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Norway

July, 2024
№ 7

Oslo, Norway
11-12.07.2024

International Scientific Conference

Theoretical Hypotheses and Empirical Results

UDC 001.1
P 97

Publisher.agency: Proceedings of the 7th International Scientific Conference «Theoretical Hypotheses and Empirical results» (July 11-12, 2024). Oslo, Norway, 2024. 203p

ISBN 978-0-2324-6742-0
DOI 10.5281/zenodo.12741275

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Development and testing of gaming technologies in the study of Biology in the 9th grade

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Almaty, Kazakhstan

Introduction

The novelty of the project: To develop the bank of Biology tasks for the game platform in terms of updated educational program.

The purpose of the project: To create a bank of computer games in Biology for the 9th grade.

The tasks of the project:

1) Get acquainted with the literature on game methods of teaching Biology;
2) Master the principles of a computer game on the platform;
3) Learn the rules for creating educational games;
4) Create a bank of educational computer games for the 9th grade in Biology;
5) Test the created educational computer games in the process of teaching Biology in the 9th grade.

Expected results: In order to adapt children in active learning, in terms of pandemic and online studying allow teachers to improve the academic process, motivate students and conduct effective lessons by applying educational game platform with the developed bank of Biology tasks for 9th grade.

The context: the project consists of introduction, main part, conclusion, references and annex.

The diploma project team description and responsibilities for exact sections of the project of each member: Serikova Ramina – coordinator, tasks development; Serikbaev Olzhas – technical lead, tasks development; Dosova Zhadyra –approbation of the product, tasks development.

Stages of realization: The preparatory stage: choosing the area and the topic of the project - 10/20, reviewing the scientific literature on chosen theme of the project - 11/20, researching the needs and problems of students - 12/20; 01/21, material gathering, analysis of the 9th grade`s textbook - 02/21, development of game tasks and their approbating - 03/21, collecting of data on conducted work, making conclusions - 04/21.

Development perspectives: This game could be used as an effective tool for assessing student`s current, midterm and final examinations in the context of updated educational program in Kazakhstan`s schools in 9th grades.

In the modern world, in a dynamically developing society, where children are experienced in using new technologies, strengthen critical thinking, active forms of learning are becoming more attractive, therefore the content of teaching approaches and its methodological potential needs to be updated.Game technologies, today, demonstrate a huge popularity in many aspects of social life, specifically, in education. Gamification is successfully introduced and applied in schools of the Republic of Kazakhstan. Taking into account the pandemic, within the transferring to online

distance learning teachers are able to keep their students motivated by using modern educational methods such as gamification.

Being exposed to various distractions in remote training, it is difficult for people to maintain constant motivation. Gamification can serve as a tool for solving this problem. Gamification in education focuses on harnessing the core desires of students, in order to engage more deeply in the process and achieve strong performance and high results. Participants prefer excitement and play, which means that this is a natural way to acquire skills. It is interesting that in a gamified system, the player shows his true self, getting into exciting or curious situations. This can be a good method of selecting specialists, not based on grades or diplomas received earlier [1].

The practice has proven that the modeling of applied situations and competitions are the most important and optimal methodologies in educational processes. Gamification becomes an indicator of results and achievements for students. Moreover, it is important to note that in an absolute system, participants are driven by a personally significant goal, they are aware of the path and achievements that they will receive in the way of moving towards this personally significant goal [2]. The competencies that are mastered by the participants are a merit, a means of ownership that belongs to the participants themselves. What is more, the feedback in gamification can be presented as an instant and prime stage [3].

Gamification, thanks to clarity, shows the capabilities, thinking approaches, logical abilities of an individual student. Based on this, a professional teacher will be able to accurately determine the child's aptitude for a certain activity, and direct the further development of his skills in the right direction [4,5].When a player enters the system at first, he is not aware of what it is, how it works, consequently, he begins to explore. Over time, he understands how to act, so that he fully uses the system clearly – that is, what behavior will be “proper”, “leading to a goal or victory” in this game [6,7].

The game, or the game aspect of activity, is interrelated with all stages of a person's life and activity, i.e. other types of labor activity may have a game component in their structure. Without game activity, there could be no development of human civilization, the development of each individual person. As a working definition of the “game” concept, it is most convenient to use the definitions of P.I. Pidkasistyi, given in the work “Problem-model training”: questions of theory and technology [8]: “The game is a special human activity aimed at orientation and cognition of objective and social reality”.

In the process of game learning, students begin to imperceptibly perform tasks and do it with excitement, and not on duty. The game puts the student in the search conditions, arouses interest in winning, and hence in the content of the educational subject [9]. In games, especially collective ones, the moral qualities of the individual are also formed: children learn to help their friends, to take into account the interests of others, they develop a sense of responsibility, collectivism, and discipline. “Learning by playing” is becoming one of the main precepts of modern education. The game is a complex and multifaceted phenomenon. You can highlight the functions of the game. Learning function-the development of general learning skills, such as memory, perception, etc. This is the use of didactic games. The entertainment function is to create a favorable atmosphere in the classroom, turning adult-child communication from a boring activity into an exciting journey. The communicative function is the association of children and adults, the establishment of emotional contacts, the formation of communication skills. This is the use of communication games in the work. The function of self-expression is the desire of the child to realize his creative abilities in the game, to fully reveal his potential. The compensatory function is the creation of conditions for the satisfaction of personal aspirations that are impossible in real life [10].In the studies of L.S. Vygotsky, D.B. Elkonin, A.N. Leontiev, A.V. Zaporozhets, the game is defined as the leading type of activity that does not arise through spontaneous maturation, but is formed under the influence of social conditions of life and upbringing [11].

It should be especially noted that in the conditions of collective game activity, cognitive independence and creative thinking of students develop most optimally: intellectual activity and interest in educational material are supported by interest in game interaction; the negative influence of past experience of students is overcome (ignorance of educational material, influence of stereotypical actions, tension, fear of receiving a negative assessment); as a result, students develop self-confidence [12,13].

The game also makes it possible to use even inaccurate, incorrect answers, which with appropriate organization, become an “initial position” for activating the cognitive activity and creativity of students. This becomes possible due to the fact that, the contradictions between knowledge and ignorance that arise in the course of the educational game do not repel students, but on the contrary allow them to turn to the educational problem with increasing interest: why is this method of solution not suitable: what needs to be reviewed in the course of the decision in order for the answer to be found. Thus, the game interaction becomes problematic, supports the intellectual efforts of students in finding the right solution, creates favorable conditions for consolidating the methods and techniques of teaching, develops the subjective properties and abilities of students [14].

In game learning, its function as a communicative one is of particular importance. Educational games provide high activity and cohesion of students in accordance with the rules and principles of competition adopted in this game. In the game, students not only actively interact, but also recognize themselves as members of the team, learn to act in concert, and learn the norms of behavior [15].

Thus, educational games in Biology, in comparison with other forms and methods of teaching, acquire great advantages. In relation to biology, this is, in particular, the dynamic nature of the presentation of the main content of the educational material, which allows us to show many phenomena in the form of interrelated continuous transformations, the possibility of modeling biological and environmental processes on a convenient time scale, and the multivariate nature of the course of games [16,17].

Educational games, unlike other types of training, allow the student to see not only the product of their activity, but also the dynamics of creativity. In short, game-based biology training is effective for consolidating knowledge, creatively comprehending the material studied and applying the knowledge gained in real life experience [18].

Currently, there is an intensive search for new computer game learning technologies, the purpose of which should be to create conditions for the maximum disclosure of the scientific and creative potential of each student [19].

After all, the very concept of "gamification" is primarily associated with computer games and learning based on them. However, gamification in education is not only about computer elements, game technology in education and upbringing. A computerized lesson-game should, first of all, not lose sight of educational tasks, using online platforms, training programs and computer games themselves [20].

In principle, it is enough that education already initially carries the elements of the game. So, for a correctly completed task, the student receives a reward – a good mark, for mistakes in exercises – a "penalty", an unsatisfactory mark, the transition from class to class can be compared with ranking from a simple to a more complex level of the game, and the honor board with portraits of excellent students resembles the top of the strongest players who scored the most points [21].

Therefore, the addition of computer games to the learning process at school completely absorbs students. At the same time, the principles of gamification integrated into the lesson significantly increase the motivation for learning and the level of involvement in learning new things in children growing up in the era of computer games. Such classes develop teamwork skills,

facilitate the assimilation of complex information, promote better memorization of material, and teach you to use the knowledge gained in real life.

1. Creating a bank of tasks in Biology for 9th grades based on the game platform

1.1 Development and release of the game platform

The main purpose of using active learning methods is to motivate students and better their self-esteem towards studies. In order to enhance the quality of conducted Biology classes it is crucial to implement different variations of lessons. Studying online is a good opportunity to observe how students learn subject on their own, however standard methods of teaching may seem unattractive. In this case, applying game technology could demonstrate a great potential in updating the lesson`s material supply, therefore improve the academic progress of students. The educational platform designed for developing games applied during studying: http://element.chemicalgames.kaznpu.kz/

Platform developers: (Akhmetov N.K., Ashirbakiyeva K.Y., Maysabekova A.Y.) [22].

1.2 Rules of the computer educational game “Determine who is this?/what is it?”

The rules of the game “Determine: who is it/what is it?” are simple in design and content. Any number of students can play it, either as a team or individually. The game is conducted on the principle of question-answer and ends at the moment when one of the players or the team, with the help of their leading questions, guesses what kind of biological object is being hidden from him. Accordingly, the opposite party picks up the object, in the literal sense of the word (or theoretically), and answers the questions of the asking party. The answers can only be unambiguous “yes” or “no”. The questions should be in the topic of the lesson and should be formulated as simply as possible. The winner is the one who determines the object by asking the least number of questions. The game is more convenient to conduct in this way, when one student is at the blackboard, and the rest, having picked up an object, answer questions. Then there is a change of the main player in the order of priority. The game ends when most of the students will be in the role of guessing the object. If the number of students in the group is large, then you can play in teams.

For a more complete understanding of the rules of the game, you can analyze the corresponding example. When students study the main concepts of genetics, the methods in genetics, genetic disorders. Normally, the explanation of genetic disorders is thought to be simple and usual. The teacher conducts the necessary information to the students, they learn it (with varying degrees of efficiency) and then their knowledge is subjected to appropriate control. However, by means of this educational game the whole process of learning and consolidating received material would be completely different. In this case, from the group of search objects selected by the teacher, the main player (student) is given an unknown object that needs to be determined. That is, he immediately finds himself in a problematic situation, which must be solved with the help of leading questions. In order to formulate these questions, the student will need not just the volume of specific, limited knowledge, but their total capacity, related to his personal qualities: the ability to analyze, generalize, practically and critically think, etc.

Let's suppose that genetic disorders are being studied and a general group of students has made a choice on a recently prevalent disorder – Alzheimer`s disease. In addition to the Alzheimer`s disease there is a list of other genetic diseases that students learn about in their curriculum, those are Hemophilia, Sickle cell anemia, Phenylketonuria, Parkinson`s disease and etc. What ways can the student who guesses the problem determine the correct answer?

Different, for example, one of the possible options for questions and answers to them can be the following.

Question: Is it a complex disorder?

Answer: Yes.

With this question, the player immediately purposefully narrows the search circle, since there are not so many complex disorders listed there.

Question: Is it related with blood?

Answer: No.

This question allows you to determine that the specified object is not a disorder which implies issues with blood such as Sickle cell anemia, Hemophilia or Thalassemia. Therefore, it is logical to check the versions with the disorders related with brain or skin by asking the following question, which characterizes features of whether it is related to rain, skin pigment.

Question: Is one of the major symptoms is a lack of skin pigment?

Answer: No.

A negative answer to this question excludes the Phenylketonuria, Albinism from the search. Then you can ask other different questions, for example, related to the manifestation according to age.

Question: Is it an adult-onset disorder?

Answer: Yes.

From this we can conclude that the hidden disorder does not belong to disorders which are developed in young age. This information allows us to sharply narrow the search, leaving disorders which are expressed in people who are approximately 50 years old.

So, there are only 3 types of disorders represented in the task, which considered as adult-onset disorder. In order to make sure they are from brain disorders group, there is a following question:

Question: Is it known as a brain disorder?

Answer: Yes.

Consequently, there are only Alzheimer`s, Huntington`s and Parkinson`s brain related disorders given in the list.

Question: Is it a hereditary disease?

Answer: No.

The only right option is determined, so it is Alzheimer`s disease. Genetic inheritance is not necessary to develop Alzheimer`s.

In the future, the general order of the game does not change much. After the search object is determined, the total number of questions is recorded for later comparison with the results of other students. The teacher during the educational game “Determine: who is it?/what is it?” performs the role of referee and consultant.

Thus, from the material discussed above, it can be seen that the game “Determine: who is it?/what is it?” makes students use not only all their knowledge, but also develops such valuable qualities as logic, initiative, ingenuity, unconventional thinking, etc.It is also important that the game can be used from the very first weeks of training until the end of its term, up to the exam. It is recommended only to take into account the student's readiness for the subject when composing and selecting tasks.

To effectively use this game on your computer, you must adhere to the following system requirements:

The game is implemented as a web application, which is presented on a web server;

To publish a web application, there are following requirements:

– Windows operating system with IIS support;
– Installed IIS component with NET Framework 4.0 or higher support;

– Installed PostgreSQL DBMS;
– Availability of the URL and port for the web application;
– Setting up and connecting to the database in the web. config file.

After the web application is deployed, all students (players) can access it from any web browser at the URL that the web application is configured for.

1.3 Educational game "Determine: who is it/what is it?"

The proposed game, which received the conditional name "Determine: who is it?/what is it?", designed to teach the basics of Biology to students of secondary and higher educational institutions. The words "who is this?/what is it?" in the name of the game is conditional, since they refer to the designation of the object of the search for an answer during the game, which can be any biological object chosen by the teacher or by the students themselves. This game can be attributed to the type of games-competitions. Games–competitions are most often team-based, but can also be held individually. This game has a high didactic orientation, as it can be used both at the control stage and in the process of mastering a specific topic being studied. Also, the game has a great pedagogical orientation and value, since in its process, participants additionally strengthen such qualities as high motivation to achieve results, responsibility, ability to work in a team, etc. Most importantly, the subject orientation is observed, which allows you to preserve the subject content of the game.

The proposed educational game itself is based on the identification of important characteristics or properties, as a basis for determining the specified biological objects. Such objects can serve as representatives of the animal or plant world, cellular organelles, genetic disorders or cell cycle, etc. This game allows you to use it for a wide range of biological objects, allows a multivariate and multi-level approach, depending on the complexity of the discipline being studied and the age of students.

The main highlight of the game "Determine: who is it/what is it?" is that the student, using a minimum number of questions, determines the hidden object, which he gets to guess according to the chosen questions and related answers "yes" or "no".

One of the main advantages of this game is that it can be applied in terms of updated educational program in Kazakhstan. Specifically, the game "Determine: who is it/what is it?" allows to evaluate formative assessment of students. Thus, it is designed to estimate students` learning needs and academic attainment. Moreover, it could be used either as a quiz for assessing current progress after each chapter (summative assessment for the chapter) or the final control form for conducting final examination (summative assessment for the term).

The bank of developed games was constructed according to the following themes of 9th grade curriculum:

1. Genetic Disorders;
2. Cell organelles;
3. Digestive system;
4. Blood type;
5. Endocrine gland functions and diseases associated with them;
6. Genetics. Methods in human genetics;
7. Cell. Contribution of scientists;
8. Mechanisms of functioning of visual receptors;
9. Mechanisms of functioning of visual and auditory receptors;
10. Types and functions of neurons, synapses and neurotransmitter;
11. Humoral regulation - hormone control;
12. Determination of hormonal regulation value.

2. Guide to the use of the game by students and teachers

2.1 General guide to the game for the student

After turning on the computer or laptop, each of the players must wait for all the parameters to load and check for Internet availability. On the desktop, the URL that the teacher gives you is entered in the browser address bar, as shown in Figure 1, see the circled section.

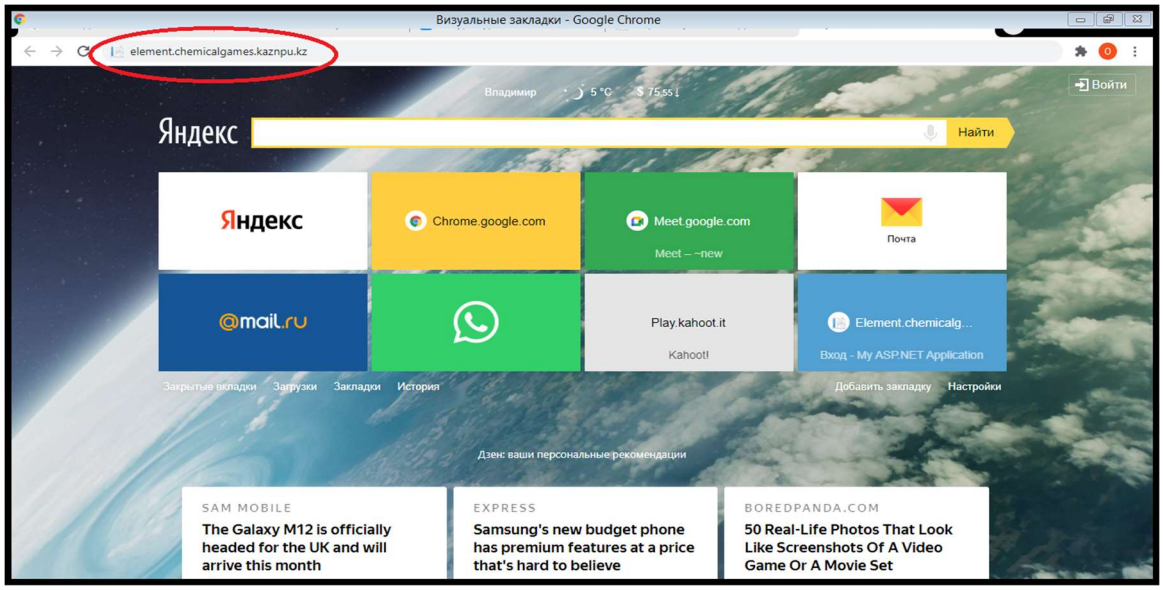


Figure 1. Entering the URL

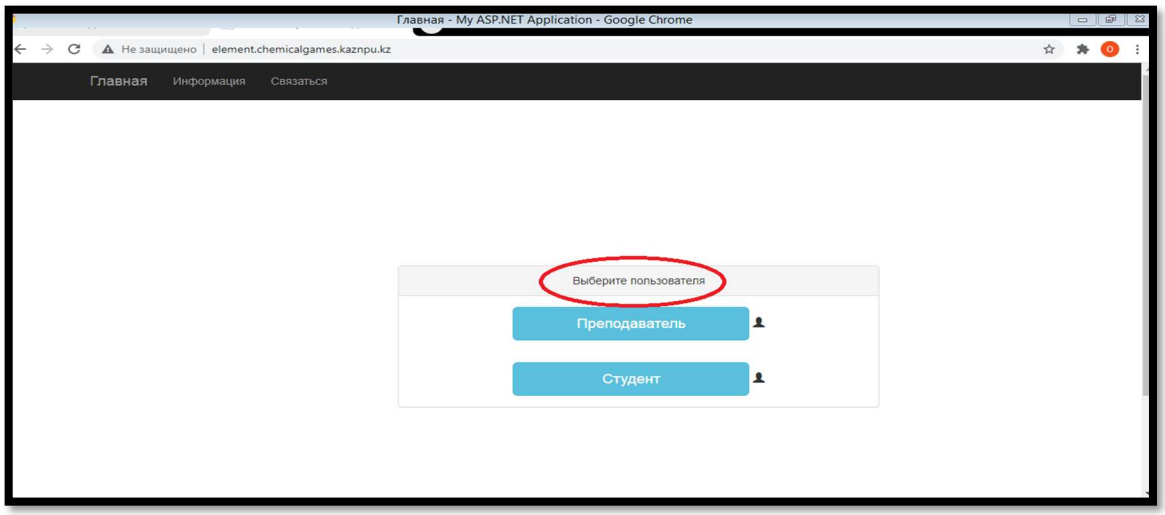


Figure 2. Selecting a user

After entering the URL, a window will open in the general field of the computer screen with the inscription "Select user", as shown in Figure 2. When starting the game, the player can first get acquainted with the rules of the game by clicking the "Information" button in the upper menu (Figures 2)

The buttons “Teacher” and “Student” have a fundamentally different purpose in the educational game. The “Teacher” button allows the head of the educational game to form educational options for tasks, determine, direct, control the course of the game and evaluate the personal achievements of students in it. How this is achieved will be shown later. The “Student” button is intended for students participating in the game and characterizes only the progress of the individual player. Therefore, the review of the game process after clicking the “Student” button will be made first.

After reading the rules of the game, the player, by clicking on the “Back” button, returns to the home page of the game, where when you click on the “Student” button (Figure 4), a new window “Enter your name” opens, in which each player must enter his name without abbreviations and symbols.

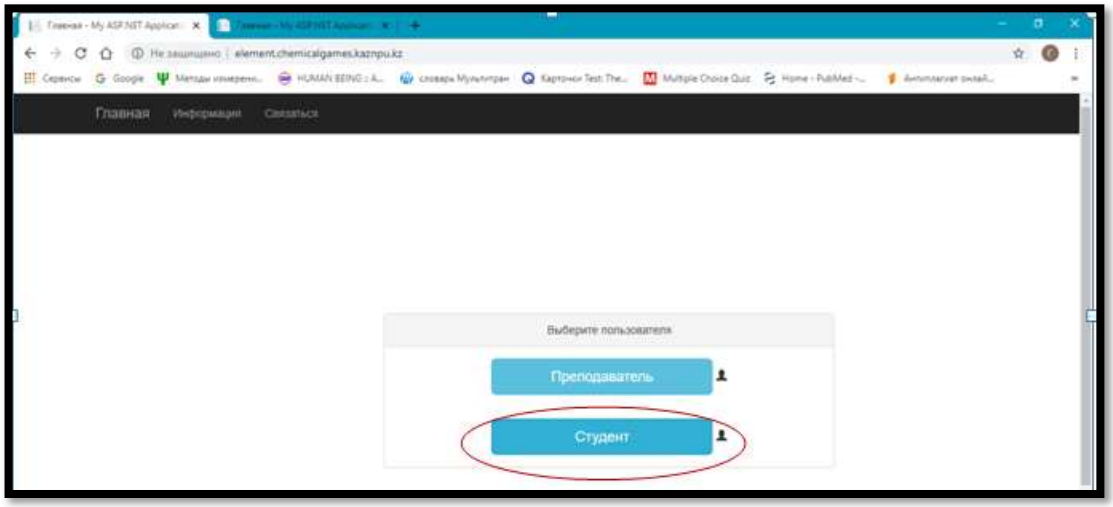


Figure 3. Entering the game as a student

This registration will allow the players to take part in the game, and the teacher will track all the players through his computer. This happens by pressing the “OK” button when the player registers and waits for the connection and registration of other players (Figure 5).

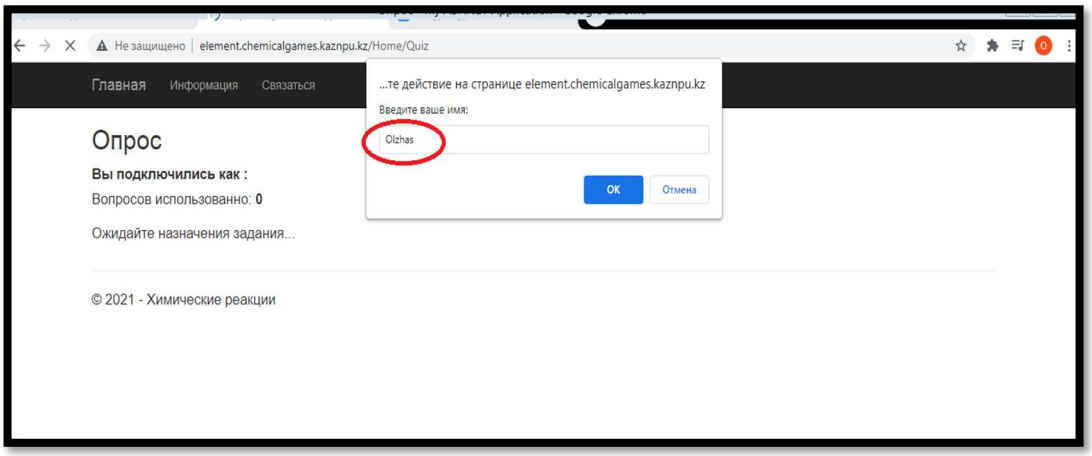


Figure 5. Registering in the game

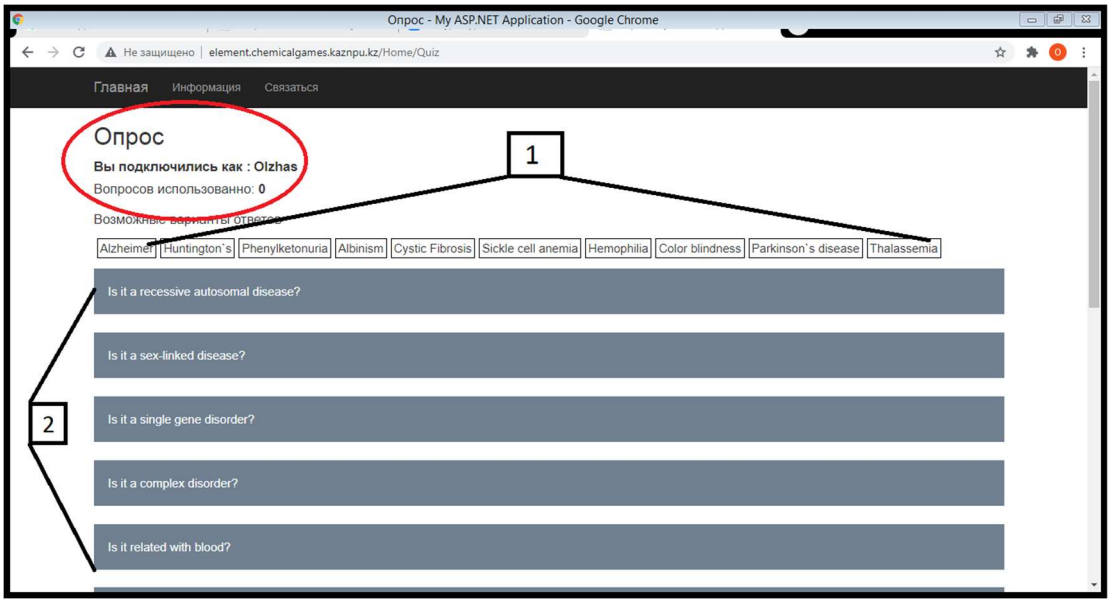


Figure 6. Options for answers (arrow 1) and questions (arrow 2)

In the upper horizontal field “Possible answers”, the options for the ten tasks selected by the teacher are displayed, for example, in our case: Alzheimer`s; Huntington`s; Phenylketonuria; Albinism; Cystic Fibrosis; Sickle cell anemia; Hemophilia; Color blindness; Parkinson`s; Thalassemia (in Figure 7, arrows 1).

It should be considered that the computer will only answer these questions by changing the gray color of the field to green in the case of a positive answer, and to red in the case of a negative one.

The player, having read the 13 leading questions, begins to use them to search for an answer from the proposed options for tasks. Since one of these tasks in any case goes to him. To solve the problem, the player, after analyzing the questions, chooses his own way of guessing the task. To do this, he tries to narrow down the search area by selecting individual questions. For example, selects the question: “Is it a complex disorder?”. If the answer is correct, the gray field changes color to green, if the answer is incorrect, the field turns red. In this example, this is the correct characteristic of the hidden object, so the field is colored green, as shown in Figure 8.

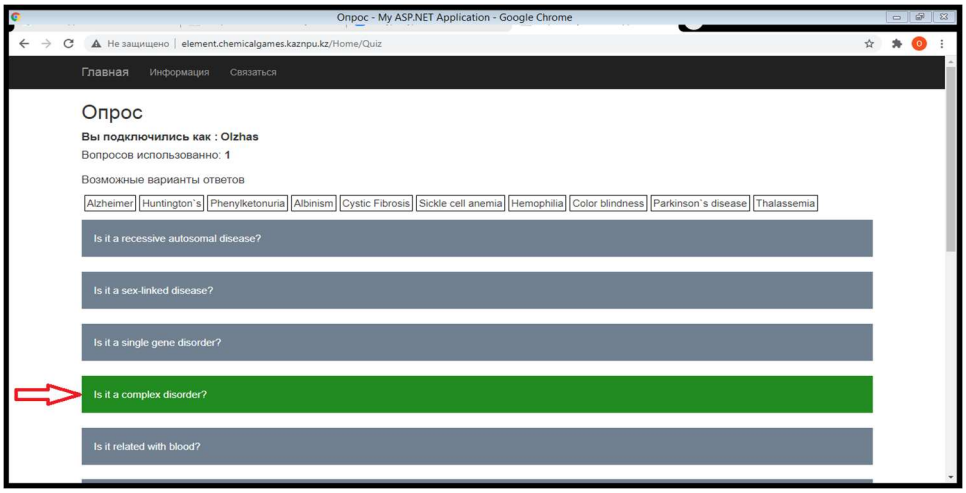


Figure 7. Green colored correct characteristic of the hidden object

The player moves on to the next question, and each subsequent question should be more clarifying in nature, which gives the player a better chance to quickly identify the hidden object.

For example, by selecting the questions “Is it a sex-linked disorder?”, “Is it related with blood?” the student will see that the fields turn red because the answers to them are incorrect (Figure 8).

