Handled Avatar and

How James Cameron's Innovative New 3D Tech Created Avatar).

Television Broadcasting – Harris Corporation.

The Vancouver 2010 Olympics presented CTV with technical challenges to manage and distribute the huge amounts of HD video that was shot during the torch relay and the Olympic venues. CTV hired Harris Corporation, with their Harris ONE integrated broadcast solution for this task. Harris puts a Windows interface on their software, presumably because it's more familiar to the majority of users, but all that does is hand over the commands to Linux, where the real work gets done. In a car that would be the equivalent of having a Windows gas pedal connected to a Linux engine.

The Financial Industry – London Stock Exchange.

There's a saying, "Windows is the safe choice. No IT manager ever got fired for choosing it". Trouble is, it just isn't true! Heads rolled at the London Stock Exchange for the expensive adoption and failure of their Windows-based trading system. Last year they finally gave up and adopted Linux. (See London Stock Exchange to abandon failed Windows platform and London Stock Exchange gets the facts and dumps Windows for Linux)

The Internet – Google.

Google runs on Linux. Everything from their massive servers down to their Android operating system for phones and other mobile devices is based on Linux. Even their upcoming Chrome OS will Linux based.

After their Chinese operation was hacked, Google is phasing out all internal use of Windows computers. Any employees wishing to use Windows on their desktop computer must get senior level security approval, otherwise they must switch to Linux or Mac. (see Google ditches Windows on security concerns).

Other companies, organizations, schools and government agencies
The few examples listed above are just the tip of the iceberg for Linux use. Other organizations include Wikipedia, One Laptop Per Child, Amazon, Virgin

America, IBM, Tommy Hilfiger, Travelocity, CERN (Large Hadron Collider) and numerous school systems around the world. (See 50 Places Linux is Running That You Might Not Expect).

The more powerful the computers, the more critical the operations, and the greater the security concerns, the more systems use Linux. It is simply more powerful, more stable, more secure and faster than competing operating systems. For students in school today looking to build careers in forward-looking organizations, a knowledge of Linux would be strong asset, whether or not they are in the IT department.

One trend is clear. Linux is increasing in relevance on the world stage and this will lead to increased demand for people familiar with Linux. This may also be reflected in higher salaries. But don't take my word for it. According to a report sponsored by Microsoft:

http://download.microsoft.com/download/2/0/a/20ac945c-34d0-4a60-8245-f80e80fe954f/Vital_Wave_Consulting_Affordable_Computing_TCO11June08.pdf.

Skilled Linux administrators can command 10% to 20% salary premiums compared to Macintosh, Windows and UNIX managers.

Now, it should be noted that this report is addressed to corporate management, attempting to argue that when it comes to TCO (total cost of ownership), Windows holds its own when compared to Linux. So far I've found no examples where Microsoft has used this figure while attempting to convince computer science students to focus on Windows instead of Linux.

The Trickle Down Effect.

It's worth repeating and emphasizing just how quickly this transformation has occurred at the high end of the computer market. And at the low end, Linux is in a strong position in gadgets and appliances running Android and Meego. (See The Year of the Linux...).

The so-called "trickle-down" effect may not have worked in economics, but it seems to have a much better chance of success in technology.

Many schools in foreign countries and even at home in Canada have already switched to Linux. This is very troubling to Microsoft as they recognize that if students learn on Linux in school, they are likely to stay with Linux after graduation. In response, Microsoft has been almost giving away Windows and Microsoft Office to school systems planning to migrate to Linux.

Summary

Linux is no longer a fringe operating system, but has widespread adoption at the high end of the market with organizations and companies at the leading edge of science and technology. Students who learn Linux may find a

substantial advantage in job opportunities compared to those trained in Windows only.

Schools can benefit by lower costs. In these days of tight education budgets, money saved on computers can be put toward special programs, teachers and assistants, or reduced school fees.

References

- 1 URL: <https://www.edx.org/learn/linux>
- 2 URL: <https://www.edx.org/course/introduction-to-linux>
- 3 URL: <https://opensource.com/article/18/5/corvus-creating-open-source-classroom>
- 4 URL: <http://gregladen.com/blog/2010/09/29/linux-in-schools/>

Форматы 70×100 1/16. 12 б.т.
Таралымы 300 дана

С. Демирел атындағы университеттің хабаршысы
Абылай хан көшесі, 1/1
Алматы облысы, Қаскелең қаласы
040900, Қазақстан
Тел.: +7 727 307 95 60 (іш. 236)
Факс: +7 727 307 95 58
e-mail: info@sdu.edu.kz

Format 70×100 1/16. 12 p.'s sh.
Edition 300 copies

The editorial office of the scientific journal
Suleyman Demirel University
1/1 Abylai Khan Street, Kaskelen
Kazakhstan, 040900
Tel: +7 727 307 95 60 (ext. 236)
Fax: +7 727 307 95 58
info@sdu.edu.kz