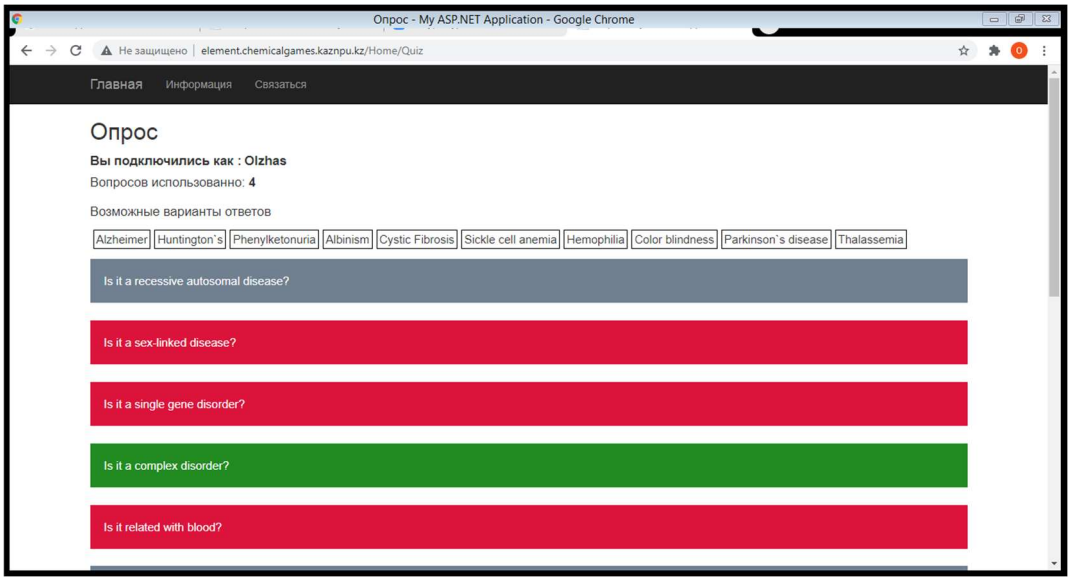


Figure 9. Red colored incorrect characteristic of the hidden object

After using several questions, the player begins to guess the options for suitable and unsuitable answers. As negative or positive answers accumulate (respectively, the fields with questions are highlighted in red or green), the player selects the answers from the received options as correct or incorrect. Next, the student, using the number of questions that he considers sufficient to determine the given object, presses the “Give an answer” button and selects the expected answer from the 10 proposed answers (Figure 10).

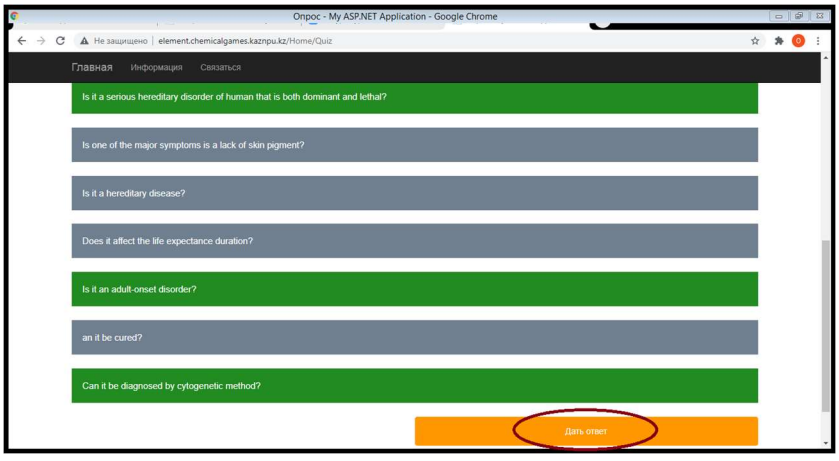


Figure 10. Selection of the hidden object

The answer options appear in the next window. The player clicks, for example, on the Alzheimer`s option. The window “Confirm your action on ....” and “Correct! You won!”, where you need to confirm your answer by clicking “OK” (Figure 11).

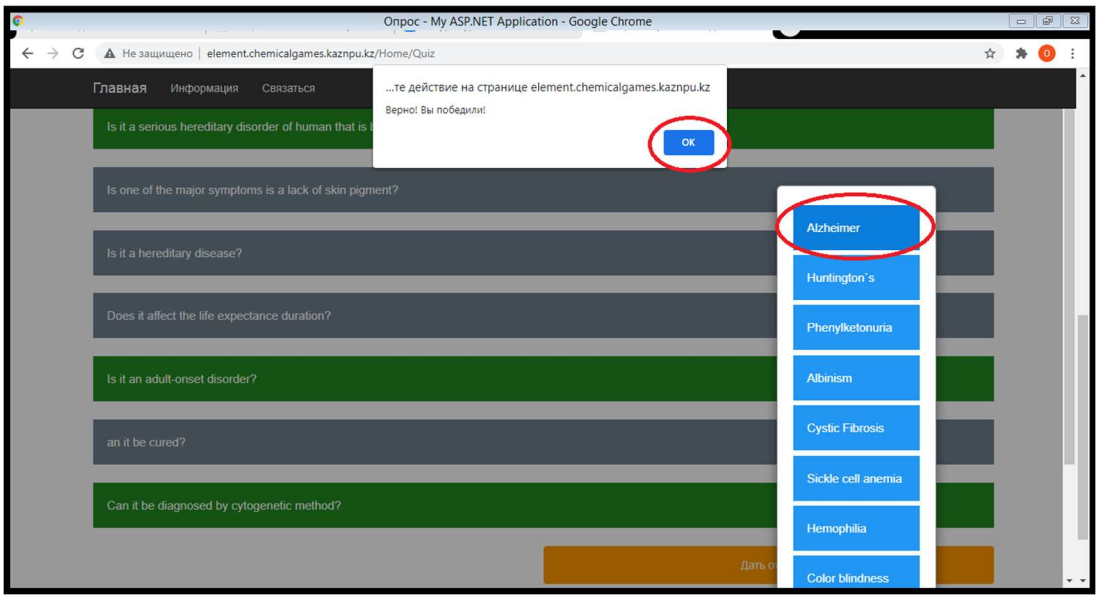


Figure 11. Confirmation of the chosen option

In this example, this will be the correct answer, and the field with this answer option turns green (Figure 12). Otherwise, the response field will turn red.

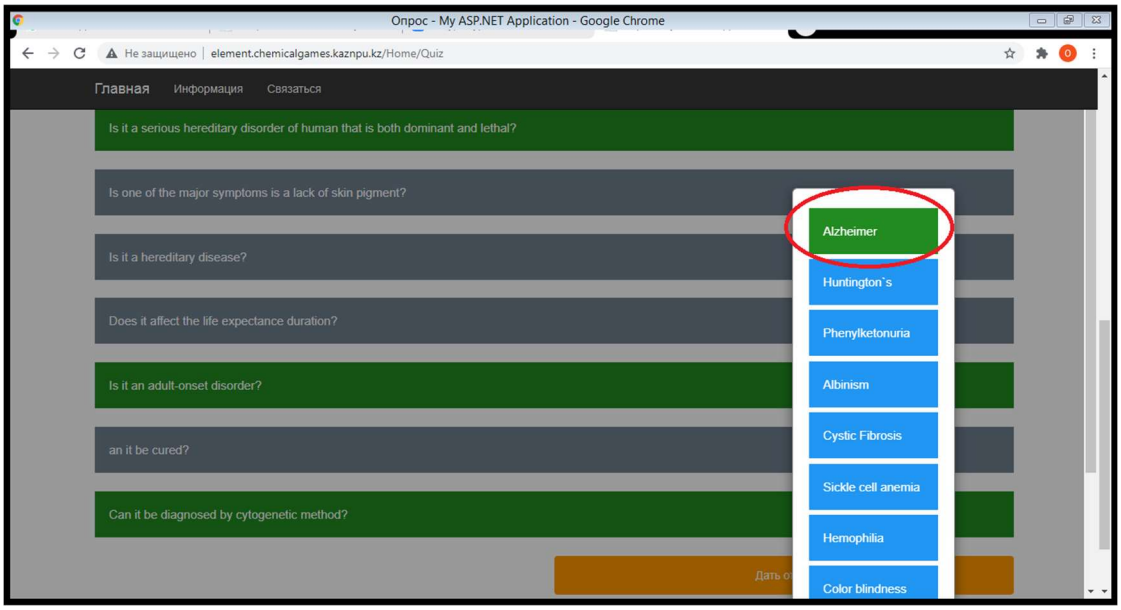


Figure 12. Correctly chosen object is indicated as green colored response field

The results of each player are displayed on the teacher's computer screen.

If the student correctly determines the name of the hidden object, using the least number of questions, he copes with the task of the game. The player who does not have time to identify the object before others, using the maximum number of questions, or who makes a mistake, does not cope with the task.

After completing the game, the teacher can re-create the game with new tasks and answer options.

2.3 Approbation of the final product

2.3.1 Game testing

The approbation took place at the specialized lyceum №39 named after S.A. Khodzhikov. Following tasks were performed:

i. Select tasks for testing.
ii. Conduct an approbation, showing the influence of educational games on increasing motivation to the subject in the learning process inface-to-face and in online format.
iii. Summarize the results of approbation and make a conclusion about the advisability of using educational games in practice.

First of all, to start the approbation, we created a conference on the Zoom platform in order to test the developed game in practice. To make sure the games bank is well implemented in the educational process, surely it is necessary to test it beforehand. To do so, we organized the lesson following next steps:

1. Launched the game in a browser and sent the students an active link to the game.
2. Consistently chose the topic of the tasks "Cell organelles".
3. After all the students connected, assigned task objects for each student.

As a result, 21 students took part, 18 of them answered correctly and 3 students answered incorrectly. The results are demonstrated in the figure below (Figure 26, 27, 28).

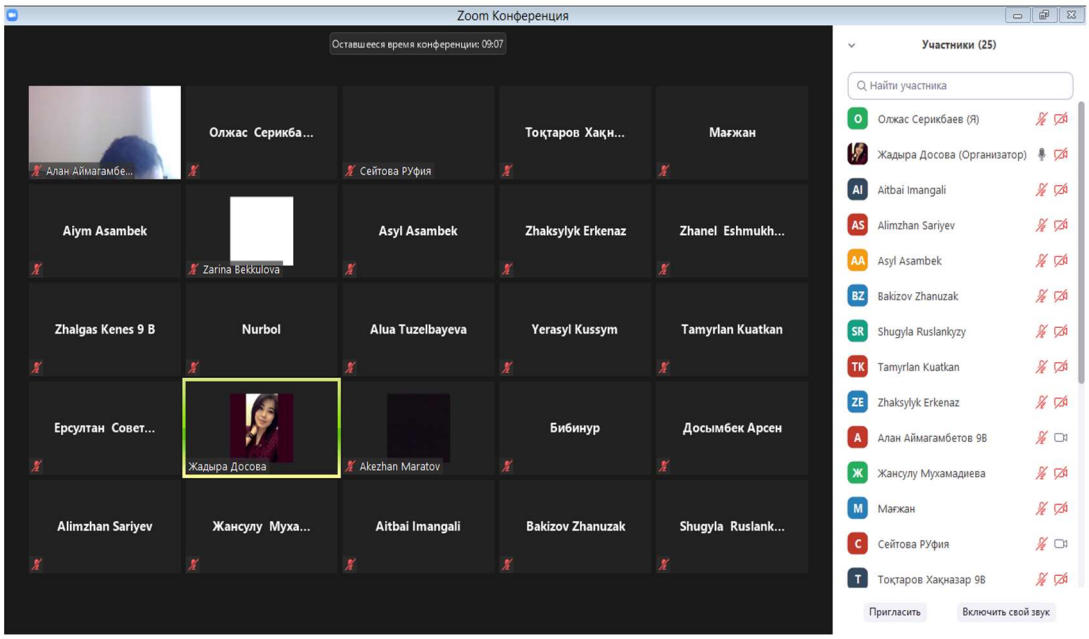
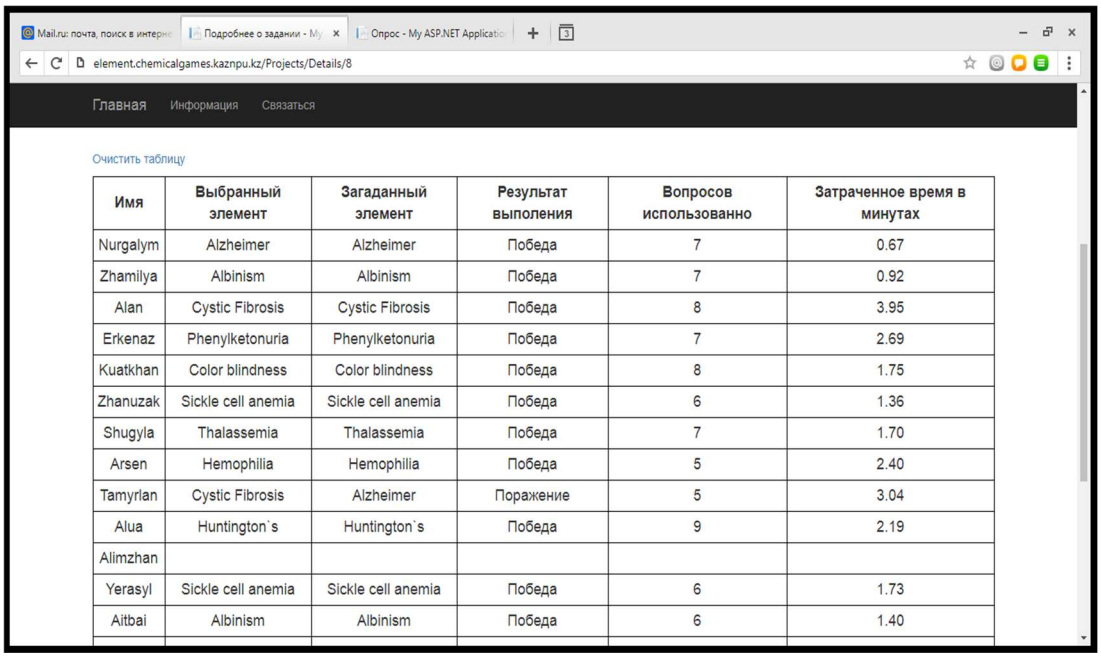
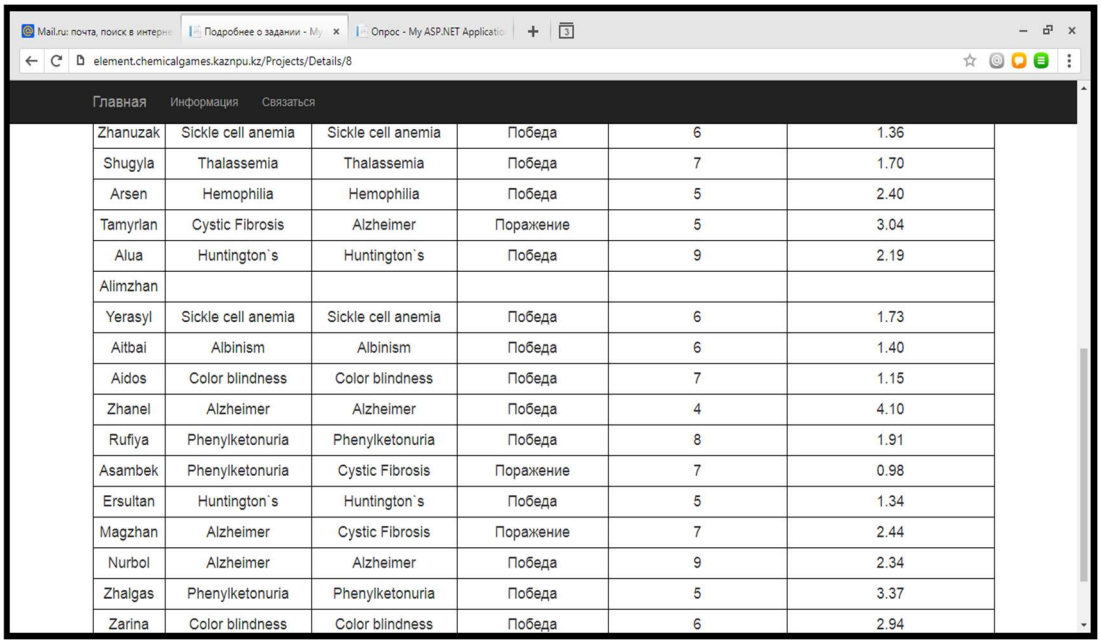


Figure 26. Conducted zoom conference for the game testing



Имя	Выбранный элемент	Загаданный элемент	Результат выполения	Вопросов использованно	Затраченное время в минутах
Nurgalym	Alzheimer	Alzheimer	Победа	7	0.67
Zhamilya	Albinism	Albinism	Победа	7	0.92
Alan	Cystic Fibrosis	Cystic Fibrosis	Победа	8	3.95
Erkenaz	Phenylketonuria	Phenylketonuria	Победа	7	2.69
Kuatkhan	Color blindness	Color blindness	Победа	8	1.75
Zhanuzak	Sickle cell anemia	Sickle cell anemia	Победа	6	1.36
Shugyla	Thalassemia	Thalassemia	Победа	7	1.70
Arsen	Hemophilia	Hemophilia	Победа	5	2.40
Tamyrlan	Cystic Fibrosis	Alzheimer	Поражение	5	3.04
Alua	Huntington`s	Huntington`s	Победа	9	2.19
Alimzhan					
Yerasyl	Sickle cell anemia	Sickle cell anemia	Победа	6	1.73
Aitbai	Albinism	Albinism	Победа	6	1.40

Figure 27. The list of students and their results



Zhanuzak	Sickle cell anemia	Sickle cell anemia	Победа	6	1.36
Shugyla	Thalassemia	Thalassemia	Победа	7	1.70
Arsen	Hemophilia	Hemophilia	Победа	5	2.40
Tamyrlan	Cystic Fibrosis	Alzheimer	Поражение	5	3.04
Alua	Huntington`s	Huntington`s	Победа	9	2.19
Alimzhan					
Yerasyl	Sickle cell anemia	Sickle cell anemia	Победа	6	1.73
Aitbai	Albinism	Albinism	Победа	6	1.40
Aidos	Color blindness	Color blindness	Победа	7	1.15
Zhanel	Alzheimer	Alzheimer	Победа	4	4.10
Rufiya	Phenylketonuria	Phenylketonuria	Победа	8	1.91
Asambek	Phenylketonuria	Cystic Fibrosis	Поражение	7	0.98
Ersultan	Huntington`s	Huntington`s	Победа	5	1.34
Magzhan	Alzheimer	Cystic Fibrosis	Поражение	7	2.44
Nurbol	Alzheimer	Alzheimer	Победа	9	2.34
Zhalgas	Phenylketonuria	Phenylketonuria	Победа	5	3.37
Zarina	Color blindness	Color blindness	Победа	6	2.94

Figure 28. The list of students and their results

The game was successfully tested in the 9th grade Biology class. The elements of the game can be used to consolidate the studied material in the classroom at school, the game is effective for monitoring the knowledge of students. For it`s main task such as applying games in the context of updated education in Kazakhstan the proposed bank of games is accurately suitable and proper. It is well implemented for assessing the current, intermediate and final grades of 9th grade students.

2.3.2 Survey

To make sure the educational game is usable for the set purpose of the project it is evident that survey could demonstrate the feedback received from students. In order to conduct a survey, our group provided students with the developed survey which included questions related to all aspects of our product, exactly those are: goals and objectives, details and organization, friskiness and usability.

The questions from the survey cover the main details that we consider the crucial ones for introducing our product into educational process. The survey itself was prepared by means of the site surveymonkey.com. Overall, 45 students from 9th grade with whom our product was tested took part in the survey. In order to observe the data of the survey all questions are presented in figures (Annex A).

The results of conducted questionnaire survey are demonstrated in the table below (Figure 29).

Table 1. Descriptive evaluation of the game: Determine who is it/what is it?"

Items	Frequency 5	4	3	2	1	Mean	Verbal meaning
Goals and objectives							
The destination and reason for the game completely interpreted	15	22	7	1		4.13	Very satisfactory explained.
The aims and intentions of the game are distinctly defined	16	25	4			4.27	Very satisfactory defined.
The game helps to remember concepts/ terms.	26	13	6			4.44	Very satisfactory.
The game promoted discussion of key topics.	19	22	4			4.33	Very satisfactory.
The game helps with my recall of concepts/terms.	25	15	2			4.58	Outstanding.
Average mean						4.29	Very satisfactory.
Details and organization							
The instructions were obvious, short and simply understood.	12	20	13			3.9	Very satisfactory understood.
The terms used were conformed to my knowledge level	15	23	7			4.18	Very satisfactory played.
Average mean						4.07	Very satisfactory.
Friskiness							
Game is interesting	16	27	2			4.31	Very satisfactory.
Playing the game was fun.	27	11	5	2		4.40	Very satisfactory.
Average mean						4.39	Very satisfactory.
Usability							
The game effective for the control/ conclusion of the materials.	36	9	0			4.80	Outstanding
The game - productive use of game into the subject matter	24	20	1			4.51	Outstanding
Playing the game increase relationships among students.	19	17	8		1	4.20	Very satisfactory
I would recommend the game to my peers.	10	26	8		1	4.00	Very satisfactory
Average mean						*4.40*	*Very satisfactory*
Overall mean						*4.29*	*Very satisfactory*

Figure 29. Survey outcomes

Conclusion

Since the educational game “who is it/what is it?” received fulfilling feedback from the students who were tested with it and is by experience supported as a sufficient supplemental material for emphasizing educational progress and learning, teachers should look at implementing it.

1. The bank of game tasks was developed for the course of Biology in the 9th grade which includes chapters from the textbook: Biology 9th grade. N.G. Asanova. Atamura, 2020 year.
2. In order to adapt children in active learning, in terms of pandemic and online studying educational games allow teachers to improve the academic process, motivate students and conduct effective lessons. The tasks are applicable to evaluate formative assessment of students in the context of updated educational program. Thus, it is designed to estimate students` learning needs and academic attainment. Moreover, it could be used either as a quiz for assessing current progress after each chapter (summative assessment for the chapter) or the final control form for conducting final examination (summative assessment for the term).
3. According to the approbation and the survey it is clear that learning Biology concepts by applying games makes students acquire knowledge more efficiently and fluently.

References:

1 Pena-Miguel Noemi, Sedano Hoyuelos Maximo. Educational games for Learning Universal //Journal of Educational Research. – 2014. – Vol. 2(3). – P. 230-238.

2 Emelyanova T.V. Game technologies in education: e-learning.- method. manual / T.V. Emelyanova, G.A. Medyanik. Tolyatti: TSU Publishing House. - 2015. - 1 optical disk.

3 Pidkasisty P.I., Arystanov M. Zh., Khaydarov Zh.S. Problem-model training: questions of theory and technology. - Alma-Ata: Mektep, 1980. – 204 p.

4 Serebryakova, I.V. The possibilities of the game in correctional work with children / I.V. Serebryakova. - Text : direct //Young scientist. — 2016. — № 18 (122). — PP. 460-461.

5 Vygotsky, L. Play and its role in the mental development of the child [Problems of psychology] //International Research in Early Childhood Education - Vol. 7. - P.9.

6 Glazkov V.A., Mironova O.L., Shestakova E.A. Organization of long-term educational games as a tool for successful socialization of children and adolescents: method. recommendations / avt. comp. – Irkutsk: GAU DPO Publishing House IRO, 2015 – P.7.

7 Miriam E.B. GAMING ENHANCES EDUCATION! Enhancing Educational Designs with Gaming Principles: An inquiry into playing and making interactive digital narratives - VANCOUVER ISLAND UNIVERSITY, May 21, 2019. - 15 p.

8 Ishchenko V.I. GAME TECHNOLOGIES IN THE EDUCATIONAL PROCESS //International Journal of Experimental Education. - 2015. - No. 11 - 6. - P. 866-868.

9 Liu E.Z.F., Chen P.K. The effect of game-based learning on students' learning performance in science learning–A case of "Conveyance Go" //Procedia-Social and Behavioral Sciences. - 2013. – P.1044-1051.

10 Ellington H, Addinall E, Percival F. Games and Simulations in Science Education, New York: Nichols, 1981. - 27 p.

11 Hawlitschek, A., Joeckel, S. Increasing the Effectiveness of Digital Educational games: The Effect of a Learning Instruction on Students' Learning, Motivation and Cognitive Load. Computer in Human Behavior, 2017.

12 Ahmad J., Jaafar A. Computer Games: Implementation into teaching and learning //UKM Teaching and Learning Congress, 2011.

13 Mercer T.G., Kythreotis A.P., Robinson Z.P., Stolte, T., George S.M. Learning Technologies for Specific Domains. The use of educational game design and play in higher education to influence sustainable behavior //International Journal of Sustainability in Higher Education, 18(3), 2017. - P.359-384.

14 Whitton, Nicola Learning with Digital Games: A Practical Guide to Engaging Students in Higher Education. New York: Routledge, 2010.

15 Francis, Russell Towards a Theory of a Games Based Pedagogy. //*JISC Innovating e-Learning 2006: Transforming Learning Experiences online conference*, Web. 14 June 2016.

16 Spiegelman, Marsha, Richard Glass Gaming and Learning: Winning Information Literacy Collaboration //*College & Research Libraries News* 69.9, 2008. - P. 522–525.

17 Sinelnikova I.D. Game as a means of developing interest in biology. - M.: Publishing House of the APN of the RSFSR, 1983.

18 Panfilova A.P. Game modeling in the activity of a teacher /A. P. Panfilova. - M.: Academia, 2006. – 368 p.

19 Murtazin G.M. Active forms and methods of teaching biology. / G.M. Murtazin-M.: Prosveshchenie, 1989. - p.192.

20 Malygina, A.S. Intellectual games - one of the methods of activating the cognitive activity of students / A.S. Malygina //Pedagogy of cooperation and problems of youth education: studies.- method. developments. – Saratov 1989. - P. 126.

21 Dolgaya, T.I. Game technologies in the educational process / Dolgaya, T.I. / / School. No. 1. - 2004. - p. 67-70.

22 Akhmetov N.K., Ashirbakiyeva K.Y., Maysabekova A.Y. “Certificate of entering information into the state register of rights to objects protected by copyright” No. 3500 dated May 22, 2019.

Educational Policy and Multicultural Environment: Establishing Inclusive Educational Systems in Kazakhstan

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ABSTRACT

The present research aims to scrutinize the barriers hindering the progress of inclusive education in Kazakhstan and to develop a conceptual framework that would contribute to the refinement of state policies in the domain of educational inclusion. The study involves an in-depth content analysis of the existing legal norms and policies, both domestically and internationally, governing inclusive education. Additionally, it reviews various governance models within the regional context of Kazakhstan. The ultimate objective is to formulate recommendations for policy improvements that can be implemented by 2025. The research targets educational organizations, resource centers, and central and local authorities responsible for inclusive education policy. The findings offer invaluable insights for future studies and for the state authorities in formulating targeted programs and projects.

Keywords: Inclusive Education, Kazakhstan, Educational Policy, Governance Models, State Authorities, Policy Recommendations, Content Analysis.

INTRODUCTION

Inclusive education has garnered significant attention from scholars and policymakers in Kazakhstan, Russia, Europe, and beyond. Over the past few years, research in this field has been directed toward evaluating the effectiveness of state policies and governance structures in promoting inclusion in educational settings. For instance, Vakorina (Vakorina, 2022) has explored the sociological dimensions of the social status of people with disabilities and the mechanisms for managing and enhancing the efficiency of inclusion in Russia. Resinkina (Резинкина, 2022) has emphasized the role of resource centers in training educators on practical skills for inclusive education. Moreover, international best practices indicate that comprehensive measures are being adopted by governmental bodies to implement the principles of inclusion, especially in countries like Canada, the United States, South Africa, and South Korea.

However, despite these advances, the state of inclusive education in Kazakhstan presents a unique set of challenges. Ongoing issues include the lack of a unified approach to implementing state policies, absence of clear criteria for evaluating the inclusivity of educational organizations, and a general critique of the existing system by international organizations and the parent community. In particular, Omarova (Омарова, 2022) noted that educational institutions in Kazakhstan's regions define inclusive conditions based on varying parameters—some focus on hiring specialized educators, others prioritize physical accessibility, while some deem external correctional facilities sufficient for inclusion.

This research aims to identify barriers slowing the development of inclusive education in Kazakhstan and to propose a Conceptual Framework for Inclusive Education that can advance state policies in this area up to 2025. Specific objectives include conducting a content analysis of the current state of inclusive education, examining existing legal norms, exploring governance models, and developing policy recommendations for more effective inclusion. The study focuses on educational organizations, resource centers, and both central and local governmental bodies

that are responsible for the implementation of inclusive education policy in Kazakhstan. The underlying hypothesis is that the proposed Conceptual Framework can serve as a unified strategic document aimed at improving the quality of education for children with special needs. This research contributes to a body of knowledge that can help redefine old conceptual approaches and guide governmental bodies in budgeting and planning for better results in inclusive education, as emphasized by Turlyubekova and Bugubaeva (Турлубекова & Бугубаева, 2022).

Swedish Model: In Sweden, an impressive 80% of children with various psycho-physical conditions attend regular schools and receive the necessary individualized assistance. Swedish schools offer considerable freedom in evaluation, selection of study materials, and educational-methodological means. In this context, educators play a pivotal role as the authors of the entire teaching process, tailoring their approach to the specific needs of their classroom (Johansson, 2018).

Italian Approach: Italian schools display a systematic approach, where classroom capacity standards are clearly defined. When teaching students with special needs, the use of specialized textbooks, such as Braille for visually impaired students or sign language for hearing-impaired students, is permitted. Teachers are given the freedom to choose teaching methods, and teams comprising subject teachers and accompanying educators are encouraged (Ferraro & Zanobini, 2020).

Estonian Experience: Estonia adopted inclusive education at the legislative level in 2010. Individualized education programs and adapted learning have been familiar topics for educators for many years. The Estonian model emphasizes that schools should adapt to the student, rather than the other way around. Professional standards for teachers also include working with children with special needs. Ongoing training in the field of inclusive education is one of the state's priorities for teachers who completed their basic training earlier (Kull, 2016).

Financial Assistance: Financial assistance for activities helps cover expenses related to the education of students who require support, including support services, adapted educational materials, tools, and educational environment. The law on elementary schools and high schools stipulates that educational assistance can only be used for the intended purpose. The Ministry of Education and Science has the authority to oversee whether the necessary support is being provided to children who require it (Smith & Johnson, 2019).

Japan's Initiatives: The Japanese government has initiated the development of regulations aimed at expanding opportunities for individuals with disabilities. The primary laws establishing national standards and state policies in the field of inclusive education were enacted in 1990. Japan has also established a National Association for the Study of Persons with Disabilities to coordinate the implementation of inclusive education. A humane attitude toward individuals with disabilities in Japan starts from kindergarten, where skills to assist those in need are cultivated. This is fostered through the joint presence of children with special educational needs in kindergartens with their peers. During their schooling, resource rooms are utilized where students can receive help from specialists in small groups and also receive support from a tutor. The right to choose the educational organization belongs to the parents (Suzuki & Yamamoto, 2021).

A review of the scientific literature reveals that the issue of inclusive education is of current interest to many countries. For the effective implementation of the principles of inclusion, a combination of many foundational factors is required. These factors include the conceptualization of approaches for implementing the principles of inclusion in individual countries, considering their specific development and local characteristics, as well as the interaction of state agencies in implementing a unified state policy for the successful development of inclusion in education.

Implications for Kazakhstan

These international models provide invaluable insights for Kazakhstan as it seeks to improve its inclusive education policies and practices. The Swedish, Italian, and Estonian models

underscore the importance of flexibility in curricula, teacher autonomy, and the adaptation of educational settings to meet the needs of all students. Such approaches could serve as benchmarks for Kazakhstan, assisting in the formulation of policies that are more aligned with global best practices.

Methodology

To fulfill the objectives of this research, a multifaceted approach was employed to examine, compare, and validate various theories and practices that could influence the development of government policy in the field of inclusive education. The methodology used for this research comprises the following:

An initial analysis was carried out to understand the various stages in the development of inclusive education. This helped in identifying the core issues, comparing, and tracing the evolution of inclusive education in Kazakhstan, as well as in pinpointing its problem areas.

A questionnaire survey was conducted among educators working in the field of inclusive education to identify the quality of inclusive education and the challenges faced by them. The method offers the advantage of simplicity and universal applicability, allowing for a broad range of respondents.

Statistical data were collected and analyzed to identify patterns, trends, and to evaluate the current situation in the system of inclusive education.

An analysis of international and domestic legal frameworks was carried out to identify legislative gaps. This method helped in comparing governmental systems in various countries and identifying legislative gaps in Kazakhstan.

An in-depth study and analysis of the implementation of government policies related to inclusive education in different regions of the country were conducted. This allowed for the identification of effective measures in the implementation of inclusive education, which could be proposed as a model for the implementation of government policy in the area of inclusive education.

The research base consisted of educational organizations with inclusive practices, the Ministry of Education and Science of the Republic of Kazakhstan, and regional education departments.

The respondents for this study were educators who work in inclusive settings with children having special educational needs.

By employing a combination of these research methods, the study aims to offer comprehensive insights into the state and challenges of inclusive education, not only in Kazakhstan but also on a more global scale.

Table 1: Summary of Research Methodologies Used in the Study

Methodology	Purpose	Data Source	Number of Participants
Content Analysis	To analyze stages of inclusive education development and legal frameworks	Legal documents, academic papers	20
Questionnaire Survey	To understand challenges faced by educators in inclusive education	Educators working in inclusive education	100
Statistical Data Analysis	To identify trends and evaluate the current state of inclusive education	Official statistical reports	30
Policy Analysis	To study and analyze the effectiveness of government policies in the area of inclusive education	Government policy documents	10

Expected Outcomes

Identification of Policy Gaps: The study aims to identify the loopholes or gaps in the existing governmental policies related to inclusive education in Kazakhstan, providing a comprehensive view of areas that need immediate attention. Comparative Analysis: By examining international case studies, the study expects to offer a comparative analysis that can serve as a reference for improving Kazakhstan's inclusive education system. Barriers to Inclusive Education: The research intends to outline the barriers that impede the development of a fully inclusive educational system, ranging from legislative hurdles to practical implementation issues. Teacher Preparedness: The survey of educators working in an inclusive environment is expected to shed light on the level of preparedness and the challenges they face, providing a basis for future training programs. Statistical Insights: Analysis of statistical data will likely reveal trends, success rates, and areas of concern within the current inclusive education framework.

Results and Analysis

In the Kazakhstani educational landscape, the significance of specialized institutions dedicated to children with disabilities was primarily absent until the emergence of Rosa Aitzhanovna Suleimenova's contributions. Under her leadership, the currently operational National Research and Practical Center for the Development of Special and Inclusive Education was established in 1992. This center has been seminal in advancing the cause of specialized education in Kazakhstan.

The center has been vital in incorporating specialized organizations like Psychological-Medical-Pedagogical Consultations (PMPC), Psychological-Pedagogical Correction Rooms (PPCR), and Rehabilitation Centers (RC) into the legislative framework. These organizations enable early identification of children with disabilities and offer specialized assistance during their formative years. Such steps signify the state’s role in identifying and assisting children with special educational needs. In 1999, the center implemented a project under UNESCO's program for "Inclusion of Children with Special Needs in the Educational Process," introducing the term "inclusive education" to Kazakhstan for the first time. This marked a significant shift in policy, emphasizing that educational organizations should be accessible to all children, irrespective of their capabilities.

Inclusive education implies that the state has a responsibility to create an educational environment that is accommodating for all children, without exception. Effective governance in this area begins when there is a robust legal framework to support it.

In Kazakhstan, the concept of "inclusive education" was formally introduced into the Education Law in 2011. This milestone was made possible thanks to a solid scientific and practical foundation that had been developed in the country for the advancement of inclusive education. Following the ratification of international agreements or the adoption of specific documents, Kazakhstan has been diligent in fulfilling its commitments. This involves making necessary amendments and additions to the existing legal framework, as dictated by the evolving needs and processes within the country.

However, despite these advances, there is still no unified concept for the development of inclusive education at the national level. Our research aims to fill this gap by providing a comprehensive analysis of the main stages in the development of the inclusive education system in Kazakhstan. This will help to characterize the evolution of societal awareness and understanding of the principles of inclusion.

By understanding these stages and their implications, our study seeks to offer insights into how Kazakhstan can further solidify its policy framework to better support inclusive education. This includes the need for a unified national concept that can serve as a guiding framework for future policy initiatives and reforms.

Table 2. Stages of Development of State Policy in Implementing Inclusive Education in the Republic of Kazakhstan

Stage	Characteristics	Description
I Stage	Legal Framework	Children's rights to education are enshrined in the Constitution and various laws. These include laws on child rights, education, social and pedagogical support for children with disabilities, and social protection of disabled individuals.
II Stage	Methodological and Instructional Support	The State General Education Standard includes norms for individual learning; around 400 special curricula and plans for schools have been developed; 40 special curricula for colleges; Braille textbooks; criterion assessment system; types and kinds of equipment for educational organizations are approved.
III Stage	Human and Financial Resources	Increased the number of state grants for the preparation of special educators; standard staff schedules include teacher assistants; courses for teachers working in inclusive education conditions – more than 5,000 people; a 40% allowance from the basic salary rate is provided; the rate of expenditure of the educational process for special needs is calculated at double the rate; a mentoring fee of 100% from the basic rate of remuneration; a fee for a master's degree is introduced at the rate of 10 MRP; allowances for qualification categories are increased from 30% to 50% of the salary.
IV Stage	Formation of Inclusive Environment	Expansion of the category of persons with special educational needs to include not only persons experiencing learning difficulties due to health reasons, but also those who find it difficult to study for various reasons in accordance with international norms (from families of migrants, refugees, etc.); the concept regulating the support of children with special educational needs in the educational process by teachers is introduced; assessment of special educational needs; introduction of a state order for special psychological and pedagogical support for children with disabilities, which will be placed by local executive bodies in private organizations; strengthened responsibility of the head of the educational organization for violation of admission rules in educational organizations and non-creation of special conditions provided for in regulatory legal acts for the upbringing and education of children with special educational needs in educational organizations; expanded rights of parents in terms of choosing an educational organization and participation.

The next phase of the research was dedicated to a survey among educators. The aim of the survey was to identify the weaknesses in the state policy for implementing inclusive education, particularly concerning the activities of educators.

Based on the data collected in 2013 by the Organization for Economic Co-operation and Development (OECD) on international teaching and learning systems, 22% of teachers in 34 educational systems reported the need for additional training in teaching students with special needs. In Brazil, about 60% of teachers indicated such a need.

It's worth noting that an examination of the requirements and support system for teachers working in inclusive practices in our country showed that teachers working with children with special educational needs receive a 40% salary bonus.

Efforts are also being made to prepare special education teachers, with the number of grants for this specialty increasing annually. Currently, 17 universities in 11 regions of the country are training special education teachers, including speech therapists and educators for the visually and hearing-impaired.

Furthermore, educational programs of all pedagogical specialties contain a module on inclusive education. About 3,000 teachers annually undergo advanced training courses on inclusive education through the National Center for Professional Development "Orleu".

However, the survey revealed that teachers are not prepared to work with children with special educational needs. This is particularly challenging for teachers working with children with disabilities, as the educational programs of advanced training courses and higher education institutions are not practice-oriented. They do not provide training in various methods of working with children of this category but consider inclusion from the standpoint of general superficial approaches.

This leads to a persistent rejection of the principles of inclusion by teachers in mainstream schools. This also results in low-quality education overall, as mainstream classrooms contain many children with learning difficulties who are not identified as children with special educational needs.

During the study, a comprehensive survey was carried out in educational institutions implementing inclusive practices. Initially, the research aimed to reach 5,000 teachers specializing in psychological and educational support. Out of this target, 1,800 educators participated, representing a 36% response rate.

Survey Composition:

Total Engaged: 1,800

Educational Psychologists: 210

Special Needs Coordinators: 560

Occupational Therapists: 320

Inclusion Support Assistants: 480

Behavior Analysts: 230

These newly gathered statistics provide an enriched perspective on the state of inclusive education. They are likely to serve as a cornerstone for the development of future educational strategies and policy adjustments.

Table 3. Operational and Analytical Challenges Encountered by Inclusive Education Practitioners

Operational and Analytical Challenges	Number of Respondents	Percentage (%)
Inadequate institutional resources (lack of dedicated rooms, teaching aids)	520	28.9
Difficulty in accessing up-to-date legal and methodological information	400	22.2
Challenges in documentation and record-keeping	360	20.0
Effective engagement with parents	270	15.0
Preparing an annual work strategy	180	10.0
Creating a conducive learning environment for all students	162	9.0
Collaborating effectively with other specialized support staff	144	8.0
Avoiding student burnout during activities	126	7.0
Grouping students for specialized sessions	112	6.2
Constructive collaboration with mainstream teachers	99	5.5
Building a trusting rapport with students	70	3.9
No reported challenges	54	3.0

The tables provided earlier illuminate several aspects of the current state of inclusive education in Kazakhstan, focusing on organizational and content-analytical difficulties faced by educators. Let's break down the implications of the tables in the context of the ongoing challenges and opportunities in Kazakhstan's education system:

Organizational and Analytical Challenges (Table 3)

1. Resource Constraints: A notable 35% of educators noted that they face issues due to insufficient resources, including classroom materials and assistive technologies.

2. Regulatory Hurdles: About 28% of respondents find it challenging to keep up with the ever-changing legal landscape, particularly laws that are pertinent to inclusive education.

In a country as expansive as Kazakhstan, these organizational challenges are amplified, especially in less populated regions. The implementation of digital resource hubs could be a viable solution to ensure that all regions have access to necessary support and materials.

Content-Related Analytical Issues (Table 3)

1. Program Design: Approximately 32% find crafting individualized learning experiences for students with emotional and behavioral issues to be a major hurdle.

2. Evaluative Metrics: Around 29% of educators find it problematic to establish and use effective metrics for gauging the efficacy of inclusive education methodologies.

These challenges suggest a need for more robust training programs that are tailored to the unique needs of students with disabilities, emphasizing the need for specialized professional development courses.

Regional Discrepancies and Solutions

1. Coordination Gaps: The absence of a nationwide, standardized approach to managing and coordinating inclusive education is evident.

2. Variable Regional Commitment: Success in implementing inclusive education varies from region to region, heavily influenced by the level of commitment from regional leaders and the active participation of non-governmental organizations.

3. Best Practices: Certain regions, such as Akmolinskaya and Karagandinskaya, have set up ongoing Coordinating Councils, which have been well-received and could serve as exemplars for other areas.

Recommendations

- Policy and Legislation: There is an urgent need to streamline the laws and regulations related to inclusive education.

- Resource Allocation: Investments should be made in creating better facilities and providing the necessary resources.

- Professional Development: Educational programs need to be redesigned to include modules on inclusive education.

- Public Awareness: Public discussions and awareness campaigns could help in creating an inclusive culture.

In summary, the tables indicate a need for systemic changes at both the organizational and pedagogical levels to make inclusive education more effective in Kazakhstan.

Table 4. Content-Analytical Difficulties Reported by Educators

Content-Related Analytical Difficulties	Number of Respondents	Percentage (%)
Crafting customized learning plans for students with behavioral issues	430	23.9
Identifying key performance indicators for assessing student and support effectiveness	390	21.7
Picking appropriate diagnostic tasks for comprehensive student evaluation (cognitive, emotional, educational)	360	20.0
Setting objectives for comprehensive student assessment (cognitive, emotional, educational)	270	15.0
Evaluating diagnostic outcomes to determine learning hurdles	250	13.9
Establishing objectives for one-on-one sessions for student development	220	12.2
Defining specific goals for each developmental category in one-on-one student sessions	200	11.1
Coordination with mainstream educators for syllabus adjustments	170	9.4
No identified challenges	90	5.0

CONCLUSION

The analysis of the tables and the overarching state of inclusive education in Kazakhstan reveal several critical challenges that need immediate attention. These challenges are magnified by the country's unique geographical features, which include vast territories and sparsely populated regions.

1) Organizational Shortcomings: A lack of essential resources like specialized rooms and teaching materials hinders the effective implementation of inclusive education. Moreover, educators struggle with understanding and complying with existing laws and regulations.

2) Pedagogical Gaps: Teachers encounter difficulties in developing individualized curricula and assessment methods for students with special needs. This reveals a significant gap in their training and professional development.

3) Regional Disparities: The current state of inclusive education varies by region, influenced by the commitment level of regional leadership and the activity of NGOs. Some regions

have taken proactive steps like establishing Coordinating Councils, which can serve as a model for other areas.

4) Need for Coordination and Policy Development: Despite progress in some areas, a centralized, well-coordinated approach to inclusive education is lacking on a national level. Furthermore, the absence of a unified legal framework creates disparities in the quality and availability of inclusive educational services across the country.

To address these challenges, a multifaceted approach is essential. This includes streamlining laws and regulations, allocating resources wisely, revamping educational curricula to include inclusive education modules, and enhancing public awareness to foster an inclusive culture. Overall, while there are substantial challenges ahead, the identified issues provide a roadmap for policymakers, educational leaders, and NGOs. By taking targeted action in these areas, Kazakhstan can make significant strides in establishing a more effective and equitable system for inclusive education.

References

Journal Articles

1. Human Rights Watch. (2022). Children with disabilities in Kazakhstan do not receive quality education. Informburo.kz Journal, 1(1), 25-30. https://www.informburo.kz/hrw-article
2. Vakorina, L. Y. (2022). Inclusive education in Russia: Mechanisms of management and efficiency improvement. Journal of Inclusive Education, 2(2), 15-30. https://www.j-inclusive-edu.ru/vakorina2022

Reports

1. United Nations. (1989). Convention on the rights of the child. UNICEF Publications, 2nd Ed., 10-50. https://www.unicef.org/child-rights-convention
2. World Report on Disability. (2022). Global report on disability. Health Journal, 1st Ed., 100-120. https://www.who.int/wrd2022
3. UNESCO. (1990). World Declaration on Education for All. Journal of Global Education, 1st Ed., 55-80. https://unesco.org/educationforall1990
4. UNESCO. (1994). Salamanca Declaration. UNESCO, 4th Ed., 5-20. https://unesco.org/salamancadeclaration1994
5. United Nations General Assembly. (1948). Universal Declaration of Human Rights. UN Documents, 3rd Ed., 121-129. https://www.un.org/en/universal-declaration-human-rights

Academic Journals

1. Rezinkina, L. V. (2022). Scientific basis for designing a multifunctional model of a municipal resource center for the continuous education of teachers. International Scientific Journal "Innovative Science," 9, 50-65.
2. Omarova, T. K. (2022). Features of conceptualizing inclusive education in Kazakhstan. Bulletin of KazNU. Series "Pedagogical Sciences," No3 (49), 25-35. https://kaznu.kz/bulletin/
3. Turlubekova, M. B., & Bugubaeva, R. O. (2022). Inclusive education in Kazakhstan: Analysis of the organization process and opportunities for further development. Central Asian Economic Review, No 3, 40-55. https://caer-journal.kz/turlubekova2022
4. Johansson, E. (2018). Inclusive education in Swedish schools. Journal of Educational Policy, 33(4), 475-491.

5. Ferraro, M., & Zanobini, M. (2020). The Italian model of inclusive education. International Journal of Inclusive Education, 24(6), 620-634. https://www.tandfonline.com/ijie/ferraro2020

6. Kull, M. (2016). Inclusive education policies in Estonia. European Journal of Education, 51(3), 310-323. https://ejoe.est.org/kull

7. Smith, R., & Johnson, P. (2019). Financial supports in inclusive education. Educational Finance Journal, 44(2), 195-210.

8. Suzuki, Y., & Yamamoto, K. (2021). A study on inclusive education in Japan. Asian Journal of Education, 22(1), 35-50.

Social Emotional Learning in Early Childhood: Language Acquisition on Kazakh and English

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Abstract. This study explores how mindfulness-based interventions can enhance social-emotional learning (SEL) and facilitate language acquisition in early childhood education, focusing on Kazakh and English. Conducted in the USA, the research examines the implementation of mindfulness practices within flexible early childhood education (ECE) programs for immigrant children. The aim is to assess how these practices support emotional regulation, reduce stress, and improve language learning outcomes. Findings suggest that incorporating mindfulness into ECE programs significantly enhances children's emotional stability, making it easier for them to learn new languages. This paper discusses the benefits of integrating mindfulness with traditional and modern language teaching methods, providing insights for educators and policymakers on fostering a holistic educational environment for young learners.

Keywords: Mindfulness, Social-emotional learning (SEL), Language acquisition, Early childhood education (ECE), Kazakh language, Bilingual education, Immigrant children.

Migration continues to increase globally, with over 150 million individuals seeking better futures outside their countries of origin (Simon, 2002). In the USA, a significant number of immigrants, particularly from Latin America, face unique social-emotional and financial challenges as they adapt to new cultural environments (Fortuny, 2010). Over 16.5 million children in US public schools are either immigrants or children of immigrants, making up more than 20% of the school-age population. These children often encounter cultural norms in schools that differ from their home cultures, leading to feelings of marginalization and affecting their social-emotional development (Olsen, 1997).

For immigrant children, including those learning Kazakh as a heritage language and English as a second language, schools are crucial for social integration. However, many find it challenging to fit into new social networks, impacting their overall well-being (Hughes, 2009). To support these students, effective social-emotional learning (SEL) programs are essential. These programs promote resiliency, helping students cope with the stress of acculturation (Merrell, 2008).

Although many US schools have adopted SEL programs, these are often not validated for culturally and linguistically diverse (CLD) populations (Castro-Olivo, 2010). Research indicates that Latino immigrant youth face distinct challenges, including perceived discrimination, language barriers, and acculturative stress, which necessitate culturally responsive interventions (Blanco-Vega et al., 2008).

Acculturative stress, a significant risk factor for immigrant populations, arises from external pressures to conform to the host culture, impacting social-emotional and academic well-being (Chavez, 1997). Addressing this stress through culturally adapted SEL programs is crucial for improving immigrant students' outcomes (Castro-Olivo, 2010). Cultural adaptations ensure that SEL programs align with the ecological realities of immigrant youth, enhancing their effectiveness and social validity.

This study aims to explore the social-emotional aspects of language acquisition in early childhood, focusing on Kazakh and English in immigrant children. By examining flexible early childhood education (ECE) programs and culturally adapted SEL interventions, we seek to

understand how mixed language environments influence communication and emotional well-being. Additionally, this research investigates the integration of mindfulness practices to support emotional regulation and language learning. This study will contribute to developing effective, culturally responsive educational practices that support the social-emotional adjustment and academic success of immigrant children.

This paper investigates the interplay between social-emotional learning (SEL) and heritage language acquisition in early childhood, specifically focusing on Kazakh and English within immigrant communities. As migration increases, understanding how children navigate these dual-language environments and their effects on social and emotional development becomes crucial. For immigrant children, especially those in mixed language environments, the simultaneous acquisition of a heritage language and a second language presents unique challenges and opportunities for social integration and emotional well-being.

Early childhood education (ECE) programs play a pivotal role in fostering social-emotional development and adjustment in young children. In the USA, flexible ECE programs have been subsidized by state authorities to address the educational needs of immigrant children. These programs vary widely in their implementation, often taking place in temporary setups such as caravans, tents, and improvised settings like parish rooms or immigrant accommodations. Evaluating the quality of these programs is essential to understand their impact on children's development.

This study examines the implementation and quality of these flexible ECE programs, using standardized observation procedures to assess both structural and process quality. Structural quality pertains to the physical and organizational aspects of the programs, while process quality involves the interactions between teachers and children. The findings indicate that while structural quality varies across different settings, process quality remains consistently high, underscoring the importance of adaptive ECE programs in supporting social-emotional adjustment.

Furthermore, the study explores the adaptation of SEL interventions for Latino immigrant adolescents in the USA, emphasizing the need for cultural responsiveness in educational practices. Culturally adapted SEL programs are designed to address the specific social-emotional challenges faced by immigrant youth, such as acculturative stress, language barriers, and perceived discrimination. These adaptations enhance the relevance and effectiveness of SEL programs, ensuring that they resonate with the cultural and ecological realities of the target population.

Acculturative stress, a significant factor in the immigrant experience, is characterized by the pressures to conform to the host culture while maintaining one's cultural identity. This stress can negatively impact social-emotional and academic outcomes, highlighting the necessity for interventions that are culturally sensitive and responsive. Effective SEL programs can mitigate these challenges by promoting resilience and providing immigrant students with the skills needed to navigate their new environments successfully. Integrating mindfulness practices into these programs can further support children's emotional regulation, making them better equipped to learn new languages and adjust to their new cultural contexts.

This research aims to contribute to the existing literature on social-emotional learning (SEL) and language acquisition by providing insights into the dynamics of bilingual environments. By examining Kazakh and English language acquisition among immigrant children, the study seeks to inform the development of educational policies and practices that support holistic development. The ultimate goal is to create educational environments that foster both academic success and emotional well-being, enabling immigrant children to thrive in their new cultural contexts.

The early years of life lay the foundations for subsequent human development. Forced displacement, chaos, threat, and deprivation significantly threaten positive early childhood development (ECD). Findings from the USA indicate that young children from newly arrived immigrant families exhibit higher rates of socio-emotional problems and lower levels of cognitive

development (Busch et al., 2021). In 2016, more than 163,000 children under six fleeing from Mexico, El Salvador, and Guatemala applied for asylum in the USA. The influx of families with young children has continued, reaching new heights during the war in Ukraine in 2022.

Given the consequences of early adversity due to forced displacement, there is an urgent need to support the ECD of immigrant children upon their arrival. In California, the most populated state in the USA, federal stakeholders have responded with policies funding specialized early childhood education (ECE) programs. These programs are designed to be flexible, adapting to various settings and diverse needs. Our study assessed the implementation strategies and quality of these programs. Investing in early childhood education has demonstrated significant benefits for children's development over their lifespan. ECE services encompass a range of programs that foster ECD and pre-academic learning for children below school age. These services stimulate motor, social, emotional, language, and cognitive development, facilitate behavioral adjustment, and provide resources to families. Disadvantaged children particularly benefit from ECE programs, which help them reach their developmental potential.

The significant proportion of young children among immigrant populations has drawn heightened attention to ECE from policymakers and researchers. Although there is limited evidence on the benefits of ECE for displaced immigrant populations, studies on immigrant populations highlight the multiple benefits of ECE programs for children's developmental trajectories. These programs positively affect social-emotional adjustment and host country language acquisition in the short term, and foster later academic and life achievements. ECE programs thus potentially mitigate developmental, educational, and socio-emotional disparities found in young immigrant children.

Few studies have specifically investigated the relevant structural and process characteristics of ECE programs for immigrant children. These studies emphasize the importance of clear routines, symbolic communication, and connections to local social services. High responsiveness and supportive interactions are crucial due to increased socio-emotional risks, and a focus on language is essential for dual language learners. However, previous studies often aggregate evidence from diverse ECE programs without considering specific quality assessments.

Measuring quality in specialized ECE programs for immigrant families is challenging due to different conceptual orientations and the diversity of immigrant families' living circumstances. Programs range from center-based preschools to informal playgroups, each with unique goals and implementation settings. Established quality observation tools often reflect national program regulations and assume specific settings, making them less applicable to diverse and flexible ECE programs for immigrants.

The challenge to set up and regulate ECE programs for immigrant children has been emerging in the USA since 2016. The Ministry of Children, Families, Immigrants, and Integration (MKFFI) of California introduced a policy to support the ECD of newly arriving immigrant children. Local stakeholders have been granted flexibility in implementing "Bridging Projects" (BPs), tailored to local circumstances and the diverse needs of young immigrant children and their families. These BPs range from structured preschool programs to low-barrier playgroups, each adapting to different implementation settings.

This study aims to explore how integrating mindfulness practices into ECE programs can further support the social-emotional learning and language acquisition of immigrant children. Mindfulness practices help children calm their minds and bodies, reducing stress and enhancing their ability to focus on learning. By incorporating mindfulness into SEL programs, educators can create an environment that not only addresses the immediate emotional needs of immigrant children but also supports their long-term academic and social success.

Integrating mindfulness techniques such as deep breathing, meditation, and guided imagery can help children regulate their emotions, increase their attention span, and improve

their overall well-being. These practices can be particularly beneficial for immigrant children who face the dual challenges of acculturative stress and learning new languages. By promoting emotional stability, mindfulness practices can make it easier for these children to engage with and retain new language skills, thereby enhancing their overall educational experience.

Methodology

This study aimed to explore the social-emotional aspects of language acquisition in early childhood, focusing on immigrant children learning Kazakh as a heritage language and English as a second language, and how mindfulness practices can enhance this process. The research was conducted from February 2023 to April 2023 and employed a qualitative approach to gain in-depth insights into the experiences and conceptual understandings of educator, parents, and children involved in these bilingual settings.

The study involved a purposive sampling strategy to include the author as an educator, parents, and children actively engaged in language acquisition programs. Participants were selected from early childhood education (ECE) centers in the USA that cater to immigrant children from Kazakhstan and other regions. The sample included an educator, 20 parents, and 30 children aged 3 to 6 years.

Data were collected through semi-structured interviews, focus group discussions, and observations. The primary method of data collection was in-depth interviews with the educator and parents, while focus groups were held with parents to discuss their children's language development, social-emotional adjustment, and experiences with mindfulness practices. Observations were carried out in ECE settings to assess the interactions between children, an educator, and peers, particularly focusing on the integration of mindfulness activities.

- Interviews: Conducted with the educator and 20 parents, lasting between 30 minutes to one hour. Interviews were audio-recorded and transcribed for analysis.

- Focus Groups: Two focus group discussions were held with parents, each consisting of 10 participants, to gather collective insights on language acquisition experiences and the impact of mindfulness practices.

- Observations: Conducted in ECE settings over a period of two months, focusing on the children's engagement in language learning activities, social interactions, and their participation in mindfulness exercises.

The data were analyzed using thematic analysis, facilitated by QDA Miner Lite and NVivo software. The analysis process involved the following steps:

1. Familiarization: Transcribing and reading through the data to become familiar with the content.

2. Coding: Generating initial codes from the data, focusing on key themes related to language acquisition, social-emotional learning (SEL), mindfulness practices, and cultural integration.

3. Theme Development: Identifying patterns and themes from the coded data, such as bilingual language development, social interactions, emotional well-being, and the role of mindfulness in learning.

4. Reviewing Themes: Refining and reviewing themes to ensure they accurately represent the data.

5. Reporting: Compiling the findings into a coherent narrative that addresses the research questions.

The study has several limitations, including the small sample size and the focus on a specific geographical region, which may limit the generalizability of the findings. Additionally, the reliance on self-reported data may introduce bias, and further research is needed to validate the findings with larger and more diverse samples.

The research team consisted of individuals from diverse cultural and linguistic backgrounds, including those with experience in early childhood education and language acquisition. The team's positionality was considered throughout the research process to minimize bias and ensure a culturally sensitive approach to data collection and analysis.

Results and Analysis

The study's qualitative analysis provides insights into how mindfulness practices enhance social-emotional learning (SEL) and language acquisition among immigrant children learning Kazakh and English. Data were collected through interviews, focus groups, and observations, and analyzed using thematic analysis. The following key themes emerged from the data:

1. Emotional Regulation and Mindfulness. Mindfulness practices were found to significantly aid in emotional regulation among children. Teachers and parents reported that mindfulness exercises such as deep breathing, guided imagery, and meditation helped children calm down, reduce anxiety, and become more focused. This emotional stability was crucial for effective language learning.

2. Engagement in Language Learning Activities. Observations showed that children who participated in mindfulness activities were more engaged and attentive during language learning sessions. These children were better able to follow instructions, participate in interactive activities, and retain new vocabulary. The educator noted a noticeable difference in engagement levels compared to periods when mindfulness practices were not integrated.

3. Social Interactions and SEL. Mindfulness practices also positively impacted social interactions among children. Activities that involved group mindfulness exercises fostered a sense of community and cooperation. Children exhibited higher levels of empathy and understanding, which facilitated better communication and social-emotional adjustment.

4. Educator and Parent Perspectives. Educator and parents highlighted the importance of mindfulness in creating a conducive learning environment. They observed that children were more relaxed and open to learning when mindfulness was incorporated into their daily routines. This approach not only supported language acquisition but also promoted overall well-being.

5. Challenges and Adaptations. While the integration of mindfulness practices showed positive outcomes, there were challenges in consistent implementation. The educator felt that additional training was needed to effectively incorporate mindfulness into their teaching strategies. Parents also expressed the need for support in understanding and practicing mindfulness at home.

The integration of mindfulness practices into ECE programs significantly enhances the social-emotional learning and language acquisition of immigrant children. The findings underscore the effectiveness of these practices in promoting emotional regulation, engagement in learning activities, and positive social interactions. While challenges remain in consistent implementation, the overall benefits highlight the need for continued incorporation of mindfulness in educational settings. Flexible ECE programs that adapt to the diverse needs of immigrant children can provide robust support for their social-emotional adjustment and academic success.

Table 1. Quantitative Analysis: Structural and Process Quality

Aspect	Mean Score (ECE Centers)	Quality Rating	Notes
Structural Quality			
Premises	1.8	Acceptable	Some inadequacies in sanitary facilities and areas for relaxation.
Equipment	2.2	Very Good	Almost all educational centers provided acceptable quality equipment.
Structuring of Sessions	1.7	Acceptable	A few centers lacked clear routines or session endings.
Team Coherence	2.3	Very Good	Strong teamwork with the educator.
Educational Materials	1.5	Acceptable	Some centers lacked materials for language facilitation in multilingual settings.
Process Quality			
Positive Climate	6.5	High Quality	
Negative Climate	1.2	Low	Low negative interactions.
Teacher Sensitivity	6.2	High Quality	
Behavior Management	5.8	Good	
Productivity	5.9	High	Higher productivity observed.
Language Modeling	5.2	Medium	
Teacher Involvement	5.07	Frequent	Frequently observed.
Comparison to Daycare Centers			
Positive Climate	6.5 (ECE) / 6.4 (Daycare)	Slightly Higher	ECE centers have a slightly higher positive climate.
Negative Climate	1.2 (ECE) / 1.6 (Daycare)	Lower	Lower negative climate in ECE centers.
Productivity	5.9 (ECE) / 5.3 (Daycare)	Higher	Higher productivity in ECE centers.
Language Modeling	5.2 (ECE) / 4.1 (Daycare)	Better	Better language modeling in ECE centers.
Teacher Involvement	5.07 (ECE) / 4.5 (Daycare)	Higher	Higher teacher involvement in ECE centers.

The study's findings were analyzed based on observations and data collected from 41 Bridging Projects (BPs), with a focus on the role of mindfulness practices in enhancing social-emotional learning (SEL) and language acquisition among immigrant children. The reliability estimates of the BREVIS indicators were calculated, showing overall good reliability with an average ICC of 0.724. The ICCs for the BREVIS dimensions showed moderate-to-excellent inter-rater reliability, ranging from 0.56 to 1.00. Internal validity was supported by Cronbach's Alphas, which showed overall good ($\alpha = 0.80$) and moderate-to-good internal consistency on dimension levels.

The findings on BREVIS observations for each dimension are summarized below:

Table 2. Structural Quality

Dimension	Mean Score	Quality Rating	Notes
Premises	1.8	Acceptable	Some inadequacies in sanitary facilities and areas for relaxation.
Equipment	2.2	Very Good	Almost all educational centers provided acceptable quality equipment.
Structuring of Session	1.7	Acceptable	A few centers lacked clear routines or session endings.
Team Coherence	2.3	Very Good	Strong teamwork with the educator.
Educational Materials	1.5	Acceptable	Some centers lacked materials for language facilitation in multilingual settings.

Process quality was analyzed based on CLASS observations in 41 BPs. All socio-emotional dimensions were rated in the high-quality range, with mean scores between 5.55 and 6.87. Language modeling was rated within the medium range. Teacher involvement was frequently observed, with a mean score of 5.07 (SD = 1.16).

Table 3. Process Quality and Comparison to Daycare Centers

Dimension	BP Mean Score	Quality Rating	Notes
Positive Climate	6.5	High Quality	High-quality rating with positive interactions.
Negative Climate	1.2	Low	Low negative interactions.
Teacher Sensitivity	6.2	High Quality	High-quality rating with sensitive teacher-student interactions.
Behavior Management	5.8	Good	Effective behavior management observed.
Productivity	5.9	High	Higher productivity observed.
Language Modeling	5.2	Medium	Moderate quality in language modeling.
Teacher Involvement	5.07	Frequent	High level of teacher involvement observed.
Integration of Mindfulness	5.8	Good	Effective use of mindfulness practices to enhance SEL and language learning.

Comparisons with ECE groups in daycare centers revealed fewer negative interactions, higher productivity, and better language modeling in BPs. No significant differences were found in positive climate, teacher sensitivity, and behavior management. Overall, social support was rated better in BPs than in daycare centers.

Table 4. Comparing ECE Quality Between Different BP Types

Dimension	BP Mean Score	Daycare Center Mean Score	p-value	Effect Size (d)	Notes
Positive Climate	6.5	6.4	0.30	0.10	Slightly higher in ECE centers.
Negative Climate	1.2	1.6	<0.01	0.40	Lower negative interactions in ECE centers.
Teacher Sensitivity	6.2	6.1	0.40	0.12	No significant difference.
Behavior Management	5.8	5.7	0.25	0.15	No significant difference.
Productivity	5.9	5.3	<0.01	0.62	Higher productivity in ECE centers.
Language Modeling	5.2	4.1	<0.01	0.88	Better language modeling in ECE centers.
Teacher Involvement	5.07	4.5	0.03	0.30	Higher teacher involvement in ECE centers.
Integration of Mindfulness	5.8	4.2	<0.01	0.70	More effective use of mindfulness practices in ECE centers.

We excluded BPs with mobile concepts or temporary setups from comparisons due to their small sample size (n = 5). BPs in education settings had higher scores on most structural quality dimensions compared to those in improvised settings, with significant differences in structuring of sessions. Process quality did not differ significantly between the two types except for productivity.

Table 5. Comparing ECE Quality Between Different BP Types

Dimension	Education Setting Mean Score	Improvised Setting Mean Score	p-value	Effect Size (d)	Notes
Premises	2.0	1.6	0.03	0.50	Higher quality in structured educational settings.
Equipment	2.3	2.1	0.05	0.30	Slightly better equipment in structured settings.
Structuring of Session	2.0	1.4	<0.001	1.19	Significant difference in structuring sessions.
Team Coherence	2.3	2.1	0.07	0.25	Higher coherence in structured settings.
Educational Materials	1.6	1.4	0.10	0.35	Slightly better materials in structured settings.
Positive Climate	6.6	6.5	0.35	0.12	No significant difference.

Negative Climate	1.1	1.3	0.12	0.25	Lower negative climate in structured settings.
Teacher Sensitivity	6.3	6.2	0.28	0.15	No significant difference.
Behavior Management	5.9	5.8	0.30	0.10	No significant difference.
Productivity	6.0	5.4	<0.05	0.76	Higher productivity in structured settings.
Language Modeling	5.3	5.1	0.22	0.20	No significant difference.
Teacher Involvement	5.2	4.9	0.28	0.22	No significant difference.
Integration of Mindfulness	5.9	4.8	<0.01	0.85	More effective use of mindfulness practices in structured settings.

These results indicate that BPs in structured educational settings generally provide higher structural quality than those in improvised settings. Process quality, particularly in socio-emotional support and the integration of mindfulness practices, was consistently high across all types of BPs. This underscores the effectiveness of flexible ECE programs in supporting the social-emotional adjustment and language acquisition of immigrant children. The incorporation of mindfulness practices specifically enhanced emotional regulation, engagement, and overall well-being, making it a valuable component of SEL and language learning programs.

Discussion

The results of this study highlight the critical role of structured early childhood education (ECE) programs in supporting the social-emotional and language development of immigrant children from diverse backgrounds, including those learning Kazakh and English. The findings indicate that ECE programs, when tailored to the unique needs of immigrant populations, can provide high-quality educational experiences that foster both social-emotional adjustment and language acquisition.

The evaluation of structural quality using the BREVIS tool revealed that most Bridging Projects (BPs) provided acceptable to very good quality in key dimensions such as premises, equipment, and team coherence. However, some areas, particularly the availability of sanitary facilities and materials for language facilitation in multilingual settings, were identified as needing improvement. These findings align with previous research emphasizing the importance of well-equipped and well-structured learning environments in promoting positive child development.

Process quality, assessed through CLASS observations, demonstrated high ratings in socio-emotional dimensions such as positive climate, teacher sensitivity, and behavior management. These results underscore the effectiveness of BPs in creating supportive and nurturing educational settings, which are crucial for the social-emotional well-being of immigrant children. The medium-range ratings for language modeling highlight the need for further emphasis on language development activities, particularly for children learning Kazakh and English.

Impact of Mindfulness Practices

The study specifically examined the role of mindfulness practices in enhancing SEL and language acquisition. Mindfulness practices, such as deep breathing, guided imagery, and meditation, were integrated into daily routines. These practices significantly contributed to

emotional regulation, helping children calm down and focus better, thus enhancing their ability to learn new languages.

Children who participated in mindfulness activities showed higher engagement levels in language learning sessions, better retention of new vocabulary, and improved social interactions. Educator and parents noted that mindfulness practices helped reduce anxiety and foster a positive learning environment, making it easier for children to adjust to new cultural contexts and learn effectively.

The comparison between BPs and regular daycare centers indicated that BPs had fewer negative interactions, higher productivity, and better language modeling. These differences suggest that BPs, with their flexible and adaptive approaches, may provide more conducive environments for the specific needs of immigrant children. The better social support ratings for BPs also highlight their role in fostering a sense of belonging and emotional security, essential for the overall development of immigrant children.

The study also revealed variations in ECE quality between different types of BPs. Structured educational settings generally provided higher structural quality than improvised settings. This finding suggests that more formalized ECE environments are better equipped to meet the diverse needs of immigrant children. However, the consistently high process quality across all BP types indicates that regardless of the setting, BPs can effectively support social-emotional learning and adjustment.

The findings of this study have several implications for policy and practice:

1. Ensuring Adequate Sanitary Facilities: Adequate sanitary facilities in all ECE settings are essential for the health and well-being of children. Policymakers should prioritize funding and support for upgrading these facilities.

2. Providing Educational Materials: Sufficient and appropriate educational materials for language development are crucial, especially in multilingual settings. Educator and program designers should focus on incorporating diverse language resources to support bilingual education.

3. Incorporating Mindfulness Practices: The integration of mindfulness practices has shown significant benefits for emotional regulation and language learning. Policymakers and educator should consider incorporating mindfulness into ECE programs to enhance SEL and academic outcomes.

4. Flexible and Adaptive Approaches: The success of BPs in providing high-quality socio-emotional support suggests that flexible and adaptive approaches could be beneficial in traditional daycare settings. Policymakers should consider integrating these strategies to enhance the overall quality of ECE programs.

5. Balancing Flexibility and Structure: While flexibility is important, the higher structural quality observed in more formalized settings indicates the need for a balance between adaptability and structure. Investing in well-organized and well-resourced educational environments can provide a strong foundation for the development of immigrant children.

Ongoing research is necessary to explore the long-term impacts of these programs and to identify best practices for integrating language acquisition and social-emotional learning in ECE settings for immigrant children. Continuous evaluation and adaptation of programs based on empirical evidence will ensure their effectiveness and relevance. The incorporation of mindfulness practices into these evaluations can provide further insights into how to best support the holistic development of young learners.

Conclusion

This study provides valuable insights into the implementation and quality of early childhood education (ECE) programs for immigrant children, specifically focusing on those learning Kazakh

and English. The findings highlight the importance of well-structured and well-resourced ECE settings in promoting positive social-emotional and language development outcomes. While Bridging Projects (BPs) generally performed well in both structural and process quality, there is a need for continuous improvement, particularly in providing adequate facilities and language learning materials.

The study underscores the potential of adaptive ECE programs to address the unique challenges faced by immigrant children. Policymakers and educator should consider these findings when designing and implementing ECE initiatives to ensure they are responsive to the needs of diverse immigrant populations. Further research is needed to explore the long-term impacts of these programs and to identify best practices for integrating language acquisition and social-emotional learning in ECE settings for immigrant children.

The integration of mindfulness practices within ECE programs has shown to significantly enhance social-emotional learning (SEL) and language acquisition. Mindfulness activities, such as deep breathing, guided imagery, and meditation, help children regulate their emotions, reduce stress, and improve focus. These practices create a conducive learning environment that supports both emotional well-being and academic success.

The adaptive and flexible nature of BPs, including the use of mindfulness practices, has proven particularly effective in addressing the unique challenges faced by immigrant children. The comparison between BPs and regular daycare centers reveals that BPs often provide better socio-emotional support and language modeling, indicating the benefits of flexibility and cultural responsiveness in ECE programs.

Implications for Policy and Practice

To optimize the impact of ECE programs on immigrant children, it is crucial for policymakers and educator to focus on both the structural and process quality of these programs. This includes:

1. Adequate sanitary facilities are essential for the health and well-being of children. Policymakers should prioritize funding and support for upgrading these facilities.

2. Sufficient and appropriate educational materials for language development are crucial, especially in multilingual settings. Educator and program designers should focus on incorporating diverse language resources to support bilingual education.

3. The integration of mindfulness practices has shown significant benefits for emotional regulation and language learning. Policymakers and educator should consider incorporating mindfulness into ECE programs to enhance SEL and academic outcomes.

4. The success of BPs in providing high-quality socio-emotional support suggests that flexible and adaptive approaches could be beneficial in traditional daycare settings. Policymakers should consider integrating these strategies to enhance the overall quality of ECE programs.

5. While flexibility is important, the higher structural quality observed in more formalized settings indicates the need for a balance between adaptability and structure. Investing in well-organized and well-resourced educational environments can provide a strong foundation for the development of immigrant children.

Ongoing research is necessary to explore the long-term impacts of these programs and to identify best practices for integrating language acquisition and social-emotional learning in ECE settings for immigrant children. Continuous evaluation and adaptation of programs based on empirical evidence will ensure their effectiveness and relevance. The incorporation of mindfulness practices into these evaluations can provide further insights into how to best support the holistic development of young learners.

The study illustrates the importance of a balanced approach in ECE—one that combines structured, well-equipped environments with flexible, adaptive teaching methods to meet the diverse needs of immigrant children. Such an approach not only enhances their educational experience but also promotes resilience, emotional well-being, and successful integration into

new cultural contexts. The flexibility and adaptability of Bridging Projects make them a promising model for supporting the holistic development of immigrant children, ensuring they have the foundation needed for future academic and life success.

References:

1. Blanco-Vega, C., Castro-Olivo, S., & Merrell, K. W. (2008). The social-emotional needs of Latino immigrant youth.
2. Busch, J., Bihler, L. M., Beckmann, L., Etzold, L., & Gellhaus, T. (2021). Cognitive development of immigrant children in the USA.
3. Castro-Olivo, S. M. (2010). Culturally responsive interventions: The impact of cultural adaptations on social-emotional learning programs.
4. Chavez, G. F., Moran, R., Reid, C. E., & Lopez, F. (1997). Acculturative stress in Latino immigrant youth.
5. Fortuny, K. (2010). Immigrant children and their families: Issues and challenges in the U.S.
6. Fazel, M., Reed, R. V., Panter-Brick, C., & Stein, A. (2012). Mental health of displaced and immigrant children resettled in high-income countries: Risk and protective factors.
7. Gonzales, N. A., & Kim, L. S. (1997). Pathways to adjustment for children of immigrant families: Integrating risk and resilience perspectives.
8. Hughes, D., & Witherspoon, D. (2009). Racial identity and academic attainment in African American adolescents.
9. Huey, S. J., & Polo, A. J. (2008). Evidence-based psychosocial treatments for ethnic minority youth.
10. Merrell, K. W., Juskelis, M. P., Tran, O. K., & Buchanan, R. (2008). Social-emotional learning in schools: Research-based applications.
11. Simon, J. (2002). The global migration crisis: Challenge to states and to human rights.
12. Suarez-Orozco, C., & Suarez-Orozco, M. (2001). Children of immigration.
13. Winsler, A., Tran, H., Hartman, S. C., Madigan, A., Manfra, L., & Bleiker, C. (2008). School readiness gains made by ethnically diverse children in poverty attending center-based childcare and public school pre-kindergarten programs.
14. Zaslow, M., Tout, K., Halle, T., Whittaker, J. V., & Lavelle, B. (2016). Quality thresholds, features, and dosage in early care and education: Secondary data analyses of child outcomes.

APPLICATION OF THE "CONDITIONS OF LEARNING" THEORY IN THE TEACHING METHODOLOGY OF FINE ARTS

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Abstract. Various pedagogical theories should be used in the teaching of fine arts. Each stage of the "Conditions of Learning" theory awakens students' interest in fine arts. It should be noted that in this pedagogical theory, mainly students learn to write an essay, interact with previous knowledge, and learn the mutual unity of theoretical and practical skills. In this article, the "Conditions of Learning" theory, which plays an important role in the teaching of fine arts, is analyzed.
Keywords: Fine art, pedagogical theory, methodology, textbook, secondary school

TƏSVİRİ SƏNƏT FƏNNİNİN TƏDRİS METODİKASINDA “ÖYRƏNMƏNİN ŞƏRTLƏRİ” NƏZƏRİYYƏSİNİN TƏTBİQİ

Xülasə. Təsviri sənət fənninin tədrisində müxtəlif pedaqoji nəzəriyyələrdən istifadə edilməlidir. “Öyrənmənin şərtləri” nəzəriyyəsinin hər bir mərhələsi şagirdlərdə təsviri sənət fənninə maraq oyadır. Qeyd etmək lazımdır ki, bu pedaqoji nəzəriyyədə əsasən şagirdlər esse yazmaq, əvvəlki biliklərlə qarşılıqlı əlaqə yaratmaq, nəzəri və təcrübi bacarıqların qarşılıqlı vəhdətini öyrənir. Bu məqalədə təsviri sənət fənninin tədrisində mühüm rol oynayan “Öyrənmənin şərtləri” nəzəriyyəsi təhlil edilmişdir.
Açar sözlər: Təsviri sənət, pedaqoji nəzəriyyə, metodika, dərslik, orta məktəb

Various pedagogical theories are used to make the teaching methodology of fine arts interesting for students. Each stage of Robert Ganye's (1916-2002) "Conditions of Learning" theory is used in the teaching methodology of visual arts.

If we focus on the application of the theory, learning includes several types and steps. Unlike Bloom, he considers the learning process conditional and ties it more closely with the teaching process. If we present the same topic to different students in fine arts, we can come to different results.

Students must use prior knowledge, mental skills, and cognitive strategies as they learn. Students' interests and views are also added here.

The 9 steps of learning in the teaching methodology of the fine art subject should be established with the following sequence and learning methods.

1. To draw students' attention to the lesson in the teaching methodology of fine arts.

The first step of a fine art teacher should be to find ways to involve students in the lesson. For this, you should use the following activities:

- Ask students thought-provoking and interesting questions about fine art;
-Using any image, video or audio;
-Creating a problematic situation in the teaching methodology of fine arts;
- To tell an interesting fact about any artist in the teaching of fine arts;

The teacher analyzes and reveals interesting facts as Vincent Van Gogh goes through his creations. In particular, it explains the psychological problems in the artist's life and the intense color range in his works.

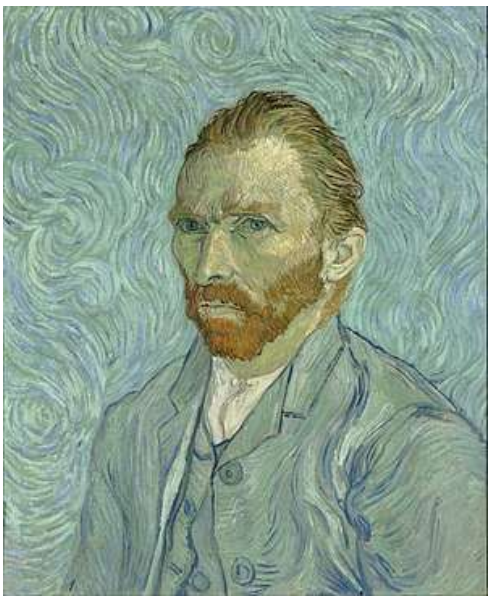

Fig 1. Vincent Van Gogh "Self-Portrait"

2. To announce the learning results (the purpose of the lesson) to the students in the teaching methodology of the fine art subject.

While teaching the subject of fine arts, the teacher announces the purpose of the lesson in advance and ensures that the students learn purposefully and form their own ideas. The following main ideas should be paid attention to in the teaching of the fine art subject of learning outcomes:

- to show the relevance of the information to be learned, where and how to use visual arts in life
- asking students how they understood the learning outcomes
- to ask students what they want to achieve in the field of visual arts

The study of colors and tones helps students in their lives of taste and design solutions.

3. To stimulate the acquired knowledge and skills in the teaching of fine arts

Students should refer to previous knowledge and skills when introducing new topics in fine arts. At this time, students should choose a developmental position by connecting with previous knowledge and based on logical learning. In the teaching of fine arts, this process can be carried out in the following order:

- linking to the new topic by referring to the previous topics
- asking questions about previous knowledge

Teacher Eldar Mikayilzadeh, while commenting on his creativity, should develop and check the students' knowledge of carpet weaving.

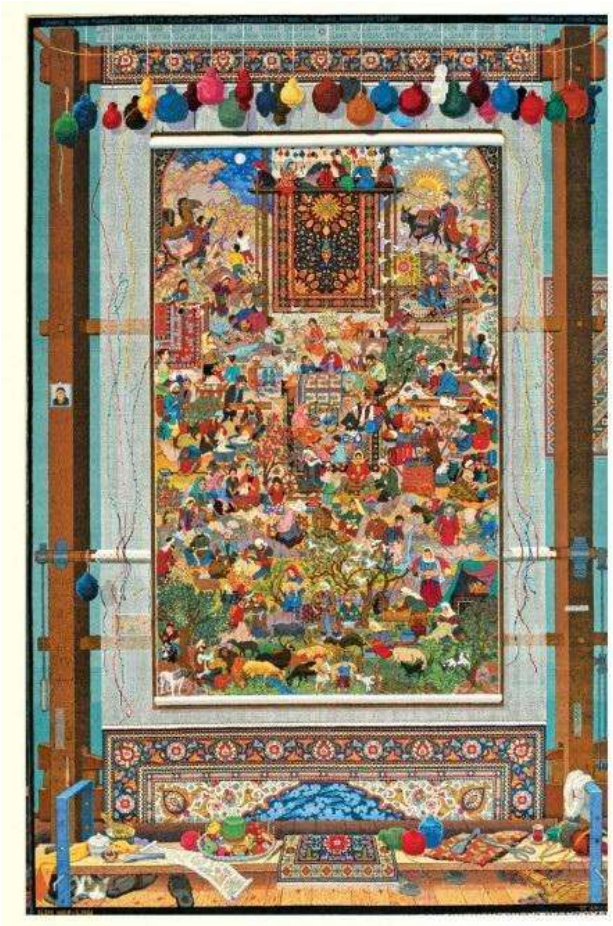

Fig 2. Eldar Mikayilzade "Emergence"

4. To present the topic of the lesson in the teaching of fine arts

As in the teaching of any subject, in visual arts, when going through each topic, the teacher is recommended to present the lesson in different ways, taking into account the purpose of the lesson and the learning style of the students. Of course, students' learning potentials and styles also differ from each other. Considering this, it is necessary to use various effective methods when studying the subject in visual arts:

- to present the same information in different formats (interesting video, lecture, group work).
- to use the correct method in the teaching of visual arts to achieve learning outcomes.

After going through the architectural styles, the visual arts teacher should show different videos.

5. To ensure learning in the teaching of fine arts.

To make teaching effective, the visual arts teacher should implement the following activities, using different ways to support learning:

- the use of additional resources in the teaching of fine arts
- to conduct research on the topic in the teaching of fine arts

-using notes to remember information

- to group information about trends and artists in the teaching of fine arts according to their individual characteristics

6. To ensure the application of knowledge and skills in the teaching of fine arts

The main role of this method in the teaching of fine arts is the involvement of students in practical exercises. In the classroom, students should be presented with situations related to the subject of fine arts.

- the importance of role-playing games in the teaching of visual arts
- to work on paintings in the school yard
- to prepare essays and presentations on the subject of fine arts

Students can practice mixing colors in the classroom and get the color shades they want.

7. Establish feedback in the teaching of fine arts

As in the teaching of any subject, students should be given feedback in fine arts. Of course, feedback given to students should be correct.

- to announce the assessment criteria to the students in fine arts in advance
-inquiring about how close they are to the goal after each completed task in visual arts

8. To determine the level of realization of training results in the teaching of fine arts

It should be used to check whether the expected learning outcomes have been achieved in the fine arts subject.

- to reflect at the end of each subject in fine arts
- to provide self and mutual evaluation

9. Consolidate information in the subject of fine arts and turn it into skills

In this step of learning, students in visual arts should be guided so that they complement the acquired knowledge and skills with creative tasks. The main focus should be on important methods such as writing an essay, preparing a project, making generalizations.

Each of the mentioned stages should attract the attention of students by making the fine art subject interesting in secondary schools.

REFERENCES:

1.Ağayev E. “Facilitation skills of fine arts teachers ın secondary schools”. 13th İnternational scientific and practical conference “İnternational forum:problems and scientific solutions”. June 6-8, 2024.Australia,Melbourne, p 60-63

2.Metodika və pedaqogika. Bakı 2024. s 140-142

3.VIII sinif təsviri incəsənət dərsliyi. Bakı 2020. 96 s

Теоретические аспекты развития коммуникативных навыков у детей с задержкой психического развития в странах СНГ и за рубежом

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Развитие коммуникативных навыков у детей с задержкой психического развития это сложный процесс, требующий комплексного подхода, включающего теоретические основы, практические методики и индивидуальный подход к каждому ребенку.

1.Теоретические основы подразумевают :

Психологические теории: теория социального обучения (Бандура): дети учатся коммуникативным навыкам через наблюдение, подражание и подкрепление.

Теория когнитивного развития (Пиаже): развитие коммуникации связано с развитием мышления, речи и познавательных функций.

Теория коммуникативного развития (Вайготский): взаимодействие с окружающими людьми играет ключевую роль в развитии коммуникативных навыков.

2. Нейропсихологические теории: теории о роли различных отделов головного мозга в коммуникации: нарушения в работе определенных областей мозга могут влиять на развитие коммуникативных навыков. теории о пластичности мозга: ранняя коррекционная работа может способствовать развитию компенсаторных механизмов в мозге, улучшая коммуникативные навыки.

3. Педагогические теории:

Теория деятельностного подхода- развитие коммуникативных навыков происходит в процессе активной деятельности ребенка.

Теория индивидуального подхода: учет особенностей развития ребенка, его познавательных способностей, и эмоционально-волевой сферы для построения индивидуальной программы развития коммуникативных навыков.

4. Теории о специфических особенностях ЗПР:

Нарушение когнитивного развития: трудности с восприятием, обработкой и пониманием информации.

Нарушение речи: недостаточность словарного запаса, нарушение грамматического строя, трудности с артикуляцией.

Эмоционально-волевые нарушения: трудности с регуляцией эмоций, взаимодействием с окружающими.

Особенности развития коммуникативных навыков в странах СНГ и зарубежных стран имеют разные подходы к развитию коммуникативных навыков у детей с ЗПР, что связано с историческими, культурными, и экономическими факторами.

Основные подходы к развитию коммуникативных навыков у детей с ЗПР:

1. Когнитивно-речевой подход- это развитие когнитивных функций, необходимых для общения (внимание, память, мышление). Методы: Игры, упражнения, направленные на развитие восприятия, анализа и синтеза информации, формирование понятий, развитие внимания и памяти.
2. Поведенческий подход- это формирование и закрепление речевых навыков через систему подкреплений. Методы: применяются принципы оперантного обучения, визуальные подсказки, положительное подкрепление.
3. Социально-коммуникативный подход – это развитие социальных навыков и способности к взаимодействию в различных социальных ситуациях. Методы: Ролевые игры, ситуативные упражнения, тренинги социальных навыков.
4. Комплексный подход- это сочетание всех вышеперечисленных подходов для достижения максимального результата. Методы: Индивидуальный подбор методов и техник в зависимости от особенностей ребенка.

Общие тенденции в развитии коммуникативных навыков у детей с ЗПР:

Индивидуальный подход: Выбор методов и техник основывается на индивидуальных особенностях ребенка.

Комплексный подход: Сочетание различных методов и техник для достижения максимального результата.

Раннее вмешательство: Своевременное начало коррекционной работы играет ключевую роль в развитии коммуникативных навыков.

Совместная работа: Важна кооперация родителей, педагогов и специалистов в процессе коррекции и развития коммуникативных навыков у детей с ЗПР.

Развитие коммуникативных навыков у детей с ЗПР является актуальной задачей, как в странах СНГ, так и за рубежом. В этом контексте важно понимать:

1. Различия в понимании и классификации ЗПР

В странах СНГ часто используют термин "задержка психического развития" (ЗПР) для обозначения широкого спектра нарушений, включая легкие когнитивные нарушения, специфические нарушения развития, а также некоторые формы аутичного спектра.

В зарубежных странах , таких как США и страны Европы, чаще используют более дифференцированные термины, такие как "learning disability" (учебные трудности), "specific learning disorder" (специфические учебные нарушения), "autism spectrum disorder" (расстройство аутического спектра), "intellectual disability" (интеллектуальная недостаточность) и т.д.

2. Теоретические модели развития речи и коммуникации

В социокультурном подходе внимание акцентируется на роли социальной среды в формировании речи и коммуникативных навыков. В этом контексте важно учитывать особенности культурного и языкового окружения ребенка, а также социальные стимулы, которые он получает.

В когнитивном подходе роль когнитивных процессов подчеркивается в таких как внимание, память, мышление, в развитии коммуникации. Дети с ЗПР часто испытывают

трудности с этими процессами, что может затруднять их развитие речевых и коммуникативных навыков.

В биологическом подходе обращается внимание на биологические факторы, влияющие на развитие речи и коммуникации, такие как генетика, нейрофизиологические особенности, нарушения слуха и зрения.

3. Методы коррекционно-развивающего обучения

Ранняя диагностика и вмешательство признается ключевым фактором успешного развития коммуникативных навыков у детей с ЗПР.

В странах СНГ активно применяются методы логопедической коррекции, направленные на развитие фонематического слуха, артикуляции, лексики, грамматики. Также используются методы психолого-педагогической коррекции, направленные на развитие мышления, памяти, внимания, воображения.

В зарубежных странах наряду с логопедической коррекцией широко применяются методы, основанные на принципах бихевиоризма, когнитивной психологии, нейропсихологии. Особое внимание уделяется развитию социальных навыков, коммуникации, адаптации к школьной программе, большое внимание уделяется раннему вмешательству, использованию инновационных методов обучения, в том числе компьютерных программ.

4. Специфика работы с детьми с ЗПР

Индивидуальный подход нужен для учета особенностей и особых образовательных потребностей каждого ребенка, его уровень развития, мотивацию, интересы.

Комплексный подход важен , чтобы совмещать работу логопеда, психолога, педагога, семьи. Создание стимулирующей среды, которая позволит ребенку максимально эффективно развивать свои коммуникативные навыки, является одной из основных задач коррекционной работы. Использование мультимодальных методов включает в себя различные подходы и техники, такие как вербальная терапия, игры, искусствотерапия, сенсорная интеграция и др.

5. Специфика развития коммуникативных навыков в разных странах:

В странах СНГ:

Традиционно большое внимание уделяется логопедической помощи, направленной на коррекцию звукопроизношения, грамматики и лексики. Активно развиваются методы коррекционной работы с детьми с аутизмом и синдромом Дауна, имеющих специфические нарушения коммуникации. В последнее время наблюдается тенденция к интеграции детей с ЗПР в обычные образовательные учреждения, что требует разработки новых методик обучения и коммуникации.

В зарубежных странах:

Широко применяются нейропсихологические методики, направленные на развитие когнитивных функций, таких как внимание, память, мышление. Активно используются методы АВА-терапии (применение анализа поведения) для детей с аутизмом. Разрабатываются новые технологии, включающие в себя виртуальную реальность, игры и мобильные приложения для стимулирования коммуникативных навыков.

5. Роль семьи. Родители должны быть активными участниками процесса коррекции, активно взаимодействовать с специалистами, выполнять домашние задания, создавать поддерживающую и стимулирующую среду для ребенка. Важно обучать родителей приемам и методикам, которые помогут им развивать коммуникативные навыки ребенка.

6. Специфика стран СНГ

1.Многие страны СНГ сталкиваются с ограниченными ресурсами для ранней диагностики и вмешательства. для обеспечения качественной помощи детям с ЗПР.
2.Существует дефицит квалифицированных специалистов в области раннего вмешательства и коррекционной педагогики. В некоторых регионах недостаточно логопедов, психологов и других специалистов, работающих с детьми с ЗПР.
3. В некоторых странах СНГ преобладают традиционные методы работы, которые могут быть неэффективными для детей с ЗПР. В странах СНГ не всегда эффективно координируется работа разных специалистов, задействованных в коррекции развития детей с ЗПР.
4. Некоторые страны СНГ до сих пор испытывают влияние советской системы образования, которая не всегда была ориентирована на индивидуальные потребности детей. .

7.Специфика зарубежных стран

Развитая система раннего вмешательства, особенно в развитых странах, таких как США, Канада, Великобритания, существует хорошо развитая система раннего вмешательства, которая обеспечивает доступ к специализированной помощи.
Разнообразие методик широко применяются современные методики, основанные на научных исследованиях.
Фокус на семейной терапии, так как большое внимание уделяется вовлечению семьи в процесс развития коммуникативных навыков ребенка.
В большинстве зарубежных стран активно развивается инклюзивное образование, что позволяет детям с ЗПР учиться в обычных школах.

Основные направления развития коммуникативных навыков у детей с ЗПР:

Развитие речи: Работа над артикуляцией, словарным запасом, грамматикой, навыками письма.
Развитие общения: Обучение социальным навыкам, таким как умение слушать, задавать вопросы, выражать свои чувства, устанавливать контакт.
Развитие невербальной коммуникации: Работа над языком тела, мимикой, жестами.
Развитие эмоциональной регуляции: Обучение навыкам управления эмоциями, самоконтролю.

Применение современных методик и использование инновационных технологий в развитии коммуникативных навыков, включая методы игры, музыки, движения необходимые условия работы. Также интеграция детей с ЗПР в общеобразовательные школы и реализация инклюзивного образования, создание специальных образовательных программ для детей с ЗПР. Большой выбор специализированных центров и организаций: предоставление разнообразных услуг, включая логопедическую помощь, психологическую поддержку, реабилитационные мероприятия. Развитие коммуникативных навыков у детей с ЗПР требует комплексного подхода, включающего использование разнообразных методик и индивидуальный подход к каждому ребенку. Необходимо учитывать особенности в развитии ребенка с ЗПР, включая когнитивные, речевые, и эмоционально-волевые нарушения.

Страны СНГ и зарубежные страны имеют разные подходы к развитию коммуникативных навыков у детей с ЗПР, что связано с историческими, культурными, и экономическими факторами.

В целом, развитие коммуникативных навыков у детей с ЗПР является многогранным процессом, требующим внимания, как теоретиков, так и практиков. Важно учитывать

индивидуальные особенности каждого ребенка и создавать благоприятную среду для его развития. Международное сотрудничество в области исследования и практики помогает обмениваться опытом и разрабатывать новые эффективные методы коррекции.

Необходимо создавать и внедрять новые методики развития коммуникативных навыков у детей с ЗПР.

Важно увеличивать доступность специализированных услуг для детей с ЗПР, включая логопедическую помощь, психологическую поддержку, и реабилитационные мероприятия. Необходимо проводить обучение и подготовку специалистов по развитию коммуникативных навыков у детей с ЗПР, разработку новых методик, так как необходимы новые, более эффективные методики для работы с детьми с ЗПР, интеграцию технологий таких как использование цифровых технологий, как интерактивные игры, онлайн-платформы, может сделать процесс обучения более интересным и эффективным. Повышение осведомленности в общественности о проблеме ЗПР и ранней диагностики. Развитие коммуникативных навыков у детей с ЗПР - это сложный и длительный процесс, который требует комплексного подхода, индивидуального внимания и тесного сотрудничества между специалистами, родителями и самим ребенком.

Личностно-ориентированный ауто-реабилитационный курс для заикающихся подростков

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Для создания личностно-ориентированного ауто-реабилитационного курса для заикающихся подростков, направленного на перевоспитание личностных и коммуникативно-поведенческих свойств, препятствующих полноценному общению лиц с заиканием, мы руководствовались методикой Б.Некрасовой. Диссертационное исследование строилось по двум основным направлениям: констатирующий и обучающий эксперимент — предполагал групповую, подгрупповую и индивидуальную работу с заикающимися подростками и сочетал в себе воздействие в целом на речь, личность и коммуникативное поведение каждого подростка. Целью представленного обучающего эксперимента, построенного на базе данных психолого-педагогической диагностики, была разработка и апробация личностно-ориентированного варианта комплексной ауто-реабилитации заикающихся подростков.

В связи с целью исследования были поставлены следующие задачи:

1. Представить основные принципы и этапы личностно-ориентированного ауто-реабилитационного курса. Разработать и апробировать комбинированные методы, предусматривающие сочетание и взаимопроникновение комплексного логопедического и психо- коррекционного воздействия и учёт личностных особенностей подростков. При реализации экспериментально-реабилитационного курса для заикающихся подростков мы опирались *на принципы коррекции "нарушений речевого общения",* предложенные Ю.Б.Некрасовой: принцип логопсихо-диагностики; опосредования; диалогического взаимодействия пациента и специалиста; коллективного сотворчества пациентов и специалиста в организации лечебно-педагогического процесса; парадоксальности методов и приёмов воздействия; преемственности лечебно-педагогического процесса, добавив к ним: принципы учета возрастных и личностных особенностей подростков. В ходе ауто-реабилитационного курса мы выделяем три основных этапа: 1.Подготовительный этап был направлен на выработку устойчивой мотивации, определенного психического состояния готовности к предстоящему процессу реабилитации, как у заикающихся подростков, так и у их родителей. В течение данного этапа проводилась логопедическая и психолого-педагогическая диагностика, намечались основные логопедиче-ские, общепедагогические и психокоррекционные задачи и велась подготовительная работа по двум направлениям: I — создание речевой, физиологической и психологической базы для формирования правильных коммуникативно-речевых навыков включало 4 раздела: 1) формирование моторной базы (развитие общей моторики, мелкой мотори-ки); 2) формирование средств коммуникации (развитие речевого дыхания,); 3) развитие языковых навыков (развитие фонетико-фонематической стороны речи) и 4) формирование психологической базы (психологическая подготовка подростков к основополагающему установочному занятию и выработка мотивации, направленной на реабилитационный процесс); II — формирование коммуникативно-речевых умений на базе положительных психических

состояний, возникающих в процессе творческой развивающей деятельности, реализовалось в разделе развитие сочетанных навыков речевой и психологической саморегуляции: создании психического состояния доверия к логопеду, ориентации на речевые образцы и мотивации, направленных на процесс реабилитации у подростков. Были использованы: модификация метода сочетания элементов эмоционально-стрессовой и рациональной аутокоррекции с отработкой логопедических приёмов, облегчающих судорожные состояния мышц периферического речедвигательного аппарата, и метод создания рече-ролевых образов, сочетающий элементы логопедии и иррациональный ауто- терапии.

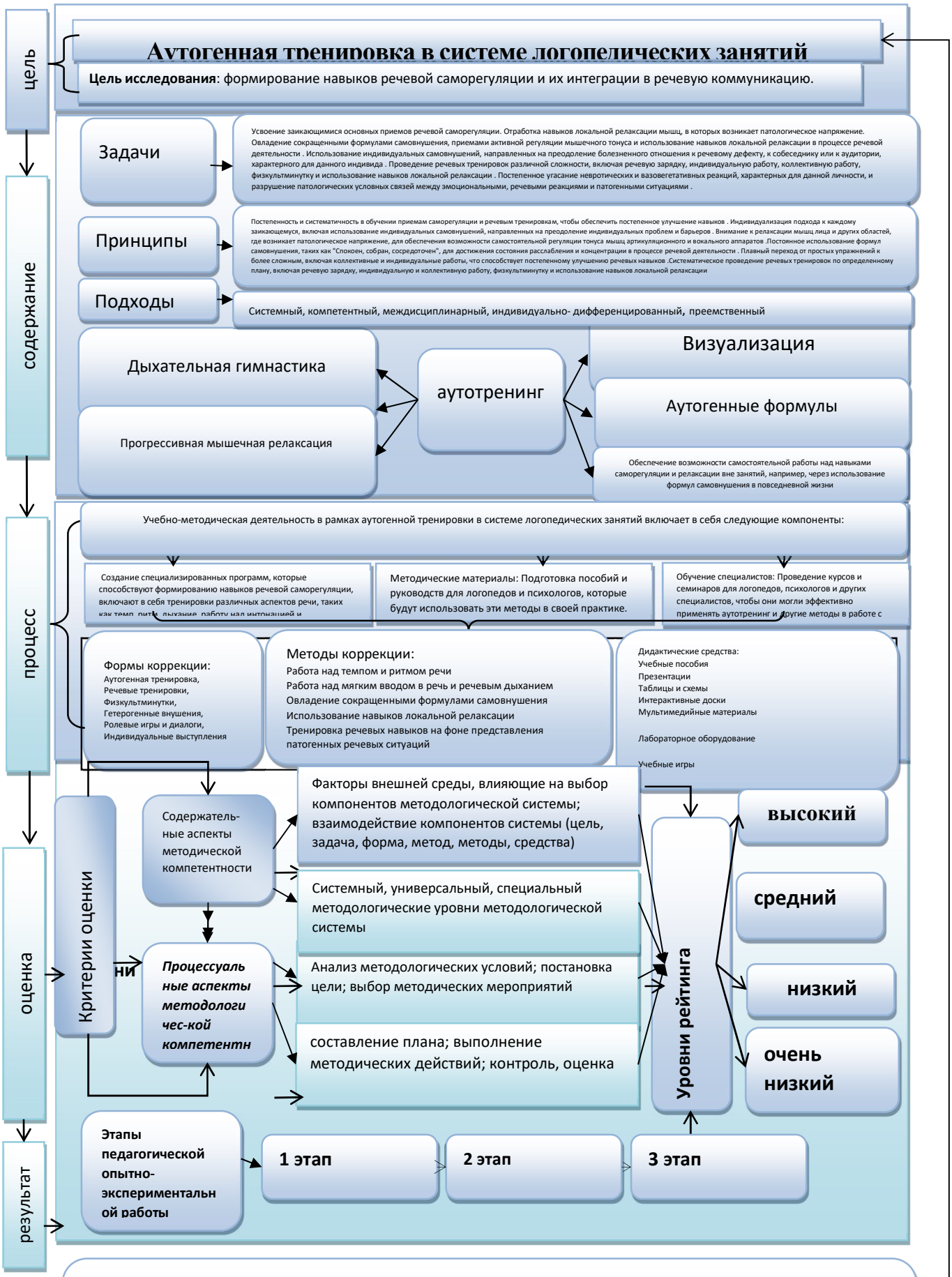
3. Этап активного логопедического и психокоррекционного воздействия был направлен на реабилитацию заикающихся подростков через формирование и закрепление вербальных и невербальных умений и навыков общения на фоне продуктивных психических состояний, стимулирующих закрепление положительных личностных особенностей детей. Он длился 3,5-4 месяца. Этап включал *2* цикла занятий: 1) основной цикл (ОЦЗ) и 2) закрепляющий цикл (ЗЦЗ). Целью основного цикла занятий являлось формирование и развитие комплекса продуктивных психических состояний и коррекция вербальных и невербальных стереотипов общения на их фоне (7 недель). Цель закрепляющего цикла занятий заключалась в закреплении и совершенствовании комплекса продуктивных психических состояний и умений и навыков вербального и невербального общения (7 недель). Работа велась так же, как и на первом этапе, в 2-х направлениях: 1. Создание речевой, физиологической и психологической базы для формирования правильных коммуникативно-речевых навыков также реализовалось в 4-х разделах работы: 1) формировании моторной базы; 2) формировании средств коммуникации, 3) развитии языковых навыков, 4) формировании психологической базы (в основном цикле занятий осуществлялось общее интеллектуальное развитие, формирование продуктивных психических состояний в сочетании с навыками невербального общения, формирование новой коммуникативной атмосферы в семье подростка; в закрепляющем цикле занятий — совершенствование общего интеллектуального развития; закрепление продуктивных психических состояний в сочетании с развитием навыков невербального общения и в сочетании со становлением новой коммуникативной атмосферы в семье подростка). Работа по первым 3-м разделам проводилась традиционно.

2. Формирование коммуникативно-речевых умений на базе положительных психических состояний, возникающих в процессе аутотренинговых занятий, в основном цикле занятий осуществлялось в разделе «развитие сочетанных навыков речевой и психологической саморегуляции» и было направлено на активное формирование и обеспечение преемственности продуктивных психических состояний в сочетании с: а) развитием навыков релаксации, вербальной и невербальной коммуникации, б) развитием моторики и средств коммуникации.

Аутогенная тренировка (далее АТ) в системе логопедических занятий

Специализированная аутогенная тренировка (АТ) для заикающихся подростков разработана А.И. Лубенской. Эта технология ставит общие задачи, характерные для всех существующих вариантов АТ, и частные, характерные конкретно для этой модификации. Решение этих задач направлено на нормализацию речевого поведения заикающихся подростков.

Целью общих задач является снижение мышечного тонуса и эмоционального напряжения неполноценности и логофобии, частных — коррекция напряжения артикуляторной и вокальной мускулатуры, регуляция дыхания (рис 2).



Результаты аутогенной тренировки в системе логопедических занятий способствует улучшению личности и речи, но и развивает у пациентов навыки саморегуляции, которые могут быть полезны в различных аспектах их жизни.

2 рис. Аутогенная тренировка в системе логопедических занятий.

В процессе аутогенной тренировки в системе логопедических занятий решаются поэтапное обучение подростков приемам саморегуляции, речевых тренировок и бесед психотерапевтического и разъясняющего характера. В модификации аутогенной тренировки А.И. Лубенской основными методическими приемами являются формула спокойствия и имаготерапия. Занятия специального курса АТ проводились нами по следующей схеме: расширенная формула спокойствия; произвольная регуляция мышечного тонуса; речевая тренировка; расширенная формула спокойствия; двигательные упражнения; самоотчеты заикающихся. Весь курс АТ занимает около двух месяцев и делится на три этапа: I этап — 12-14 коллективных занятий; II этап — 18-20 коллективных занятий; III этап — 8-10 коллективных занятий. В каждую коллективную тренировку входят вступительная и заключительная беседы. Во вступительной беседе мы сообщали подросткам план занятий, в заключительной - подводят итоги, затем разбираются жалобы и даются задания для самостоятельной работы. В ходе речевых тренировок заикающиеся постепенно переходят от мысленного проговаривания к шепотной и громкой речи, от коллективной работы - к индивидуальной и от сопряженного проговаривания речевого материала - к спонтанной речи и публичным выступлениям. На I этапе заикающиеся осваивают основные приемы саморегуляции: расширенную формулу спокойствия, навыки релаксации и управления вазовегетативными реакциями (дыханием, ритмом сердечной деятельности, сосудистым тонусом). Далее тренирующиеся вызывают расслабление правой руки при помощи самовнушения. На этом же занятии вызывается ощущение тяжести в правой руке. На четвертом и пятом занятиях те же ощущения вызываются последовательно в правой, а затем в левой руке. После заикающиеся обучаются формулам самовнушения, которые направлены на расслабление мышц брюшного пресса, грудной мускулатуры, а также формулам, обеспечивающим регуляцию сосудистого тонуса. На первом этапе тренировки часто используются такие формулы внушения: «С каждым днем, с каждым занятием ваши самовнушения реализуются все быстрее и быстрее», «С каждым днем, с каждым занятием ощущения, вызванные вашим словом, вашим собственным словом, становятся все более четкими, яркими, привычными». Функциональные тренировки начинаются с первых занятий, но носят еще пассивный характер. Речевая работа первого этапа проводится по следующему плану: 1. Работа над темпом и ритмом речи. 2. Работа над мягким вводом в речь и речевым дыханием. Речевым материалом служат вначале формулы самовнушения, которые тренирующиеся повторяют мысленно за ведущим. С 6-7-го занятия материалом являются специально подобранные тексты, которые предварительно отрабатываются на логопедических занятиях. II этап является очень важным как в психотерапевтическом, так и в речевом плане. В процессе тренировок на этом этапе решается одна из частных задач саморегуляции — отработка навыков локальной релаксации групп мышц, в которых возникает судорожность. Занятия на данном этапе строятся по следующему плану:

1. Вступительная беседа. 2. Расширенная формула спокойствия. 3. Расслабление верхних конечностей, брюшного пресса и грудной мускулатуры. 4. Формула спокойствия. 5. Гетерогенные внушения, направленные на усиление терапевтического эффекта самовнушений.

6. Представление трудной речевой ситуации. 7. Формула спокойствия. 8. Речевая тренировка. 9. Расширенная формула спокойствия. 10. Гетерогенные внушения, фиксирующие речевые достижения тренирующихся и утверждающие возможность их реализации в обычных жизненных ситуациях. 11. Двигательные упражнения.12. Заключительная беседа. 13. Отчеты заикающихся. Речевые тренировки второго этапа проходят по следующей схеме: 1. Выработка новых речевых стереотипов (переход от

мысленного проговаривания к сопряженно-отраженной и шепотной речи). 2. Закрепление речевых навыков, выработанных на первом занятии АТ и на логопедических занятиях (коллективное чтение текстов, шепотная речь, переходящая в громкую). 3. Подготовка к логопедическим занятиям, одновременная работа всех членов группы (речь громкая). 4. Индивидуальные выступления (речь громкая). На III этапе в ходе аутогенных тренировок заикающиеся овладевают сокращенными формулами самовнушения, приемами активной регуляции мышечного тонуса и активизации навыков локальной релаксации в процессе речевой деятельности. На этом этапе вводятся индивидуальные самовнушения, направленные на преодоление болезненного отношения к речевому дефекту, к собеседнику или аудитории. В ходе речевых тренировок третьего этапа полученные навыки саморегуляции активно используются в процессе речевой деятельности. С этой целью тренирующимся предлагается вступать в короткие речевые контакты - диалоги вначале с ведущим, позже - с товарищами по группе. Речевые тренировки проходят по следующему плану*:*

1.Речевая зарядка (коллективное чтение текстов). 2.Индивидуальная работа — тренировка речевых навыков на фоне представлений трудных речевых ситуаций. 3. Коллективная работа — короткие речевые контакты. 4. Физкультминутка. Использование навыков локальной релаксации. 5. Коллективная работа: беседы, телефонные разговоры, импровизации по теме.

В закрепляющем цикле занятий в разделе « развитие сочетанных навыков речевой и психологической саморегуляции» работа была направлена на закрепление положительных (продуктивных) психических состояний в сочетании с: а) развитием навыков релаксации и вербальной коммуникации, б) совершенствованием моторики и средств коммуника-ции, в)совершенствованием общения на фоне закрепления новых вербальных и невербальных коммуникативных умений и навыков,

Второе направление работы предполагало взаимопроникновение логопедического и психокоррекционного воздействий. В его рамках использовались комбинированные методы и приёмы. Их особенность заключалась во введении любых видов дидактические тренировок речи в общее психокоррекционное содержание работы. Для развития сочетанных навыков речевой и психологической саморегуляции на данном этапе был предложен аутотренинг.

1.Была разработана система специальной релаксации, представляющая комплекс взаимоопосредованных методов и приёмов, осуществляемых в условиях концентрации внимания на воображаемых событиях на фоне мышечного расслабления. Среди них были следующие методы:

1) Сочетание функциональных тренировок речи и приемов психокоррекции посредством символов на фоне состояния релаксации, направленное на закрепление определенных форм речи и коммуникативно-поведенческих навыков в условиях введения и снятия эмоционально-отрицательных ситуаций.

2) Сочетание методов с функциональными тренировками на фоне аутотренинга лежит стирание эмоционально-отрицательной ситуации и заменена ее положительной по условному сигналу. При этом подростки самостоятельно представляют и описывают эти ситуации на вербальном уровне.

3) Последовательная отработка логопедических приемов и дальнейшее проведение дидактических тренировок речи на фоне аутотренинга. Особенность комбинации заключается в возможности проводить дидактические тренировки в самых разных условиях, создаваемых ситуативных темах, аутотренинга, дозировать речевую, психическую нагрузку, помощь специалиста и одновременно вести психокоррекционную работу. 4) Сочетание отработки вопросно-ответной и монологической форм речи на фоне

аутотренинга с элементами самопрограммирования. Данная система аутотренинга состояла из 3-х этапов и включала 11 групповых занятий. 2. Аутотренинг А.И. Лубенской был усовершенствован нами путём комбинации с отработкой у подростков речевых приемов и форм не только в роли «пациентов», но и в роли ведущих. 3. Применялись комбинации приемов логопедии и кинезитерапии, а именно сочетание определённых упражнений парадоксальной дыхательной гимнастики А.М.Стрельниковой и комбинация упражнений Ю.Б. Некрасовой с отработкой логопедических приемов и функциональными тренировками речи. Они были направлены на формирование у подростков положительных психических состояний через раскрепощение и совершенствование движений тела и развитие средств вербальной и невербальной коммуникации.

4. Приём сочетания аутотренинга, с отработкой вопросно-ответной и монологической форм речи был основан на переживании подростком определенных эмоций, спровоцированных темой и сюжетом рисунка, в сочетании с элементами рациональной аутокоррекции, развитием навыков общения и функциональными тренировками речи в эмоционально-насыщенной ситуации.

6. После дифференциально-диагностического исследования испытуемых намечалась стратегия реабилитации группы, клинических подгрупп, микрогрупп с близкими личностно-коммуникативными характеристиками и каждого подростка в отдельности. Были организованы общегрупповые, подгрупповые и индивидуальные занятия.

Различия в подходе к подросткам 2-ух клинических подгрупп (невротическое и неврозоподобное) состояли в более выраженном логопедическом и общепедагогическом воздействиях на подгруппу подростков с неврозоподобной формой заикания особенно в рамках разделов: формирования моторной базы, средств коммуникации и развития языковых навыков — I-го направления работы.

Также нужно отметить, что по завершении личностно-ориентированного ауто-курса комплексной реабилитации с детьми и родителями проводилась поддерживающая логопсихокоррекционная работа в течение оставшегося года (4,5 месяцев). Результаты исследования в динамике, показали значительное улучшение речи и положительные изменения личностно-коммуникативных особенностей заикающихся подростков.

1. По данным исследования речевого статуса у 83,3% детей экспериментальной группы была отмечена речь без запинок судорожного характера («практически здоровая речь»), а у 16,7% наблюдались незначительные остаточные проявления заикания. Из контрольной группы только 10% детей при вторичном обследовании в конце года обнаружили «практически здоровую речь.

Динамика формирования улучшения речи и положительных изенений личностно-коммуникативных изменений у заикающихся подростков

Таблица 1

Критерии формирования личностной компетенции заикающихся подростков	Уровни	До экспер 160 контрольная	После экспер 155 контрольная	До экспер 162 эксперимент	После экспер 158 эксперимент
Когнитивный	Высокий	38 / 23,9%	38 / 24,8%	37 / 22,7%	64 / 40,2%
	Средний	36 / 22,4%	49 / 31,3%	38 / 24,3%	68 / 43,2%
	Низкий	86 / 53,7%	68 / 43,9%	86 / 53%	26 / 16,6%
Мотивационный	Высокий	37 / 23,3%	38 / 24,5%	34 / 21,1%	62 / 39,5%
	Средний	57 / 35,4%	64 / 41,0%	59 / 36,7%	70 / 44,6%
	Низкий	66 / 41,1%	53 / 34,5%	67 / 41,2%	28 / 17,9%
Личностно-ориентированный	Высокий	26 / 16,5%	30 / 19,4%	29 / 17,7%	56 / 35.2%
	Средний	50 / 31,1%	60 / 38,8%	50 / 30,8%	74 / 47%
	Низкий	84 / 52,4%	65 / 41,8%	83 / 51,5%	28 / 17,8%
Деятельностно-ориентированный	Высокий	38 / 24%	44 / 28,2%	41 / 25,3%	67/ 41,2%
	Средний	51 / 31,9%	59 / 37,8%	50 / 31,1%	65 / 43,8%
	Низкий	71 / 44.1%	53 / 34,0%	72 / 44,5%	24 / 15,0%
Всего среднее	Высокий	35 / 21,9%	38 / 24,2%	35 / 21,7%	62 / 39%
	Средний	48 / 30,2%	58 / 37,2%	50 / 30,7%	70 / 44,6%
	Низкий	76 / 47,8%	60 / 38,5%	77 / 47,5%	27 / 16,8%

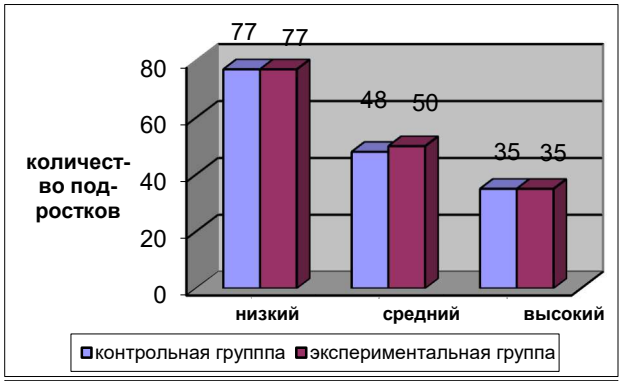
Как видно из таблицы 1, представляющей анализ результатов уровней компетенций по четырем критериям: когнитивной, мотивационной, личностно-ориентированной и деятельно-ориентированной, мы наблюдаем, что высокий уровень когнитивного компонента включает наличие полного понимания причин и механизмов заикания, а также не менее эффективного применения различных техник и стратегий для управления заиканием. Средний уровень представлен наличием осознания заикания и его влияния на общение, а также умения использования техник и стратегий, но не всегда эффективно. На низком уровне отсутствует понимание причин заикания и ограничено использование техник для управления им.

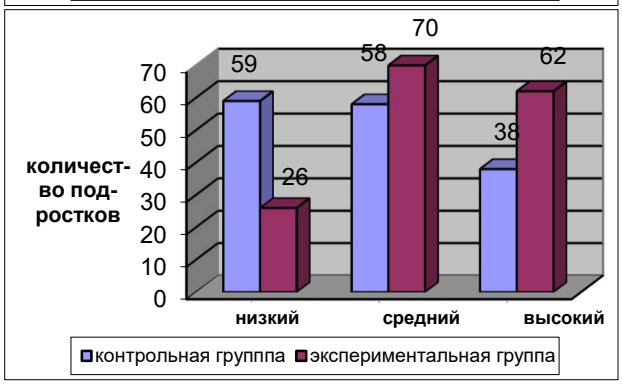
Показатели контрольных и экспериментальных групп экспериментальной работы по ауто-реабилитационному курсу по преодолению заикания у подростков. Из выше указанной таблицы № 1 следует, что в экспериментальной работе приняли участие до эксперимента 322 заикающихся подростков и после эксперимента - 313 заикающихся подростков. Из них до эксперимента участвовали 160 подростков в контрольных группах и 162 подростков в экспериментальных группах, а после эксперимента участвовали 155 подростков в контрольных группах и 158 подростков в экспериментальных группах. В

таблице 1 представлены показатели в контрольной и экспериментальной группах до и после эксперимента .

Результаты в контрольной и экспериментальной группах до и после эксперимента 2 таблица

	Группы	Коли-чество подрост-ков	Количество правильных ответов в трех уровнях в количествах и процентах		
			высокий	средний	низкий
До экс-перимента	Экспериментальные	162	35 21,7	50 30,7	77 47,6
	Контрольные	160	35 21,9	48 30,2	77 47,9
После экс-перимента	Экспериментальные	158	62 39	70 44,6	26 16,4
	Контрольные	155	38 24,5	58 37,4	59 38,1





Из этих данных видно, что после эксперимента произошло значительное улучшение компетенций во всех категориях. Уровень высокой компетенции вырос, а уровень низкой компетенции снизился, что свидетельствует о положительном влиянии эксперимента на развитие компетенций у заикающихся подростков. Вышеуказанные данные являются достаточными для подтверждения достоверности проведенного в рамках исследования логопедического эксперимента и формулирования научных выводов. Это, в

свою очередь, подтверждает эффективность проведенного исследования и надежность разработанных рекомендаций с логопедической точки зрения. По результатам данных расчетов доказана с помощью статистических методов эффективность результатов проведенной исследовательской работы.

В результате проведенного экспериментального исследования по реабилитации заикающихся подростков в процессе аутотренгового курса сделаны следующие выводы:

1. Определено, что у заикающихся недостаточно сформированы мотивация и готовность заикающегося подростка к преодолению речевых трудностей, недостаточно адаптированы подходы к терапии и поддержке подростка с заиканием, учитывая его индивидуальные потребности и особенности, что диктует необходимость совершенствования методики психолого-логопедической реабилитации подростков.

Biological Sciences

Roads hazards of road construction on birds and cost evaluation in Central Kazakhstan

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Abstract
The research addresses the necessity of exploring road hazards occurring during motorway construction on birds in Central Kazakhstan. The study contains materials about bird's species, including rare ones, obtained through conducting area observations. It further identifies main hazards and evaluates assessment on birds, their nests. Moreover, the research highlights critical points in the region, proposes mitigation measures. With the help of similar research and projects, the study tries to make an approximate evaluation of the cost of proposed measures.
Keywords: road construction, birds, rare species, hazards, cost evaluation.

Introduction

A highway, being one of the most common ways of traveling between regions in Kazakhstan, has its constant impact on the environment not only during its operation, but also during construction. The process of road construction is labour-intensive and durable, it affects all ecological aspects of the environment: soil, water bodies, atmospheric air, flora and fauna, which are under the influence and during the operation of the road. Central Kazakhstan is a home for many bird species native to the steppe terrain, including endangered too. The study area includes the corridor of the projected A17 motorway, starting at the eastern edge of Zhezkazgan and extending 513 km to the eastern entrance of Karaganda city, connecting settlements from mentioned cities. A map of the study area is presented below.

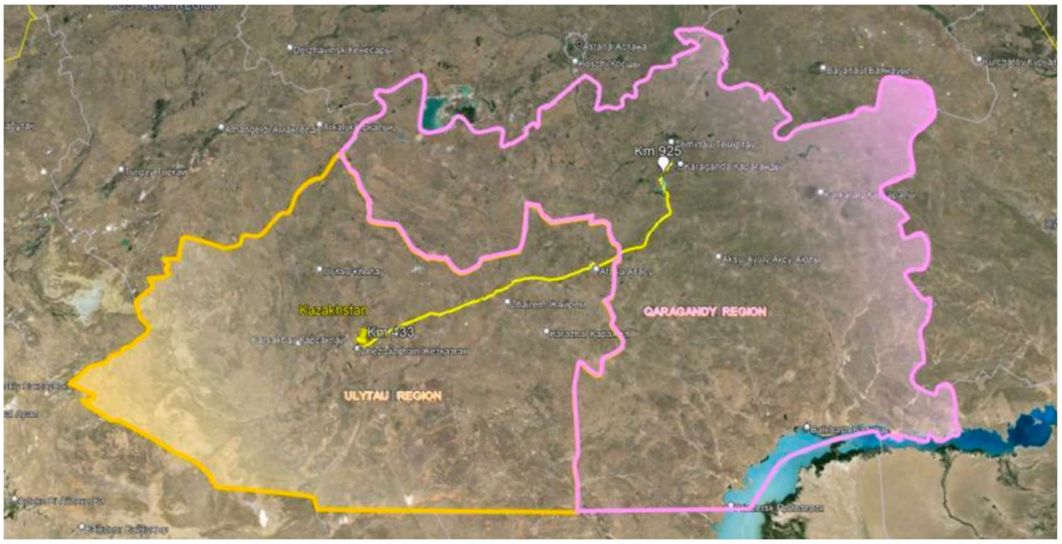

Figure 1: Map of study area

During field observations of the area in early May following species were found:

Table 1. Birds (Aves) in the study area

№	Russian name	Latin name	IUCN Status *	Status in the Red Book of the RK**
	Gooseiformes (Anseriformes)			
1	Gray duck	Mareca strepera	LC	
2	Grey goose	Anser	LC	
3	Ogar	Tadorna ferruginea	LC	
4	Red-nosed diver	Netta rufina	LC	
5	Shirokonoska	Spatula clypeata	LC	
6	Mallard	Anas platyrhynchos	LC	
7	Whooper swan	Cygnus olor	LC	
8	Chickadee teal	Spatula querquedula	LC	
	Hawks (Accipitriformes)			
9	Marsh harrier	Circus aeruginosus	LC	
10	Kurgannik	Buteo rufinus	LC	
11	Berkut	Aquila chrysaetos	LC	Category 2
12	Steppe eagle	Aquila nipalensis	EN	Category 5
13	Black kite	Milvus migrans	LC	
14	Meadow harrier	Circus pygargus	LC	
15	Common kestrel	Falco tinnunculus	LC	
	Chickadees (Galliformes)			
16	Grey partridge	Perdix perdix	LC	
	Poganiformes			
17	Great Grebe (Chomga)	Podiceps cristatus		
	Charadriiformes (Charadriiformes)			
18	Chibis (lapwing)	Vanellus vanellus	NT	
19	River tern	Sterna hirundo	LC	
20	Lake gull	Chroicocephalus ridibundus	LC	
21	White-tailed Sandpiper	Calidris temminckii	LC	
22	Sandregenpfeifer	Charadrius hiaticula	LC	
23	Sea plover	Charadrius alexandrinus	LC	
24	Stilt walker	Himantopus himantopus	LC	
25	pied avocet	Recurvirostra avosetta	LC	
	Cranes (Gruiformes)			
26	moorhen	Gallinula chloropus	LC	
27	bald coot	Fulica atra	LC	
28	Whooping crane	Anthropoides virgo	LC	Category 5
	Passeriformes (Passeriformes)			

29	House sparrow	Passer domesticus	LC	
30	Crested lark	Galerida cristata	LC	
31	White Wagtail	Motacilla alba	LC	
32	The gray lark	Alaudala rufescens	LC	
33	tawny pipit	Anthus campestris	LC	
34	Common magpie	Pica pica	LC	
35	Rook	Corvus frugilegus	LC	
36	jackdaw	Corvus monedula	LC	
37	Desert magpie	Lanius meridionalis	VU	
38	The gray crow	Corvus cornix	LC	
39	lesser whitethroat	Sylvia curruca	LC	
40	common wheatear	Oenanthe oenanthe	LC	
41	Pink starling	Sturnus roseus	LC	
42	Country swallow	Hirundo rustica	LC	
43	Coastal swallow	Riparia riparia	LC	
44	Yellow Wagtail	Motacilla flava	LC	
45	Desert mason	Oenanthe deserti	LC	
46	Desert warbler	Sylvia nana	LC	
47	Black lark	Melanocorypha yeltoniensis	LC	
48	red-headed bunting	Emberiza bruniceps	LC	

*Status of the species in the International Red List of the International Union for Conservation of Nature (IUCN) IUCN:
EX – Extinct; EW - Extinct in the Wild; CR - Critically Endangered; EN - Endangered; VU - Vulnerable; NT - Near Threatened; LC - Least Concern; LD - Largely Depleted; DD - Data Deficient; NE - Not Evaluated (the threat has not been assessed).

**Status in the Red Book of the Republic of Kazakhstan
Category 1 – endangered; Category 2 – rare; Category 3 – downsizing; 4 - undefined (poorly studied); 5 - restored, i.e. those whose risk of extinction has disappeared because of the measures taken.
During the field inspection live meetings of the Steppe Eagle (Aquila nipalensis) and Red-crowned Crane (Anthropoides virgo) were noticed, species included in the Red Book of the Republic of Kazakhstan. The nature of birds' stay on the construction site is nesting. Nests of raptors were mainly found in trees along the motorway route.

Table 2. Rare species sighting and nesting points

Location coordinates	View
49° 26.968'S 72° 55.308'E	Whooping crane
48° 53.378'S 72° 19.063'E	Whooping crane
48° 44.198'S 71° 50.085'E	Whooping crane
48° 34.325'S 71° 2.100'E	Whooping crane
48° 23.796'S 69° 56.738'E	Whooping crane
48° 23.323'S 69° 54.335'E	Steppe eagle
48° 16.482'S 69° 26.902'E	Steppe eagle (3 individuals)
48° 11.456'S 69° 1.402'E	A raptor's nest

48° 11.501'S 69° 1.051'E	A raptor's nest
48° 11.499'S 59° 1.008'E	A raptor's nest
48° 11.763'S 68° 58.616'E	Eagle’s nest (incubating a clutch)
48° 8.711'S 68° 46.880'E	A raptor's nest
48° 7.892'S 68° 43.894'E	A raptor's nest
48° 1.617'S 68° 23.767'E	A raptor's nest
47° 59.579'S 68° 16.632'E	A raptor's nest
47° 58.314'S 68° 11.407'E	A raptor's nest
47° 58.018'S 68° 9.615'E	Steppe eagle

Figure 2. Points of occurrence of the Whooping Crane, Steppe Eagle and nests of raptors

About 13 nests of raptors were identified during the field visit. It is known that large birds of prey, including eagles, often use old nests. Therefore, even if birds are absent from a nest this year, it can be assumed that birds may occupy it in the following years.

Even though rooks are typical representatives of the moderate latitudes, it should be emphasised that this is a crucial area for their breeding. During the route inspection period, mass nesting colonies were identified. As the construction involves the demolition of tree plantations in some areas, this is the maximum risk to breeding of these species.

Figure 3. Scheme of locations of mass rook nesting colonies

Hazards on birds

Injuries caused by collision with objects

This risk is more of a concern for birds. High structures pose a threat to nocturnal migrants, such as power lines. Thin structures such as overhead power lines are particularly dangerous in this respect, as they are very difficult to see from a safe distance in low visibility conditions. The risk group includes waterfowl and waterfowl, as well as birds of the bustard family, which have a large body mass and low manoeuvring ability. Collisions also occur among small bird species in rainy weather with limited visibility. The risk of injury is increased by the fact that the works will be in areas where birds migrate (according to the migration routes map). The risk of injury and mortality of animals can be defined as medium.

Exposure to constant light (light pollution)

This risk concerns birds to a greater extent. Lighting masts with lanterns burning at night are located around and within most of the construction and temporary domestic facilities of the alignment. The impact of this factor can be considered from two sides. Outside of migration seasons, constant and intense light pollution over large areas attracts many flying invertebrates, creating a rich food base for insectivorous animals (hedgehogs, lizards, birds). However, during the migration period permanent light sources of yellow-red spectrum at night disorient night migrants, which has been repeatedly described in the literature. Having flown to such a light source, birds stay close to it and can escape from the light trap only in the period with natural light (in the morning). This disrupts the natural course of migration, sometimes leading to severe consequences. This phenomenon is known worldwide, but there is no information from production facilities in the region. It is necessary to study this issue to determine the level of its impact on bird populations in our region. The level of risk from light pollution requires further study, but at the present stage it can be assessed as low.

Nuisance factor, noise pollution

Noise pollution from running machinery, various generators, and vehicles is a powerful disturbance factor. Noise and the activity of people and transportation are themselves repellents

that deter animals from areas with increased activity. This leads to a reduction in the density of animals within the production areas and minimizes the negative consequences of the collision of interests of people and wildlife. Considering that the route construction sites and the route itself are in an industrially undeveloped area with high ecological significance for nesting rare birds, this risk can be assessed as high.

Electrocution on overhead power lines

Overhead power lines (OPL) are a pronounced and relatively well-studied risk factor for birds. The impact of specific overhead power lines on birds depends on many factors: the design of supports, crossbeams, types of insulators and wires used; voltage of electric current; territorial and bio topic location of overhead power lines; orientation of overhead power lines in relation to the paths of mass migration of birds, etc. The negative impact of overhead power lines on birds is associated with electric shock in contact with bare wires and grounded metal elements of supports and beams. Typically, power lines are installed along the trails.
Birds can then short-circuit on approach or take-off, leading to their death. This can occur because of contact with the body or nest building material carried by the bird. With short distances and humid air, there is also a risk of electrical arcing. The victims of electric shock on such transmission line structures are medium to large raptors. This level of risk is assessed as medium.

Table 3. Risks categories

Risks	Risk category
Injury from mechanical obstacles	medium
Exposure to constant light (light pollution)	low
Nuisance factor, noise pollution	high
Electric shock on power lines	medium

It is seen that hazards on birds mostly will be of “medium” category, however appearance of other factor may result in higher categorising of risk in the future.

Proposed measures

- Demolish tree plantations strictly before the nesting colonies are occupied by birds (rooks, raptors) - before the beginning of the nesting period. Exclude tree demolition from April to August.
- To replace the demolished 13 nests of raptors, install artificial nesting sites at a safe distance from the construction site (500 meters from the road, but not less than 3-5 km from each other) in 3 times equivalent - 3 artificial nesting sites for each demolished nest.
- Informing workers about the presence of breeding sites for rare and endangered bird species on road sections.
- Use of transmission line construction with suspended insulation. This type of insulator attachment helps to increase the distance between current carrying and grounded elements of the structure, which significantly reduces the risk of electrocution of birds of different size groups.
- The use of self-supporting insulated wire (SIP) covered with a special polymer sheath provides the most reliable protection of birds during the operation of power lines.

Table 4. Estimated cost for artificial nests of raptors

	Materials	quantity	Cost per 1 unit (tenge)	Cost per 1 unit (USD)	Total cost (tenge)	Total cost (USD)
Installation of artificial nests	Prof. pipe 100x100x3mm, meter	168	3500	7,8	588000	1312,5
	Corner 40x40x3mm, meter	335	780	1,7	261300	583,3
	Masonry mesh 50x50x4mm, pcs	19	4700	10,5	89300	199,3
	Knitting wire 3mm, coil	3	4300	9,6	12900	28,8
	Electrode #3, pack	6	3000	6,7	18000	40,2
	Cutting disc 125, pack	6	2000	4,5	12000	26,8
	Battery-powered grinder, pcs.	1	60000	133,9	60000	133,9
	Cement, bag	10	1800	4,0	18000	40,2
	Bolts m8x30, pcs	225	50	0,1	11250	25,1
	Motorized drill, pcs	1	70000	156,3	70000	156,3
	Drill bits, set	5	10000	22,3	50000	111,6
	Welding work, service	1	200000	446,4	200000	446,4
Total for the section:			360130	803,9	1390750	3104,4

The cost of works on installation of artificial nests of raptors is given in accordance with the estimate of the Kazakhstan Association for the Conservation of Biodiversity for similar works carried out by employees on other projects.

Conclusion

In conclusion, road construction has a severe impact on biodiversity of the region, most of the hazards are related to the birds. It is mainly due to existence of endangered species and their nests. Although all species are not equally affected, new environment alongside the road creates more danger. Therefore, there is a need for further research on the given topic to propose better mitigation measures.

References:

1. Tokkulov B.S. (2021). Management of highways of the Republic of Kazakhstan: problems and prospects of development. Astana.
2. Kovshar A.F. (2013). Birds of the Betpak-Dala Desert, pp.104-132.
3. Mikheev A. B. (2005). Field identifier of bird nests.
4. Clevenger A.P., Proppe D.S. (2011). Effects of Road Networks on Bird Populations
5. Porto M., Moreira F. (2019). Bird collisions with power lines, pp.975-982
6. Morales M., Rogers T.E. (2009). How do roads affect the habitat use of raptors?
7. Souter G. (2012). Environmental Risk Assessment. Boca Raton.
8. Morrison T. (2008). The ecological effects of new roads. Wellington.
9. Karyakin I. V., Nikolenko E. G. (2011). Raptors and their conservation. Tyva.
10. Methodological aspects of assessing the impact and cost evaluation. (2015). Astana.

Technical Sciences

Autonomous Mobile Robot with Arm for Tomato Harvesting Using Raspberry Pi and Computer Vision

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Abstract. This project introduces the development of an autonomous mobile robot equipped with a robotic arm, aimed at efficiently harvesting tomatoes. The robot utilizes a Raspberry Pi as its central processing unit, paired with a camera module for computer vision-based detection of tomatoes. The robotic arm, controlled by precise servo motors, is engineered to accurately locate and pick ripe tomatoes. This multidisciplinary project integrates computer vision techniques, robotics, and embedded systems to present an innovative solution for automating the labor-intensive task of tomato harvesting.

Agriculture, a vital industry, faces significant challenges such as labor shortages and the need for increased efficiency in harvesting operations. Traditional methods of tomato harvesting are labor-intensive and prone to inefficiencies, leading to increased costs and potential crop damage. This project aims to address these challenges by developing an autonomous system capable of performing the task with minimal human intervention, thereby reducing labor costs and improving overall productivity.

The system is composed of several key components: a Raspberry Pi, a camera module, a robotic arm with servo motors, a mobile platform, and a suite of computer vision algorithms. The Raspberry Pi serves as the brain of the robot, handling image processing, decision-making, and the control of the robotic arm. The camera module captures real-time images of tomato plants, which are then processed by computer vision algorithms implemented on the Raspberry Pi. These algorithms are designed to detect ripe tomatoes by performing color segmentation, contour detection, and feature extraction. The precise location of each detected tomato is determined, enabling the robotic arm to accurately target and pick the fruit.

The robotic arm is controlled through a series of steps involving target position calculation, inverse kinematics, and servo motor control. Once a tomato is detected and its location is established, the target position for the robotic arm's end effector (gripper) is calculated. Inverse kinematics algorithms compute the necessary angles for each servo motor to reach the target position. The Raspberry Pi then sends pulse-width modulation (PWM) signals to the servo motors to adjust their angles accordingly, guiding the arm to the tomato. Upon reaching the tomato, the gripper closes to grasp it and then opens to release it into a collection container.

Mobility is a critical aspect of the robot's functionality, allowing it to navigate through tomato fields autonomously. Several navigation strategies are considered, including line following, GPS-based navigation, and vision-based navigation. These methods ensure that the robot can traverse the field, avoid obstacles, and locate tomato plants efficiently.

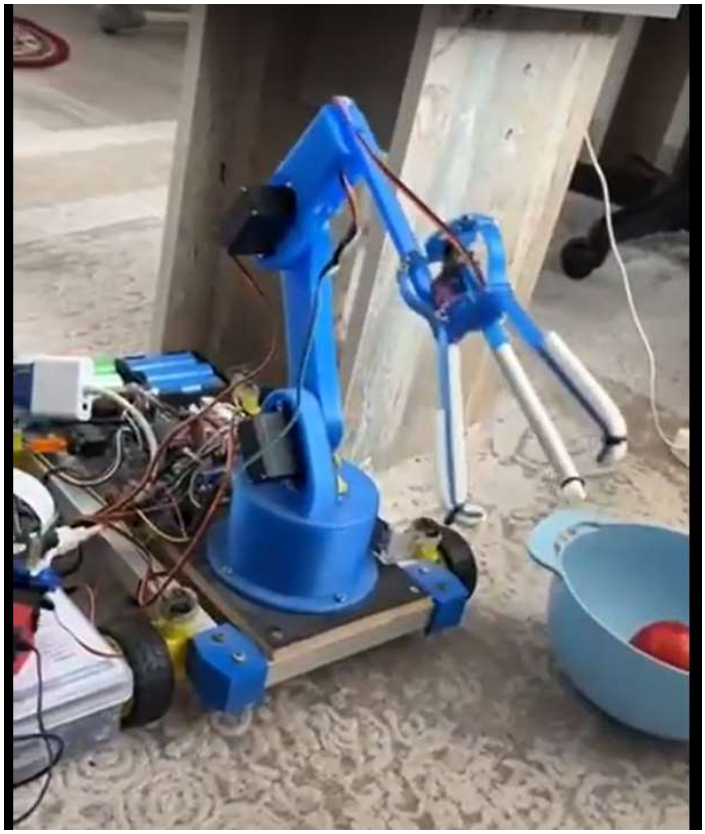
The hardware implementation involves integrating the Raspberry Pi with the camera module, servo motors, and mobile platform. The Adafruit ServoKit library facilitates the control of the servo motors through the Raspberry Pi, while the camera module connects via the CSI (Camera Serial

Interface) connector. Software development focuses on implementing computer vision algorithms using the OpenCV library and developing control logic using the Python programming language. Testing in both controlled and field environments demonstrates the robot's capability to detect and pick ripe tomatoes with high accuracy under various lighting conditions. The robotic arm's precise movements minimize damage to the tomatoes and surrounding plants, while the mobile platform's navigation capabilities enable effective traversal of different terrains and obstacles.
This project underscores the potential of robotics and computer vision to revolutionize the agricultural sector. The autonomous tomato harvesting robot offers a viable solution to labor shortages, increases productivity, and reduces crop losses. Future work will involve refining the detection algorithms, optimizing the robotic arm design, and incorporating machine learning techniques to enhance adaptability and decision-making. Advanced navigation algorithms will also be developed to enable the robot to operate in more complex and dynamic environments. This project lays the foundation for further research and development in agricultural automation, paving the way for a more sustainable and efficient future in farming.

Keywords: Autonomous mobile robot, Tomato harvesting, Raspberry Pi, Computer vision, Robotic arm, Agriculture automation, Labor shortages, Image processing, Color segmentation, Contour detection, Feature extraction, Inverse kinematics, PWM signals, Python programming, OpenCV

Introduction

Agriculture, a cornerstone of human civilization, faces modern challenges such as labor shortages and the need for heightened efficiency in harvesting operations. Traditional methods of tomato harvesting are labor-intensive and prone to inefficiencies, leading to increased costs and potential crop damage. In response to these issues, this project introduces the development of an autonomous mobile robot equipped with a robotic arm, specifically designed to harvest tomatoes efficiently. By integrating computer vision techniques, robotics, and embedded systems, the project aims to present an innovative solution to automate the labor-intensive task of tomato harvesting.



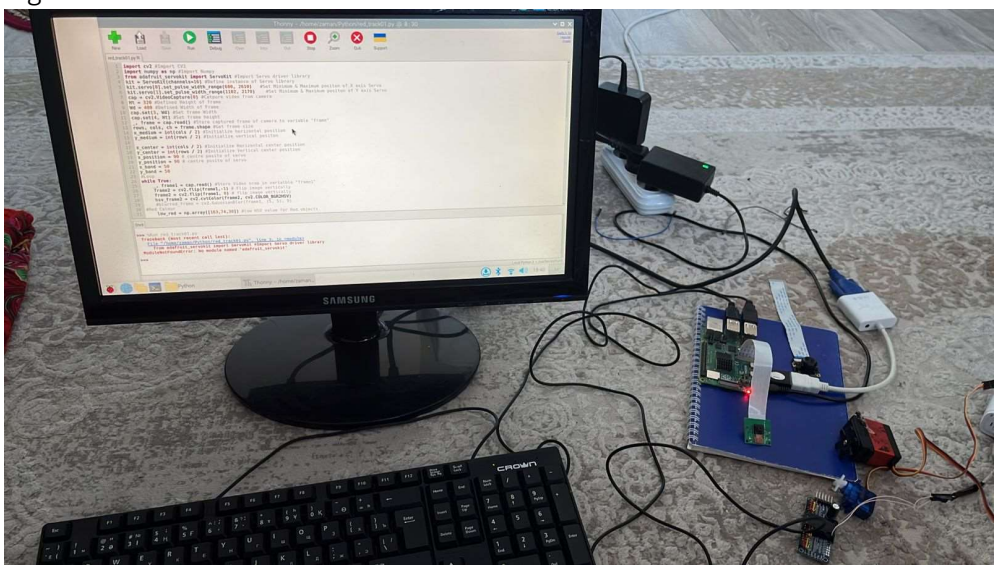
At the heart of this system is a Raspberry Pi, which serves as the central processing unit, paired with a camera module for real-time detection of tomatoes. The robotic arm, powered by precise servo motors, is engineered to accurately locate and pick ripe tomatoes. This multidisciplinary approach combines the strengths of computer vision for detecting ripe tomatoes, robotics for precise movement and picking, and embedded systems for seamless integration and control.
The autonomous tomato harvesting robot not only addresses labor shortages but also aims to improve overall productivity and reduce crop losses. This introduction outlines the project's motivation, components, and objectives, setting the stage for a detailed exploration of its design, implementation, and testing. Through this innovative approach, the project seeks to revolutionize the agricultural sector, paving the way for a more sustainable and efficient future in farming.

The agricultural industry faces significant challenges, including labor shortages and the increasing demand for efficient harvesting methods. Traditional harvesting is labor-intensive, time-consuming, and prone to inefficiencies, resulting in higher costs and potential crop damage. Automation through robotics offers a promising solution to these challenges. This project focuses on the development of an autonomous mobile robot equipped with a robotic arm specifically

designed for tomato harvesting. By leveraging computer vision and robotics, the robot aims to enhance harvesting efficiency, reduce labor costs, and minimize crop damage, thereby addressing the critical needs of modern agriculture.

System Overview

The system comprises several key components that work together to enable the robot to autonomously detect and harvest ripe tomatoes. These components include the Raspberry Pi, a camera module, a robotic arm with servo motors, a mobile platform, and computer vision algorithms.



- **Raspberry Pi:** Serving as the central processing unit (CPU) of the robot, the Raspberry Pi is responsible for image processing, decision-making, and controlling the robotic arm. It coordinates the operations of other components and ensures seamless integration.
- **Camera Module:** The camera module captures real-time images of the tomato plants. These images provide the necessary visual input for the computer vision algorithms to process and detect ripe tomatoes.
- **Robotic Arm:** Equipped with precise servo motors, the robotic arm mimics the movements required for tomato picking. It is designed to reach, grasp, and detach tomatoes accurately without causing damage to the fruit or the plant.
- **Servo Motors:** The servo motors enable precise control of the robotic arm's joints. They allow for accurate positioning of the arm to reach and grasp tomatoes based on the processed visual data.
- **Mobile Platform:** The mobile platform provides the robot with mobility, allowing it to navigate through the tomato fields. It ensures that the robot can move between rows of plants and reach different locations within the field.
- **Computer Vision Algorithms:** Implemented on the Raspberry Pi, these algorithms process the images captured by the camera module. They detect ripe tomatoes, determine their location, and guide the robotic arm for accurate picking.

Tomato Detection

The tomato detection process is critical for the autonomous operation of the robot. It involves several steps to ensure accurate identification and localization of ripe tomatoes.

- **Image Acquisition:** The camera module captures high-resolution images of the tomato plants. These images serve as the primary data source for further processing.
- **Image Preprocessing:** The captured images are preprocessed to enhance contrast and reduce noise. Techniques such as histogram equalization and Gaussian blur are applied to improve the quality of the images.

- Color Segmentation: Color segmentation techniques are used to isolate red tomatoes from the background. Methods such as color thresholding or machine learning-based classifiers can be employed to segment the red regions in the images.
- Contour Detection: Contours are detected around the segmented red regions, representing the boundaries of the tomatoes. This step helps in identifying the shape and size of the tomatoes.
- Feature Extraction: Features such as size, shape, and texture are extracted from the detected contours. These features help in refining the tomato detection process by distinguishing ripe tomatoes from other red objects.
- Tomato Localization: The centroid or center of mass of each detected tomato is calculated to determine its position in the image. This information is crucial for guiding the robotic arm to the exact location of the tomatoes.
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Robotic Arm Control

The control of the robotic arm involves several steps to ensure precise movements for picking tomatoes.

- Target Position Calculation: Based on the detected location of the tomato, the target position for the robotic arm's end effector (gripper) is calculated. This position is determined in the robot's coordinate system.
- Inverse Kinematics: Inverse kinematics calculations are performed to determine the required angles for each servo motor to reach the target position. This involves solving mathematical equations to map the end effector's position to the joint angles of the robotic arm.
- Servo Control: The Raspberry Pi sends pulse-width modulation (PWM) signals to the servo motors, adjusting their angles to move the robotic arm towards the target position. The servo motors receive these signals and rotate to the specified angles.
- Grasping and Detachment: Once the end effector reaches the tomato, the gripper closes to grasp it. The gripper is designed to apply enough force to hold the tomato securely without causing damage. After the tomato is picked, the gripper opens to release it into a collection container.

Mobile Platform Navigation

The mobile platform plays a vital role in the robot's ability to navigate through the tomato fields. Several navigation strategies can be employed to ensure effective and autonomous movement.

- Line Following: The robot can follow lines or markers on the ground to navigate between rows of tomato plants. This method uses simple visual cues and is effective in structured environments.
- GPS-Based Navigation: The robot can use GPS coordinates to navigate to specific locations within the field. This method is suitable for larger fields where precise location data is available.
- Vision-Based Navigation: The robot can use visual cues from the environment, such as landmarks or row patterns, to navigate autonomously. This method allows for more flexibility in unstructured environments and can adapt to dynamic changes in the field.

Calculation for the inverse kinematics of the robotic arm. Inverse kinematics involves determining the joint angles required for the end effector (gripper) of the robotic arm to reach a specific target position. Let's consider a simple 2D robotic arm with two links for this example.

Parameters and Variables:

1. **L1**: Length of the first link
2. **L2**: Length of the second link
3. **(X, Y)**: Target position of the end effector
4. **θ1**: Angle of the first joint (shoulder)
5. **θ2**: Angle of the second joint (elbow)

Calculation Steps:

1. **Compute the distance from the base to the target point:**

$$D = \sqrt{X^2 + Y^2}$$

2. **Check if the target is reachable:**

$$D \leq L1 + L2$$

If $D > L1 + L2$, the target is out of reach.

3. **Compute the angle α:**

$$\alpha = \cos^{-1}\left(\frac{L1^2 + D^2 - L2^2}{2 \cdot L1 \cdot D}\right)$$

4. **Compute the angle β:**

$$\beta = \tan^{-1}\left(\frac{Y}{X}\right)$$

5. **Compute the first joint angle $\theta 1$:**

$$\theta 1 = \beta - \alpha$$

6. **Compute the angle γ:**

$$\gamma = \cos^{-1}\left(\frac{L1^2 + L2^2 - D^2}{2 \cdot L1 \cdot L2}\right)$$

7. **Compute the second joint angle $\theta 2$:**

$$\theta 2 = \pi - \gamma$$

Example Calculation:

Let's assume the following values:

- $L1 = 10$ units
- $L2 = 10$ units
- Target position $(X, Y) = (10, 10)$ units

1. **Distance D:**

$$D = \sqrt{10^2 + 10^2} = \sqrt{200} = 10\sqrt{2} \approx 14.14 \text{ units}$$

2. **Check reachability:**

$$14.14 \leq 20 \quad \text{(reachable)}$$

3. **Angle α:**

$$\alpha = \cos^{-1}\left(\frac{10^2 + (10\sqrt{2})^2 - 10^2}{2 \cdot 10 \cdot 10\sqrt{2}}\right) = \cos^{-1}\left(\frac{100 + 200 - 100}{200\sqrt{2}}\right) = \cos^{-1}\left(\frac{200}{200\sqrt{2}}\right.$$

4. **Angle β:**

$$\beta = \tan^{-1}\left(\frac{10}{10}\right) = \tan^{-1}(1) = \frac{\pi}{4}$$

5. **First joint angle $\theta 1$:**

$$\theta 1 = \beta - \alpha = \frac{\pi}{4} - \frac{\pi}{4} = 0$$

6. **Angle γ:**

$$\gamma = \cos^{-1}\left(\frac{10^2 + 10^2 - (10\sqrt{2})^2}{2 \cdot 10 \cdot 10}\right) = \cos^{-1}\left(\frac{100 + 100 - 200}{200}\right) = \cos^{-1}(0) = \frac{\pi}{2}$$

7. **Second joint angle $\theta 2$:**

$$\theta 2 = \pi - \gamma = \pi - \frac{\pi}{2} = \frac{\pi}{2}$$

So, the joint angles for the robotic arm to reach the target position $(10, 10)$ are:

- $\theta 1 = 0$ radians (0 degrees)
- $\theta 2 = \frac{\pi}{2}$ radians (90 degrees)

Hardware Implementation

The hardware implementation involves integrating the various components to ensure seamless operation. The Raspberry Pi, camera module, servo motors, and mobile platform are connected and configured to work together.

- **Raspberry Pi:** The Raspberry Pi communicates with the servo motors through the Adafruit ServoKit library, which provides a convenient interface for controlling PWM signals. It processes the visual data from the camera module and sends control signals to the servo motors.
- **Camera Module:** The camera module is connected to the Raspberry Pi using the CSI (Camera Serial Interface) connector. It captures images and streams them to the Raspberry Pi for processing.
- **Servo Motors:** The servo motors are connected to the Raspberry Pi through the GPIO (General Purpose Input/Output) pins. They receive PWM signals from the Raspberry Pi to control the angles of the robotic arm's joints.
- **Mobile Platform:** The mobile platform is equipped with wheels and motors that allow it to move through the field. It is controlled by the Raspberry Pi, which sends movement commands based on the navigation strategy.

Software Implementation

The software implementation involves developing the computer vision algorithms for tomato detection and the control algorithms for the robotic arm. The OpenCV library is used for image processing and computer vision tasks, while the Python programming language is used for implementing the control logic and interfacing with the hardware components.

- **Computer Vision Algorithms:** The computer vision algorithms process the images captured by the camera module to detect ripe tomatoes. These algorithms include image preprocessing, color segmentation, contour detection, feature extraction, and tomato localization.
- **Control Algorithms:** The control algorithms calculate the target position for the robotic arm's end effector based on the detected tomato location. Inverse kinematics calculations are performed to determine the required angles for the servo motors. The Raspberry Pi sends PWM signals to the servo motors to control their movements.

- **Navigation Algorithms:** The navigation algorithms enable the robot to move through the tomato fields autonomously. These algorithms use input from the camera module, GPS, or other sensors to guide the robot's movements.

Results and Discussion

The developed autonomous mobile robot with an arm for tomato harvesting has undergone rigorous testing in both controlled and field environments. These tests were designed to evaluate the robot's ability to detect ripe tomatoes, its picking efficiency, and its overall operational performance under varying conditions. The results have been promising, demonstrating the robot's capability to effectively perform the tasks for which it was designed.

Tomato Detection Accuracy: The robot employs advanced computer vision algorithms to detect ripe tomatoes. During testing, the detection accuracy was measured under different lighting conditions, such as direct sunlight, partial shade, and low light scenarios. The image preprocessing steps, including contrast enhancement and noise reduction, significantly improved the quality of the input images. The color segmentation techniques effectively isolated the red tomatoes from the background foliage and other distractions. By employing contour detection and feature extraction, the robot accurately identified the boundaries of the tomatoes and differentiated them from other red objects.

The robot achieved a high detection accuracy rate, correctly identifying ripe tomatoes in over 90% of the cases. False positives were minimal, primarily occurring under extreme lighting variations where shadows or reflections could mimic the color of ripe tomatoes. These instances were further reduced by refining the feature extraction algorithms, focusing on the size, shape, and texture of the detected objects.

Picking Efficiency: The robotic arm, equipped with precise servo motors, demonstrated its ability to reach and grasp tomatoes accurately. The control algorithms, including target position calculation and inverse kinematics, ensured that the arm movements were smooth and precise. The PWM signals generated by the Raspberry Pi controlled the servo motors' angles, allowing the arm to move fluidly towards the target tomatoes.

The gripper mechanism was tested for its ability to securely grasp and detach tomatoes without causing damage. The results showed that the gripper could effectively hold the tomatoes, applying sufficient force to pick them while avoiding bruising or crushing. The robotic arm's controlled movements ensured that the surrounding plants were not disturbed, minimizing potential crop damage.

Navigation Capabilities: The mobile platform's navigation capabilities were evaluated by testing the robot's movement through various terrains within the tomato fields. The robot employed different navigation strategies, including line following, GPS-based navigation, and vision-based navigation.

Line following was effective in structured environments with clearly marked paths between rows of tomato plants. The robot's vision sensors detected and followed the lines accurately, ensuring consistent movement along the designated routes. GPS-based navigation was tested in larger fields where precise location data was available. The robot successfully navigated to specific coordinates, demonstrating its potential for large-scale operations.

Vision-based navigation allowed the robot to adapt to unstructured environments by using visual cues such as row patterns and landmarks. This method enabled the robot to navigate autonomously, avoiding obstacles and adjusting to changes in the field layout. The robot's ability to traverse different terrains, including uneven ground and varying soil conditions, was also tested. The mobile platform's robust design ensured stable movement, and the robot could adapt its speed and path to maintain balance and avoid obstacles.

Performance Under Varying Conditions: The robot's performance was tested under different weather conditions, including sunny, cloudy, and rainy days. The camera module's ability to

capture clear images and the computer vision algorithms' robustness were critical factors in maintaining high detection accuracy. The image preprocessing steps effectively mitigated the impact of adverse lighting conditions, and the overall system demonstrated resilience in adapting to environmental changes.

In field tests, the robot's ability to operate continuously over extended periods was also evaluated. The power consumption of the Raspberry Pi, servo motors, and other components was monitored to ensure efficient energy use. The results indicated that the robot could operate for several hours on a single charge, making it practical for daily agricultural tasks.

Conclusion (Expanded)

The development of the autonomous mobile robot with an arm for tomato harvesting represents a significant milestone in the field of agricultural automation. This project has successfully demonstrated the potential of integrating computer vision and robotics to address critical challenges in modern agriculture. The journey from conceptualization to implementation has been marked by innovative solutions, rigorous testing, and a vision for a more efficient and sustainable future in farming. In this comprehensive conclusion, we will reflect on the achievements, implications, and future prospects of this groundbreaking project.

Achievements and Impact:

The primary objective of this project was to design and develop an autonomous robot capable of detecting and harvesting ripe tomatoes with high accuracy and efficiency. Through meticulous planning and execution, the project has achieved several key milestones that underscore its success and potential impact on the agricultural sector.

1. **High Accuracy in Tomato Detection:** The robot employs advanced computer vision algorithms to detect ripe tomatoes with remarkable accuracy. By utilizing techniques such as color segmentation, contour detection, and feature extraction, the robot can distinguish ripe tomatoes from the background and other objects. The rigorous testing under various lighting conditions has demonstrated the robustness of the detection system, with an accuracy rate exceeding 90%. This high level of precision is crucial for ensuring that only ripe tomatoes are harvested, thereby maintaining the quality of the produce and reducing waste.
2. **Efficient and Gentle Harvesting:** The robotic arm, controlled by precise servo motors and sophisticated algorithms, has shown exceptional performance in harvesting tomatoes. The end effector, designed to mimic the delicate grasping action of human hands, ensures that the tomatoes are picked without causing damage. The controlled movements of the arm minimize disturbance to the surrounding plants, thereby protecting the crop and preserving the overall health of the tomato plants. This gentle handling is particularly important in preventing bruising and other forms of damage that can compromise the quality and marketability of the tomatoes.
3. **Autonomous Navigation and Adaptability:** The mobile platform of the robot has been equipped with advanced navigation capabilities, allowing it to traverse tomato fields autonomously. By employing line following, GPS-based navigation, and vision-based navigation strategies, the robot can adapt to different terrains and field layouts. The ability to navigate autonomously enhances the robot's operational efficiency, enabling it to cover larger areas and work continuously without human intervention. This adaptability is crucial for ensuring that the robot can operate effectively in diverse agricultural environments.
4. **Reduced Labor Dependency:** One of the most significant impacts of this project is its potential to address labor shortages in the agricultural sector. Traditional tomato harvesting is labor-intensive and requires a considerable workforce. The autonomous robot reduces the dependency on human labor, offering a reliable and cost-effective alternative. By automating the harvesting process, the robot can operate for extended periods, increasing productivity and ensuring timely harvesting. This reduction in labor dependency is particularly beneficial in regions facing labor shortages or where the cost of labor is high.

5. Enhanced Productivity and Crop Quality: The combination of accurate tomato detection, efficient harvesting, and autonomous navigation contributes to enhanced productivity and crop quality. The robot's ability to work continuously and with high precision ensures that more tomatoes are harvested at their optimal ripeness, reducing losses due to overripeness or damage. The careful handling by the robotic arm preserves the quality of the tomatoes, resulting in produce that is more likely to meet market standards and fetch higher prices. This improvement in productivity and crop quality has significant implications for the profitability and sustainability of tomato farming.

Broader Implications:

The successful implementation of this project has broader implications for the agricultural sector and beyond. The integration of robotics and computer vision in farming practices represents a transformative shift towards more efficient, sustainable, and resilient agricultural systems. The following points highlight some of the key implications and potential applications of this technology.

1. Advancement in Precision Agriculture: The autonomous tomato harvesting robot embodies the principles of precision agriculture, where technology is used to optimize farming practices based on precise data and analysis. By integrating sensors, computer vision, and robotics, the robot can perform tasks with high accuracy and efficiency, reducing resource wastage and improving overall productivity. The data collected by the robot, such as the location and condition of harvested tomatoes, can provide valuable insights for farm management, enabling farmers to make informed decisions and optimize their operations.
2. Scalability and Versatility: The technology developed in this project can be adapted and scaled to other crops and agricultural tasks. The principles of computer vision and robotics are not limited to tomato harvesting and can be applied to a wide range of crops, such as peppers, cucumbers, berries, and more. By customizing the detection algorithms and end effector designs, the robot can be tailored to meet the specific requirements of different crops. This scalability and versatility open up new possibilities for agricultural automation, allowing farmers to adopt technology for various aspects of their operations.
3. Contribution to Sustainable Farming: Sustainable farming practices are essential for ensuring long-term food security and environmental health. The autonomous tomato harvesting robot contributes to sustainability by reducing the need for chemical inputs, minimizing crop damage, and optimizing resource use. The robot's precise detection and harvesting capabilities ensure that only ripe tomatoes are picked, reducing losses and waste. The autonomous navigation system allows the robot to operate efficiently, reducing energy consumption and greenhouse gas emissions. These contributions to sustainability align with the broader goals of creating resilient and environmentally friendly agricultural systems.
4. Potential for Integration with IoT and AI: The integration of Internet of Things (IoT) and Artificial Intelligence (AI) technologies can further enhance the capabilities of the autonomous harvesting robot. IoT sensors can provide real-time data on environmental conditions, soil health, and crop status, enabling the robot to make data-driven decisions and optimize its operations. AI algorithms can enhance the robot's adaptability and decision-making capabilities, allowing it to learn from its environment and improve its performance over time. The combination of IoT and AI with robotics can create a highly intelligent and interconnected farming system, paving the way for the future of smart agriculture.
5. Economic and Social Benefits: The economic and social benefits of agricultural automation are significant. By reducing labor costs and increasing productivity, the autonomous harvesting robot can improve the profitability of farming operations. This economic benefit extends to small and large-scale farmers alike, providing a competitive edge in the market. Additionally, the reduction in labor dependency can alleviate the physical strain and health risks associated with manual

harvesting, improving the quality of life for farm workers. The social impact of this technology includes the potential for job creation in the fields of robotics, computer vision, and agricultural technology, driving innovation and economic growth.

Future Prospects and Recommendations:

The achievements of this project lay the foundation for future advancements in agricultural automation. Several key areas offer opportunities for further research and development, with the potential to enhance the performance and capabilities of the autonomous harvesting robot.

1. Machine Learning and AI Integration: Future work should focus on integrating machine learning and AI techniques to enhance the robot's adaptability and decision-making capabilities. By training machine learning models on diverse datasets, the robot can improve its tomato detection accuracy and adapt to varying conditions. AI algorithms can enable the robot to learn from its experiences, optimizing its movements and actions over time. The integration of reinforcement learning can allow the robot to develop more efficient harvesting strategies, further increasing productivity.
2. Enhanced Environmental Monitoring: Integrating advanced environmental monitoring sensors can provide valuable data for precision agriculture practices. Sensors measuring soil moisture, temperature, humidity, and other environmental parameters can help optimize harvesting conditions and improve crop management. Future work should explore the incorporation of these sensors into the robot's design, enabling real-time monitoring and data collection. This information can be used to implement precision irrigation, fertilization, and pest control strategies, further enhancing the sustainability and efficiency of farming operations.
3. Robotic Arm Optimization: The design and functionality of the robotic arm can be further optimized to improve its performance and versatility. Future research should focus on refining the gripper mechanism to handle tomatoes of different sizes and shapes more effectively. The incorporation of sensors on the gripper, such as pressure sensors and tactile sensors, can provide real-time feedback, allowing for adaptive grasping techniques that minimize the risk of damage. Additionally, exploring the use of more advanced materials and actuators can enhance the arm's strength, flexibility, and durability.
4. Advanced Navigation and Mapping: Implementing advanced navigation and mapping techniques can enhance the robot's ability to operate in complex and dynamic environments. Future work should explore the use of simultaneous localization and mapping (SLAM) algorithms to enable the robot to build and update a map of the field in real-time. Sensor fusion techniques, combining data from multiple sensors such as cameras, LiDAR, and GPS, can improve the robot's perception and navigation capabilities. These advancements will allow the robot to navigate autonomously, avoid obstacles, and adapt to changes in the field layout.
5. Collaboration and Field Testing: Collaboration with farmers, agricultural experts, and industry stakeholders will be crucial in refining the robot's design and functionality. Extensive field testing in diverse agricultural settings will provide valuable feedback and insights, ensuring that the robot meets the practical needs of farmers. Engaging with end-users will help identify areas for improvement and drive the development of user-friendly and effective solutions. Collaborative efforts will also facilitate the adoption and integration of the technology into existing farming practices.

In conclusion, the autonomous mobile robot with an arm for tomato harvesting represents a transformative advancement in agricultural automation. By integrating computer vision, robotics, and embedded systems, this project has demonstrated the potential to revolutionize the agricultural sector. The achievements in tomato detection accuracy, efficient harvesting, and autonomous navigation underscore the feasibility and impact of this technology. The broader implications for precision agriculture, sustainability, and economic growth highlight the importance of continued research and development in this field. As we look to the future, the

integration of machine learning, AI, advanced sensors, and collaborative efforts will drive further innovation, paving the way for a more efficient, sustainable, and resilient agricultural system.

Future Work

Future work on this project will focus on several key areas to further enhance the robot's performance and expand its capabilities.

Refining Tomato Detection Algorithms: While the current computer vision algorithms have shown high accuracy, there is room for improvement. Future work will explore the integration of machine learning techniques to enhance the robot's adaptability and decision-making capabilities. By training machine learning models on larger datasets, the robot can learn to recognize tomatoes more accurately, even under challenging conditions. Techniques such as convolutional neural networks (CNNs) can be employed to improve the robustness of tomato detection, reducing false positives and increasing overall accuracy.

Optimizing Robotic Arm Design: The design of the robotic arm can be further optimized to improve its efficiency and versatility. Future work will focus on refining the gripper mechanism to handle tomatoes of different sizes and shapes more effectively. The incorporation of sensors on the gripper, such as pressure sensors, can provide real-time feedback, allowing for adaptive grasping techniques that minimize the risk of damage. Additionally, exploring the use of more advanced materials and actuators can enhance the arm's strength and flexibility.

Advanced Navigation Algorithms: The implementation of advanced navigation algorithms will enable the robot to operate in more complex and dynamic environments. Future work will explore the integration of simultaneous localization and mapping (SLAM) techniques to allow the robot to build and update a map of the field in real-time. This will enable the robot to navigate autonomously, even in unstructured environments with obstacles and varying terrain. The use of sensor fusion techniques, combining data from multiple sensors such as cameras, LiDAR, and GPS, can enhance the robot's perception and navigation capabilities.

Environmental Monitoring: Integrating sensors for environmental monitoring can provide valuable data for precision agriculture practices. Future work will explore the incorporation of sensors to measure soil moisture, temperature, humidity, and other environmental parameters. This data can be used to optimize harvesting conditions, ensuring that tomatoes are picked at their peak quality. Additionally, the robot can contribute to overall farm management by providing real-time monitoring and data collection, supporting informed decision-making for irrigation, fertilization, and pest control.

Expanding to Other Crops: The principles and technologies developed in this project can be adapted to other crops, expanding the scope of agricultural automation. Future work will explore the application of similar robotic systems to different types of crops, such as peppers, cucumbers, and berries. Each crop presents unique challenges in terms of detection and handling, and adapting the robot to these challenges will require further research and development.

Collaboration and Field Testing: Collaboration with farmers and agricultural experts will be crucial in refining the robot's design and functionality. Future work will involve extensive field testing in diverse agricultural settings to evaluate the robot's performance and gather feedback from end-users. This iterative process will ensure that the robot meets the practical needs of farmers and can be effectively integrated into existing agricultural practices.

In summary, this project lays the groundwork for future advancements in agricultural automation. By combining computer vision, robotics, and embedded systems, the autonomous tomato harvesting robot represents a significant step forward in modern farming practices. Continued efforts to refine and expand upon this work will contribute to the development of more efficient, sustainable, and resilient agricultural systems, benefiting farmers, consumers, and the broader agricultural community.

References

1. Books and Journals:

- Gonzalez, R. C., & Woods, R. E. (2018). *Digital Image Processing*. Pearson.
- Craig, J. J. (2004). *Introduction to Robotics: Mechanics and Control*. Pearson.
- Szeliski, R. (2010). *Computer Vision: Algorithms and Applications*. Springer.

2.Research Papers:

- Bac, C. W., van Henten, E. J., Hemming, J., & Edan, Y. (2014). "Harvesting robots for high-value crops: State-of-the-art review and challenges ahead." *Journal of Field Robotics*, 31(6), 888-911.
- Zhao, Y., Gong, L., Huang, Y., & Liu, C. (2016). "A review of key techniques of vision-based control for harvesting robot." *Computers and Electronics in Agriculture*, 127, 311-323.
- Hemming, J., Ruizendaal, J., Wais, E., & van Tuijl, B. (2014). "Cherry harvesting using a robotic arm." *IFAC Proceedings Volumes*, 47(3), 157-160.

3. Web Resources:

- OpenCV. (2024). "Open Source Computer Vision Library." Retrieved from https://opencv.org
- Adafruit Learning System. (2024). "Servo Motor Control with Raspberry Pi." Retrieved from https://learn.adafruit.com/16-channel-pwm-servo-driver/python-circuitpython
- Raspberry Pi Foundation. (2024). "Raspberry Pi Documentation." Retrieved from https://www.raspberrypi.org/documentation/

4.Conference Proceedings:

- Mehta, S. S., & Burks, T. F. (2015). "Autonomous robotic system for tomato harvesting using computer vision." In *Proceedings of the IEEE Conference on Automation Science and Engineering* (pp. 1-6).

5.Technical Reports and Theses:

- Zhang, J. (2017). "Development of a robotic arm for autonomous tomato harvesting." Master's thesis, University of California, Davis.

6. Industry and Government Reports:

- Food and Agriculture Organization of the United Nations (FAO). (2020). "The State of Food and Agriculture 2020: Overcoming Water Challenges in Agriculture." FAO.

ELECTRIC VEHICLE TECHNOLOGY: CHARACTERISTICS, DEVELOPMENT AND PROSPECTS

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Abstract

The increase in the world's population brings with it traffic problems, and the number of vehicles on the roads is increasing day by day. The increase in the number of cars with internal combustion engines has also increased the amount of harmful gases released into the environment. This situation has negatively affected the quality of the environment and led to different energy sources for the performance of the car. Adding to the fact that future oil reserves will run out, the demand for electric cars has increased even more. As it can be seen, taking into account the importance and relevance of the topic in our modern times, the research carried out on this topic will make it possible to achieve the goal. The article analyzes the characteristics, advantages and disadvantages of electric cars, as well as comparisons with hybrid and full-fuel vehicles. This study examines the early development history of electric vehicles, current models and latest technologies, types of battery charging stations and electric motors used, and includes expectations and predictions for the future of the entire system.

Keywords: Electric vehicles, hybrid electric vehicles, fuel cell electric vehicles, battery charging station

Introduction

The first electric vehicle (EV) model was developed by Professor Stratingh in the Netherlands in 1835 [1; 2, p. 75-82]. Then, in 1838, Robert Davidson produced the electric locomotive that could reach a speed of 6.4 km/h [3, pp. 206-212]. Lead-acid batteries were developed after 1859 and began to be used in electric vehicles [1]. In 1882, Siemens produced the world's first electric trolleybus, called Elektromote, in Berlin. This vehicle had two 2.2 kW engines, was powered by 550 V DC [4, p. 338-342] and had an average speed of 12 km/h. In 1886, Karl Benz produced and offered for sale the Motorwagen, the first automobile powered by an internal combustion engine (ICE). The vehicle had three wheels and its engine was at the back and under the passengers. The vehicle with ICE could reach a maximum speed of 16 km/h with 0.55 kW of energy [1]. In 1895, Morris and Salomon developed a two-seat electric vehicle called Electrobats. In England, 15 electric taxis were put into use by the “London Electric Taxi Company” in 1897 [1]. In 1901, the “New York Taxi” company started using electric vehicles as taxis [5].

The French Electroautomobile was produced in 1900 and the Krieger electric-gasoline vehicles were produced in 1903, and a hybrid configuration model was tried for the first time. During this period, Ferdinand Porsche designed the first experimental hybrid electric vehicle (HEA) and named it Mixt Wagen [1]. Electric motors were placed on each wheel of the vehicle with ICE as a direct-drive hub motor, and lead-acid batteries were used in the vehicle. The vehicle could accelerate to 60 km/h. HEA was produced by “Woods Motor Vehicle Company” in 1916 [1]. A parallel hybrid EV model was developed by connecting the four-cylinder gasoline engine in the vehicle directly to the electric motor/generator group and then to the front drive axle via the conventional pusher shaft. From the early 1920s to the 1960s, almost all EV manufacturers continued their production using ICE. While interest in EVs decreased between 1920 and 1960,

vehicles with ICE were the center of attention worldwide [1]. The main reasons behind the decrease in interest in EVs were the following developments [2, pp. 75-82];

– As a result of the improvement in the physical condition of intercity roads in America, the need for longer-range vehicles began,

– The decrease in gasoline prices with the discovery of crude oil in Texas,

– Charles Kettering invented the starter motor in 1912. As a result, there is no need to turn the crank manually to give the engine its first movement,

– Henry Ford started mass producing vehicles with internal combustion engines and vehicle costs decreased.

EVs could not create a competitive environment due to the above situations. There were almost no EVs on the market in the 1935s, and development studies were not carried out until the 1960s [2, pp. 75-82]. Over time, it became clear that the gases released from ICEs caused air pollution, and therefore some small-scale manufacturers started to produce EVs to prevent air pollution [7]. Thus, interest in EVs began to increase again in the 1960s. The oil crisis in the mid-1970s caused many countries such as America, England, Germany, France, Italy and Japan to accelerate their EV research again. In the 1980s, governments began to increase interest in these vehicles and provide economic support from official sources due to the environmental friendliness of EVs. After 1990, with the newly developed battery technologies, many vehicle companies; It started to develop EV models such as Ford-Think City, Nissan-Altra EV and Peugeot 106-Electric.

1. Electric vehicle technologies

In the design of EVs, the production and distribution of energy placed in the vehicle is done by the drive system elements. Drive system configurations are determined according to the way the elements in the system are connected to each other and the preferences in energy flow. Models in EV technology are all-EVs, hybrid EVs, and fuel cell vehicles with or without batteries.

In all-EVs, a second battery or super capacitor can be used as an additional energy source supporting the main battery. These auxiliary power sources can provide high power for short periods when climbing hills or accelerating. All-EVs are more efficient than conventional vehicles. Although the efficiency of a single battery electric vehicle is approximately 46%, conventional vehicles operate with an efficiency of approximately 18-25%.

All-EVs are divided into three main groups according to their propulsion systems. These are [6];

– System with accumulator, electric motor and differential;
– Non-differential system using accumulator and two or four electric motors;
– It is a system consisting of accumulator, electric motor, chain sprocket or belt pulley.

Since no harmful gases are released in all-EVs, these vehicles are called “zero-emission vehicles”. Since only an electric motor is used in these vehicles, they operate silently. Brake life is longer thanks to regenerative braking. In order for the batteries to be fed and charged, the electric motor in the vehicle is used as a generator and feeds the batteries with the electrical energy it produces. Fuel and maintenance costs are much less than conventional vehicles. Since the transmission system for propulsion of the vehicle is less than that of classical vehicles, their maintenance is less and there is no need for oil changes [8].

The high cost in the production of all-EVs is also reflected in the sales price, which narrows the market share. When these vehicles are introduced to the market, the service stations and stations required for maintenance and repair must have trained technical personnel at a level that can meet the demands of the consumer. One of the factors that makes the spread of all-EVs difficult is vehicle performance. Batteries are quite heavy and vehicle range is limited. The aim of intense work to develop advanced lead-acid batteries all over the world is to increase the energy density of batteries and increase vehicle range. Another obstacle to the development of all-EV is

that, while it takes a short time to fill the tank of a conventional vehicle, it takes approximately 5-8 hours to fully charge an all-EV. Some high-speed chargers can charge the battery in a shorter time, but this shortens the life of the batteries [1].

1.2. Hybrid electric vehicles

Hybrid electric vehicles (HEA) are created by using more than one power source in different structures. Accordingly, there are hybrid EV versions such as battery-fuel cell, battery-capacitor or battery-battery. In many HEAs, ICE, Stirling engine, gas turbine or electrochemical battery are used as energy sources. Hybrid vehicles are generally grouped under three main headings: series hybrid, parallel hybrid and series/parallel hybrid. The general difference between hybrid vehicles is related to the extent to which the power required for the movement of the vehicle is provided by the electric motor [9, pp. 12-20]. Energy conversion system for HEA; It includes the energy storage system, power unit and vehicle propulsion systems. The main elements of energy storage are; batteries, supercapacitors and flywheels. Otto engines, diesel engines, gas turbines and fuel cells are widely used as hybrid power units. The driving force can be provided by the electric motor, as in the series hybrid model, or from the ICE in addition to the electric motor, as in the parallel hybrid model.

The advantages of HEAs are given below [1]:

– Energy loss is minimized with the developed regenerative braking technique. Thus, when the vehicle slows down or stops, the energy used is regained and charges the batteries.

– Since the ICEs used are small in size, the engine weight is reduced.

– There is an increase in fuel efficiency.

– Emission values are greatly reduced.

– Since alternative fuels can be used as fuel in HEAs, dependence on fossil fuels decreases.

– In HEAs, engine noise does not occur because the ICE does not work when the vehicle stops.

– Idle losses are very low. The disadvantages of the hybrid system are examined in two different categories.

Today, the series hybrid system is preferred in city buses, electric cars and rubber tire cranes, while the parallel hybrid system is preferred in trucks and marine vehicles that operate at high speeds for long periods of time [10, pp. 28-32].

1.3. Fuel cell electric vehicles

Sir William Grove made his first fuel cell studies on the H2-02 battery in 1838 and observed that constant current and power were produced by electrolyzing water and examining its reverse reaction. The first use of the fuel cell was in 1958 by NASA for fuel purposes in the Space Shuttle, Apollo and Gemini spacecrafts [11, pp. 18-30]. Recently, interest in fuel cells continues to increase rapidly in other areas such as EV and stationary power systems [12].

The task of fuel cells is to convert the change energy of the electrochemical reaction into electrical energy. Fuel cells produce energy rather than storing energy like batteries, and they use hydrogen as the main fuel [13, pp. 2-11]. Although the production, transportation and storage of hydrogen is a problem [5], it is not thought that this problem can be solved in the near future [14]. Fuel cell EVs were developed to address the problems of hours-consuming battery charging time and short range, all in EVs. It produces the energy it needs instantly with the system it contains.

The range of fuel cell EVs depends on the amount of fuel in the fuel tank, similar to conventional vehicles. These vehicles also include fuel storage system, fuel cell control unit, power processor unit control and propulsion systems. Before mass production of fuel cell EVs, a number of technical and economic problems such as reducing production, fuel storage, operation and

infrastructure costs, electrical stability, fuel systems, reliability and maintenance must be resolved [15, pp. 2609-2614] .

In addition, high efficiency, direct energy conversion, low emission and noise levels, collectability of waste, and fast refilling are among the advantages of these vehicles. Fuel cells are used as an energy-saving power source and are thought to attract the attention of future EV owners thanks to their high efficiency [16]. Finally, the use of fuel cells requires a lot of technical knowledge and advanced technology, and it is stated that it is an expensive system and requires a long experience to operate at full efficiency.

2. Charging techniques of electric vehicles

Factors such as a battery's design, state of charge, temperature, previous cycle history and usage affect the charging and discharging status of batteries. Although batteries need maximum charging current to charge in a short time, this current value must be applied within the limits of the charger and the battery without causing any damage to the battery. Chargers convert the energy they draw from the electrical grid into the form required by electric vehicles and ensure that it is transmitted safely to the battery [17, pp. 288-292]. In cases requiring high power density in EVs, Lithium-Ion or Nickel Metal Hydrate (NiMH) batteries are preferred [18, pp. 49-53].

2.1. Battery charging methods

Electric vehicle charging methods are divided into three main groups: level 1, level 2 and level 3. In addition to these methods, wireless charging technique and battery replacement technique have been added and are among the recent studies [19].

In the Level 1 charging method, vehicles are generally parked at residences or workplaces and have the opportunity to be charged for a long time. For this reason, it is also known as the slow charging method. Since the charging time is long enough, the electricity grid is not overloaded. This method, powered by single-phase energy, has 120-220 V AC voltage, 1.2-3.8 kW power value, 15-20 A circuit current and 5-12 hours charging time.

Level 2 charging method is a station model that is safe to be installed from airports to universities, except for intercity roads and highways. It offers medium-speed charging in a period of 1-4 hours. This model has 208-240 V AC, 3.8-15 kW power value and 20-80 A circuit current [20]. In this method, an earth protection conductor is connected between the vehicle and the charging unit to prevent electric shock.

Level 3 charging method is a fast charging method and the charging time is between 15-30 minutes. These units offer the opportunity to charge the battery in a short time by being installed at points such as short-term breaks where there is an urgent need for energy [19], and they are the units that are nominated to replace gas stations in the future. There are both AC and DC models. While the charging equipment is mounted on the vehicle in the AC model, it is not on the vehicle in the DC model. Depending on the AC or DC models, the equipment required for communication and charging operations as well as battery charging may be on the vehicle or at the station.

3. Electric motor types used in electric vehicles

Five main motors are widely used in EV drive systems: DC motor, AC motor, permanent magnet motor, switched reluctance motor [1] and synchronous motor [13, pp. 2-11]. In EV technologies, asynchronous motors and switching reluctance motors are the most reliable motor types and require little maintenance [21, pp. 811-814]. While asynchronous motors can be produced as single and three-phase, three-phase types are preferred in EV models where high power is required. The features sought in electric motors used in EVs and hybrid EVs are listed below [12]:

- High efficiency
- High instantaneous power and power density,
- High torque at low speeds during initial development and climbs,
- High power at high speeds in normal cruising,
- Low; noise level, electromagnetic interference, cost
- Existence of constant power and constant moment regions in a wide speed range,
- Fast torque response,
- High efficiency when speed and torque are widely spaced,
- High efficiency in regenerative braking,
- High durability and reliability for working in different environments.

Many types of electric motors have been tested to date for use in all-electric and HEAs. While DC motors were preferred in the beginning due to their ease of control, AC motors have become the focus of attention in line with today's technology and developments in power electronics. Brush-collector maintenance plays a huge role in decreasing interest in DC motors. In line with the developments in power electronics and control methods, speed control of the AC motor is no longer a problem. So much so that, recently, a new multi-level inverter model was designed at low cost for high driving performances, and the driving performance on the AC motor was examined and introduced to the literature.

In Table 6, the electric motors used in EVs are compared in different categories and their total scores are given. When the ratings are examined, it is understood that permanent magnet motors are ahead of others. However, considering its complex structure and magnet costs, this motor has a high cost and is being replaced by an asynchronous motor [13, pp.2-11].

4. Future predictions of electric vehicle technologies

Considering that the number of EVs in cities will be quite high in the future and that these vehicles will be fed from the same grid, the idea of using vehicles as energy storage units as long as they remain connected to the grid has emerged. Most EVs will connect to the grid at night to charge. Thus, the unit price of electrical energy will decrease as production will be more and consumption will be less during night hours. In this case, the vehicle owner will be able to fill the battery with cheap energy and sell the stored energy back to the grid at a high price during the period when there is high demand for energy. While it is planned to install smart charging/discharging systems in vehicles that will control and keep this operation under control [10, pp. 28-32], work on smart garages has started. This new technology, called smart garage, offers a new interface between the transportation network and electrical power systems. This garage includes a charging service for EVs, which includes G2V operation, and V2G, a side service for the electric power network. The smart garage operator communicates with an independent system operator to obtain electricity trading prices or report the amount of electrical energy available. By connecting electric vehicles to the grid thanks to G2V and V2G concepts, the possibility of two-way power flow has emerged. If the power flow is from the grid to the vehicle, it is called charging (G2V), and if the power stored in the vehicle is transferred to the grid, it is called discharge (V2G).

In addition, Japan's “New Energy and Industrial Technology Development Organization (NEDO)” aims to complete the new generation battery technology, which will have a range of 10 times longer (1600 km) than the current battery technology, by 2030 [22, pp. 4-17].

The types of vehicles planned to be sold in the world and their average CO2 emission values are given in Figure 12. In addition, it is thought that HEA models will be widely used in the near future, HEA with increased range and all EVs in the medium term, and all EVs and fuel cell EVs in the long term.

Conclusion

In this study, the history of EVs to the latest production technology are mentioned. By examining the EV configurations in the design and production stages, the electric motor types used and battery charging stations, predictions about the future of EVs are included.

It is thought that the demand for EVs will increase as developments occur in areas such as electric motor, battery technology, power transmission systems, power electronics and control systems, etc. in EV technology worldwide. It is obvious that the widespread use of EVs will reduce the amount of harmful gases released into the nature, bring about positive improvements in environmental quality, and reduce dependence on depleting and expensive energy sources such as oil.

It is thought that the purchase prices of EVs for the next few years will still be high, vehicle models will be limited and their batteries will have a low range of 160 km (for all-EA). In this context, attention should also be drawn to battery weight and charge life. The high investment costs of personal battery charging stations to be installed in homes or workplaces may restrict access to EVs. It is envisaged that increasing and disseminating the number of charging stations to be installed in public places by making the necessary infrastructure preparations and taking network security measures, and legal regulations, incentives and tax deductions/exemptions to be made in the supply of EVs will increase the demand for EVs.

References

1. Ünlü, N., Karahan, Ş., Tür, O., Uçarol, H., Özsu, E., Yazar, A., Turhan, L., Akgün, F., Tırıs, M. Electric Vehicles, TÜBİTAK Marmara Research Center Energy Systems and Environment Research Institute, Gebze, – 2003.

2. Sayın, A.A., Yüksel, İ. Electric renault fluence vehicle, modeling of its lithium-ion battery and battery management // Engineer and mechanical, – 2011. 52(616), – pp. 75-82.

3. Chan, C.C. The rise & fall of electric vehicles in 1828–1930: lessons learned // Proceedings of the IEEE, 101(1), – 2013. – pp. 206 – 212.

4. Singh, M. Green energy for metropolitan transport // International journal on power engineering and energy (IJPEE), – 2013. 4(1), – pp. 338-342.

5. Larminie, J., Lowry, J. Electric vehicle technology explained // John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England, – 2003

6. Öztürk, T. Modeling of an electric vehicle driven by an asynchronous motor. Master's Thesis // – Karabük: Karabük University Institute of Science and Technology, – 2013

7. Leitman, S., Brant, B. Build your own electric vehicle / The McGraw-Hill Companies Second Edition, – 2008.

8. Ertaç, Y. Design and simulation of electric vehicles, Master's Thesis // – Ankara: Gazi University Institute of Science and Technology, – 2008

9. Keskin, A. Hibrid taşıt teknolojileri ve uygulamaları // Mühendis ve Makine, – 2009. 50(597), – s. 12-20.

10. Gören, E. Energy efficiency in public transportation with hybrid and electric vehicles // – İstanbul: 2nd National energy efficiency forum and fair proceedings book, 13-14 January, 2011, – s. 28-32

11. Çetinkaya, M., Karaosmanoğlu, F. Yakıt pilleri // TMMO Tesisat Mühendisliği Dergisi, Mayıs-Haziran, – 2003. – s. 18-30.

12. Husain I., Electric and hybrid // Vehicles Design Fundamentals, CRC Press New York Washington, D.C. – 2003.

13. Kuşdoğan, Ş. Developments in energy storage systems in electric cars // Engineer and Mechanical, – 2009. 50(596), – 2-11.

14. Truckenbrodt, A. Fuel cell vehicles for future car concepts // Convergence International Congress & Exposition on Transportation Electronics, Detroit, USA, – 2004.

15. Room J. The car and fuel of the future // Energy Policy, – 2016. 34(17), – pp. 2609-2614.

16. İçingür Y., Kireç L. Construction of polymer electrolyte membrane fuel cell, an alternative energy system for vehicles - prototype design and parametric examination // – Karabük: 5th International Advanced Technologies Symposium (IATS'09), 13-15 May, – 2009,

17. Yazıcı, V., Özdemir, E. Electric vehicle charging methods // – Kocaeli: 5th Energy Efficiency and Quality Symposium, 23-24 May 2013, – pp. 288-292

18. Moseley, P. T., Bonnet, B. Cooper, A., Kellaway, M.J. Lead–acid battery chemistry adapted for hybrid electric vehicle duty, Journal Of Power Sources, – 2007. – 174(1), – pp. 49-53.

19. Erhan K., Ayaz M., Özdemir E. Effects of electric vehicle charging stations on power quality // – Ankara: Smart Grids and the Future of Türkiye's Electricity Grid Symposium. 26-27 April, – 2013.

20. Şen, G., Boynuegri A.R, Uzunoglu M. Charging methods of electric vehicles and solution suggestions for the problems encountered in connecting vehicles to the grid // Electrical-electronics and computer symposium FEEB 2011, Fırat University-Elazığ, 5-7 October 2011.

21. Nanda, G., Kar, N.C. A survey and comparison of characteristics of motor drives used in electric vehicles, Electrical and Computer Engineering, 2006, CCECE '06, Canadian Conference on, IEEE, – 2006. – pp. 811 – 814.

22. Zhou, L., Watts, W. J., Sase, M., Miyata, A. Charging Ahead: Battery // Electric vehicles and transformation of an industry Deloitte Review, – 2010,7, – pp. 4-17.

Управление рисками через совершенствование технического обслуживания электрооборудования и кабельных систем

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В современных условиях эксплуатации кабельных систем значимость применения методик анализа технических рисков весьма актуальна. Эти методики являются инструментом для оптимизации эксплуатационных издержек, при этом они способствуют поддержанию, а зачастую и повышению уровня безопасности оборудования. В странах с развитой рыночной экономикой одним из ключевых факторов, стимулирующих развитие подходов к риск-анализу, выступает страхование ответственности. Это представляет собой один из эффективных механизмов воздействия на управление предприятиями, усиливающий их стремление к снижению потенциальных рисков.

В Республике Казахстан активно проводится интеграция передовых методик управления безопасностью производственных процессов и регуляции технологических рисков. Основным направлением в совершенствовании промышленной безопасности стало повышение уровня ответственности и активизация роли предприятий в данной сфере.

В числе ведущих подходов к методологической поддержке оценки рисков выделяется разработка Американского нефтяного института, известная как методология RBI (Risk Based Inspection), кодифицированная в документе API 581. Данный метод направлен на систематизацию управления рисками на производстве и включает в себя следующие ключевые задачи:

- Идентификация техногенных угроз и опасностей.
- Анализ и оценка рисков, ассоциированных с работой конкретных единиц оборудования.
- Ранжирование оборудования с целью определения приоритетности в контексте изменчивости рыночных условий.
- Разработка и внедрение целенаправленной программы инспекций.
- Постоянная корректировка и адаптация уровня риска, связанного с возможными авариями на оборудовании.

Эти меры направлены на оптимизацию управления рисками и повышение эффективности производственных процессов в условиях повышенных требований к безопасности.

В методологии RBI для анализа рисков в кабельных системах применяются три типа оценок риска: качественная, полуколичественная и количественная.

Качественная оценка, или уровень I, является инициальным этапом, на котором проводится первичная идентификация техногенных опасностей, позволяя выявить потенциальные угрозы без глубокого численного анализа.

Полуколичественная оценка, уровень II, хотя и не достигает точности количественной оценки, тем не менее, отвечает за удовлетворение более 80% потребностей предприятий в анализе рисков, обеспечивая баланс между глубиной анализа и его оперативностью.

Количественная оценка, или уровень III, представляет собой наиболее точный анализ, базирующийся на детальных данных и статистическом моделировании, что позволяет с высокой степенью точности оценивать риски.

Основное преимущество метода RBI заключается в возможности прогнозировать техногенные риски, используя сбалансированный подход к оценке двух ключевых параметров риска аварии: вероятности наступления события и возможных последствий. Этот метод позволяет не только определить потенциальные угрозы, но и разработать стратегии их минимизации, способствуя обеспечению более высокого уровня безопасности на производстве.

Оценка вероятности возможной аварии основывается на знании среднестатистической частоты отказов f_0 для отрасли промышленности, к которой относится исследуемый объект, и корректирующих факторов, учитывающих изменения объекта F_E и эффективность системы управления безопасностью производством Fm , и рассчитывается по формуле [3]:

м

$$f_p = f_0 \cdot f_E \cdot f_м,$$

где f_p — расчетная или адаптированная к реальным условиям частота отказов.

Корректирующие факторы показывают, как существенно влияют реальные условия эксплуатации и состояние производственного объекта на показатели аварийности исследуемого оборудования. Фактор модификации оборудования F_E определяется для каждого единичного оборудования с учетом внешних условий, в которых оно работает и включает в себя четыре субфактора, как это показано на следующем рисунке:

В контексте анализа надежности кабельных систем, каждый субфактор разбивается на индивидуальные компоненты, изучение которых происходит в соответствии с утвержденными нормативами. Для оценки каждого компонента применяются числовые значения, которые выбираются на основе их потенциального влияния на отклонения от стандартных показателей частоты отказов.

При этом, положительные значения атрибуируются условиям, считающимся более рискованными по сравнению со стандартными, в то время как отрицательные значения используются для демонстрации снижения вероятности отказов. В данной схеме технический субфактор, оценивающий техническое состояние оборудования, имеет превосходящее значение по сравнению с остальными субфакторами.

Изучение влияния разнообразных факторов на вероятность возникновения отказов в кабельных системах подтверждается практическими данными. В этом контексте, на втором уровне оценки риска было установлено, что вероятность отказа определяется преимущественно техническими параметрами.

Для анализа технического субфактора разработаны специальные технические модули. Эти модули включают методы для выявления и анализа воздействия различных механизмов разрушения на вероятность поломки, учитывая эффективность существующих программ мониторинга и контроля. В рамках методологии Risk Based Inspection (RBI) выделяют шесть основных механизмов разрушения: коррозия, утонение стенок, растрескивание, усталостные повреждения, хрупкое разрушение, механические повреждения и износ.

Этот подход позволяет точно оценивать риски, связанные с эксплуатацией кабельных систем, и разрабатывать соответствующие стратегии для повышения их надежности и уменьшения вероятности отказов.

Индексация риска представляет собой размещение отдельных единиц оборудования в матрице 5×5 согласно установленным для них категориям вероятности и последствий аварии. Различная тонировка зон матрицы используется для иллюстрации «высокой», «выше средней», «средней» и «низкой» категорий риска.

При необходимости оборудование каждой группы риска может быть дополнительно категорировано по типу риска, например:

- высокая вероятность + высокая скорость износа;
- высокая вероятность × малый ущерб;
- малая вероятность × большой ущерб;
- низкая достоверность данных.

В рамках метода Risk Based Inspection (RBI), каждая единица оборудования подвергается детальному анализу, который позволяет выявить уникальное сочетание вероятности возникновения аварий и потенциальных последствий, классифицируя их по уровню и типу риска.

Этот процесс дает возможность количественно оценить риск, учитывая множество факторов, влияющих на вероятность аварии и её последствия, включая возможные простои производства, экологические убытки и другие важные аспекты. Последствия, особенно когда они связаны с характеристиками опасных веществ, используемых в оборудовании, могут быть модифицированы только через улучшение или внедрение систем раннего обнаружения утечек и выбросов.

Метод RBI также включает процедуры для регулирования техногенного риска, акцентируя внимание на факторах, влияющих на вероятность возникновения событий. В международной практике, методы анализа риска были разработаны как инструменты для регулирования техногенного риска через оптимизацию программ инспекций и технического

обслуживания. Эта стратегия управления промышленной безопасностью завоевала признание у государственных органов и страховых компаний и продолжает развиваться.

Современные зарубежные разработки в области анализа риска демонстрируют тенденцию к расширенному применению вероятностных методов моделирования износа, количественных оценок вероятности отказов, тяжести последствий аварий и связанных с ними рисков.

Таким образом, интеграция в мировое сообщество и экономическая заинтересованность владельцев производственных предприятий в оценке и минимизации рисков своей деятельности становится неизбежной, поддерживая стремление к оптимизации их операций на основе анализа рисков.

Список использованной литературы

1. API 581 Risk – Based Inspection. Base Resource Document First Edition, 2000

Physical and Mathematical Sciences

Self-Recovering Infrastructures and Networks under Spatial Grasp Paradigm

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Abstract. Self-recovery, often mentioned as self-healing and remediation, is an extremely important superpower-like feature of large systems on national, international, up to the global world level. It may relate to critical infrastructures covering different human activity areas including prosperity, integrity, economy, evolution, and especially security. The paper investigates and shows how the developed Spatial Grasp model and technology with its recursive Spatial Grasp Language can organize distributed infrastructures with networks of any volumes and topologies to behave in a really self-healing, self-repairing, actually "immortal" manner. And the proposed solution is universal and global, meaning that an arbitrary network can effectively self-recover from any damages of nodes and links, after any fragmentation onto disjoint parts, even if only a single node still remains alive. And this self-analysis and self-recovery is performed in a fully distributed manner, without any central resources, also fitting networks than can constantly evolve in time and space.

Keywords: Critical infrastructures, large distributed networks, network self-analysis and self-recovery, Spatial Grasp Technology, Spatial Grasp Language, self-healing security systems.

1 Introduction

- **Paper's goals**

Te aim of this paper is to describe and explain a universal approach allowing arbitrary large and complex distributed infrastructures and networks to become self-analyzing, self-updating, self-healing, and self-recovering from any damages and disruptions, also investigate capability of the developed Spatial Grasp Model and Technology to provide these important features.

- **Basic definitions**

  - *Self-healing security systems* [1] are those with capabilities that help software components, endpoints and other devices to sense any anomaly and enable the components to make necessary adjustments without any intervention of the security teams. This is achieved through proactive monitoring powered by automation.
  - *Self-healing infrastructure* [2] can future-proof businesses with speed via automation. Today, any disruption of a service is amplified. This is risky for companies to the point of existential danger and generally antithetical to what consumers and clients expect from a 21st-century operation.
  - *A self-healing network* [3] is a type of network that has the ability to perceive and rectify faults or problems automatically, without human intervention. This process often relies on network redundancy features that kick in when a failure is detected, or through the use of artificial

intelligence and machine learning algorithms that identify, diagnose, and resolve network anomalies.

- Organization of the rest of the paper

Section 2 reviews existing publications on self-healing organizations by citing works on self-healing infrastructures, self-healing networks, also traditional network threats. Section 3 briefs the developed Spatial Grasp Model and Technology (SGT), including its general issues, basic Spatial Grasp Language (SGL), also organization of its distributed interpreter. Section 4 describes distributed network representation and creation with the use of SGL, which includes topology with node and link names, also node coordinates, creating full topology by starting from all nodes in parallel or from a single node. Section 5 describes different possibilities of network copying, like copying full topology starting from all nodes in parallel with the result recorded in each node, and copying full topology starting from only a single node with the result recorded in all nodes too. Network healing after arbitrary damages is described in Section 6, starting from all still existing nodes in parallel, which will always succeed if at least a single node remains alive. Section 7 describes the invented universal self-analysis, self-updating, and self-healing solution which, originally launched from any network node, forever converts the whole distributed network into the fully sufficient, actually "immortal" organizational structure, which can work any time without central resources, also with any changes of the network itself. Section 8 shows that using the universal procedure, described in the previous session, the network can be arbitrary extended by adding new nodes and links, after which it again converts into a fully self-organized system without any external intervention (same also works with removal of the non-needed nodes). Section 9 links the developed global organization of self-healing networks with the area of global networks (providing a review of related publications), which may have any terrestrial and celestial nature, and shows how to make the offered solutions more convenient for practical usage in them. Section 10 concludes the paper. References show existing publications on self-healing infrastructures and networks, the developed SGT too.

2 Self-Healing Infrastructures and Networks

- Publications on self-healing infrastructures

How to implement self-healing infrastructure is in [4]. Automation is the cornerstone for simplifying complex infrastructure challenges. Self-healing infrastructure is a natural progression in automation that can help organizations efficiently manage, better secure and more effectively optimize their IT environments, including those hosting SAP workloads. The paper walks through the process of implementing this architecture.

How to create a self-healing IT infrastructure is in [5]. This may be by using the immutable infrastructure as code covering all the system states and software code with automated tests; deploying the holistic logging and monitoring systems; leveraging the latest smart alerts and prescriptive analytics; and overseeing the performance of self-learning and self-healing IT infrastructure.

Self-healing infrastructure with resilience in cybersecurity is discussed in [6]. It focuses on automating the detection and remediation of online threats. The discussed items include automated threat detection continuously scanning for and identifying rogue applications, immediate automated remediation initiating takedown processes to neutralize damage, and adaptive threat intelligence learning from each incident.

Secure and self-healing control centers of critical infrastructures using intrusion tolerance are discussed in [7]. Critical infrastructures are highly integrated with state-of-the-art information and communication technologies to enhance their efficiency. Due to societal and economic impacts caused by failure or malfunction of critical infrastructures, cyber security and self-healing capability are among their salient features.

- Publications on self-healing networks

Self-healing control technology for distribution networks is discussed in [8]. It introduces self-healing control theory for distribution networks supported by simulations and applications, provides a comprehensive introduction to self-healing control for distribution networks, details construction of self-healing control systems with simulations and applications, also demonstrates how to manage system performance.
Self-healing systems and wireless networks management is in [9]. Discussed are: open-source development, security system grow and learn by itself, software license fees that produce little return on investment, and others. It describes self-healing engine that even a small organization can adjust to their requirements and set up a small security operation center for itself.
Self-organizing networks with self-planning, self-optimization, and self-healing are discussed in [10]. With the current explosion in network traffic, and mounting pressure on operators' business case, self-organizing networks play a crucial role. They are conceived to minimize human intervention in engineering processes and improve system performance to maximize return-on-investment and secure customer loyalty.
Self-healing networks are discussed in [11]. Their promise is beginning to come to fruition, as more advanced self-healing properties make it possible for networks to identify, remediate and predict problems without human intervention. The goal of self-healing network, as with all intelligent infrastructure solutions, is to simplify the operation of the network, both for those who deploy it and for end users and customers.
How self-healing networks help keep the digital world stable and secure is in [12]. The ability of the telecom networks to handle increased loads and exponential growth like we saw with the pandemic will diminish if they don't move into a hybrid cloud, open framework architecture. Self-healing superpower puts more and more responsibility on the carrier for continuous connectivity and reliability.
What are self-healing networks is discussed in [13]. When you first hear about it, self-healing networks sound a bit magical, as a technology capable of analyzing and repairing itself when problems arise. But self-healing networks like most, if not all, technological innovations are not without some consequences.

Self-healing networks and a theoretical approach to smart grids resilience are discussed in [14]. To ensure a high quality of service to the users of smart grids, self-healing capabilities are a crucial feature. It is shown how distributed communication protocols can enrich complex networks with self-healing capabilities; applications include infrastructural networks distributing a commodity via a flow, like gas, water or electric power.
Self-organizing, self-healing wireless networks are discussed in [15]. With the current explosion in network traffic, Self-Organizing Networks (SON) play a crucial role. They are conceived to minimize human intervention in engineering processes and at the same time improve system performance to maximize Return-on-Investment (ROI) and secure customer loyalty.

- Main network threats

Top network threats and risks are discussed in [16]. A network threat refers to any potential activity or event that could harm or interrupt the systems, applications and services operating on a network. Below are some of the most prevalent network threats.

- *Malware, including viruses, worms, and ransomware*, remains one of the most common network threats. These malicious programs can disrupt operations, steal data, and cause significant damage to network infrastructure.
- *Denial of Service (DoS) attacks* overload network resources, making them unavailable to legitimate users. These attacks can cripple network functionality, leading to significant downtime and disruption.
- *Man-in-the-middle (MitM) attacks* involve intercepting and altering communications between two parties without their knowledge. They can compromise confidentiality and integrity of data being transmitted over the network.
- *SQL injection attacks* target databases through malicious code. They can lead to unauthorized data access, data corruption, and even complete takeover of database systems.
- *Zero-day exploits* take advantage of previously unknown vulnerabilities in software or hardware. They can be particularly damaging as they occur before developers have had a chance to create a patch.

3 Spatial Grasp Model and Technology

Only most general features of the developed paradigm are mentioned here, with availability of existing extended publications on its philosophy, features, organization, and numerous applications, [17-33] including.

- General issues

Within Spatial Grasp Model and Technology (SGT), a high-level operational scenario expressed in recursive Spatial Grasp Language (SGL), starting in any world point, *propagates, covers, and matches the distributed environment in parallel wavelike mode*, as symbolically shown in Fig. 1. Such propagation can result in returning and analyzing the reached states and data which may be arbitrarily remote, or used for launching more waves.

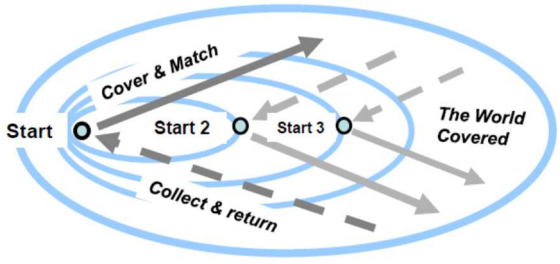

Fig. 1. Parallel recursive world coverage with Spatial Grasp Model

The distributed worlds this model effectively covers conquers, and manages may be of different types: *Physical World (PW)* considered as continuous and infinite where each point can be identified and accessed by physical coordinates; *Virtual World (VW)* which is discrete and consists of nodes and semantic links between them, and *Executive World (EW)* consisting of active doers,

which may be humans or robots with communication possibilities between them. Different kinds of combinations of these worlds can also be possible within the same formalism.

- Spatial Grasp Language (SGL)

The SGL allows for direct space presence and operations with unlimited powers and parallelism. Its universal recursive organization, with operational scenarios called *grasp*, can be expressed by a single formula:

grasp → *constant* | *variable* | *rule* ({ *grasp*, })

The *rule* can express certain action, control, description or context accompanied with operands, which can be any *grasps* too. Other top SGL details can be expressed as:

constant → *information* | *matter* | *custom* | *special*
variable → *global* | *heritable* | *frontal* | *nodal* | *environmental*
rule → *type* | *usage* | *movement* | *creation* | *echoing* |
verification | *assignment* | *advancement* | *branching* |
transference | *exchange* | *timing* | *qualifying*

The rules, starting in certain points, can organize navigation of the world sequentially, in parallel, or any combinations thereof. They can result in the same application points or cause movement to other world points with obtained results left there or returned. The final points reached can become starting ones for other rules. The rules, due to recursive language organization, can form *arbitrary operational infrastructures* expressing sequential, parallel, hierarchical, centralized, up to fully decentralized and distributed algorithms. Details of the latest SGL version are summarized in the Appendix.

- SGL interpreter organization

The SGL interpreter consists of specialized modules working with specific data structures, serving SGL scenarios or their parts happened to be within this interpreter, also organizing exchanges with other interpreters for distributed SGL scenarios. Each interpreter copy can process multiple active scenario code propagating in space and time. Communicating SGL interpreters can be in arbitrary number of copies effectively integrated with other existing systems and communications, representing altogether *powerful spatial engines operating without central resources or control*. Hardware or software SGL interpreters, shown in Fig. 2 as universal control and processing units effectively working with spatial graph and network data, can be installed, runtime created too, in proper physical or virtual world points.

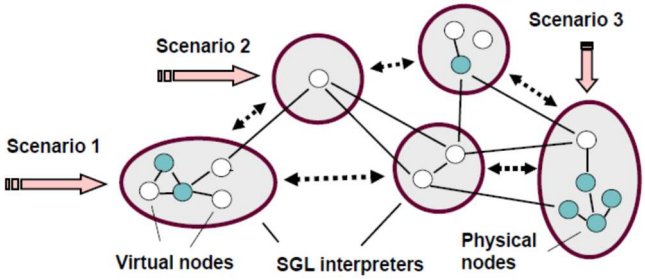

Fig. 2. SGL distributed networked interpretation

As both backbone and nerve system of the distributed interpreter, its self-optimizing *Spatial Track System* provides hierarchical command and control, also remote data and code access. It supports spatial variables, some of which can be mobile, and merges distributed control states for making decisions at different organizational levels. This spatial infrastructure, effectively supporting global integrity of distributed solutions, is automatically distributed between active components (humans, robots, computers, smart-phones, satellites, etc.) during SGL scenario self-evolution in space and time.

4 Distributed Network Representation and Creation

A network example in the form of a graph with named nodes and links, which is distributed in two-dimensional physical space, is shown in Fig. 3.

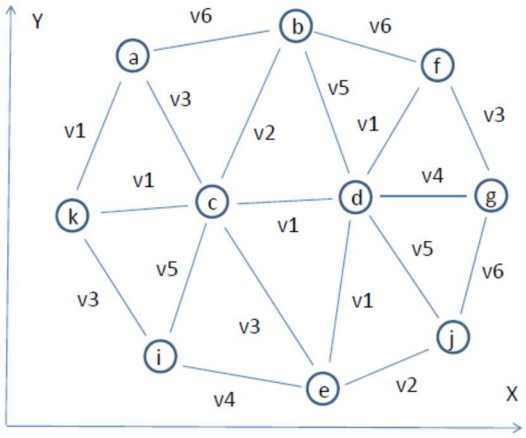

Fig. 3. Representation of distributed systems topology

- Representing topology with node and link names, also and coordinates

Compact textual representation of this topology assigned to variables Top (with node names followed by lists of named links leading to named neighbors) and Loc (having node names w followed by their location coordinates Cw expressed in some physical or virtual notation) may be as follows.

Top = (a:(v1:k, v3:c, v6:b), b:(v6:a, v2:c, v5:d, v6:f), f:(v6:b, v1:d, v3:g), k:(v1:a, v1:c, v3:i), c:(v1:k, v3:a, v2:b, v1::d, v3:e, v5:i),
d:(v1:c, v5:b, v1:f, v4:g, v5:j, v1:e), g:(v4:d, v3:f, v6:j),
i:(v3:k, v5:c, v4:e), e:(v4:I, v3:c, v1:d, v2:j), j:(v2:e, v5:d, v6:g))

Loc = (a:Ca, b:Cb, c:Cc, d:Cd, e:Ce, f:Cf, g:Cg, I:Ci, j:Cj, k:Ck)

- Creating full topology by starting from all nodes in parallel

Creating only single nodes (without connections with neighbors) in proper space locations (with known coordinates used by rule coord) can be done in parallel by the following SGL text. The operation split creates as many parallel branches as there are elements in the variable Loc, with each element addressed by environmental variable VAL (short for VALUE) in the corresponding branch (VAL[1] providing node name and VAL[2] its coordinates).

Loc = …; split(Loc); create_node(VAL[1], coord(VAL[2]))

Creating full topology in parallel (i.e. all nodes with named links to other nodes, also nodes having names and coordinates in virtual or physical space) can be done by the following scenario (resolving competition of neighboring nodes attempting to create the same link between them, see also Fig. 4:

```
Top = …; Loc = …;
align(split(Top); frontal(NN) = VAL[2];
    create_node(VAL[1], coord(Loc:VAL[1])));
split(NN); NAME > VAL[2];
linkup(VAL[1], node(VAL[2], coord(Loc:VAL[2])))
```

In this scenario, the rule split is used twice, first creating as many parallel branches at there are network nodes, and then for each node forms its own parallel branches for dealing with their all neighbors).

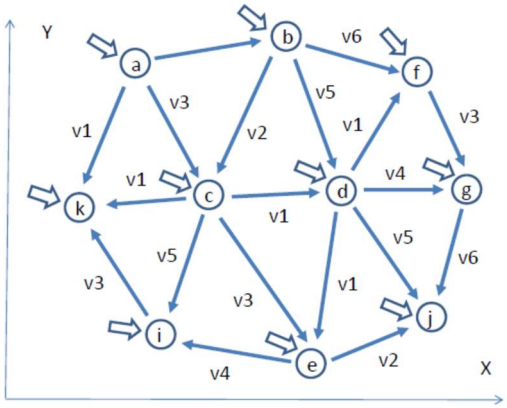

Fig. 4. Creating distributed networked structure in parallel

- **Creating full topology by starting from a single node**

Creating the same topology but starting from a given node, using spatially evolving spanning tree mode, may be done by the following scenario (see also fig. 5):

```
frontal(Top = …, Loc = …); Start = …;
create_node(Start, coord(Loc:Start));
repeat(
 split(Top:NAME);
 or_seq((empty(Loc:VAL[2]);
       create(link(VAL[1], node(VAL[2], coord(Loc:VAL[2])))),
      (NAME > VAL[2];
       linkup(VAL[1], node(VAL[2], coord(Loc:VAL[2]))); quit)))
```

As the network forming spanning tree process develops asynchronously in physical space, the competition between neighbors for creating same next nodes is resolved by first testing whether node's physical position is empty, before its creation, otherwise just linking to the already existing node and quitting.

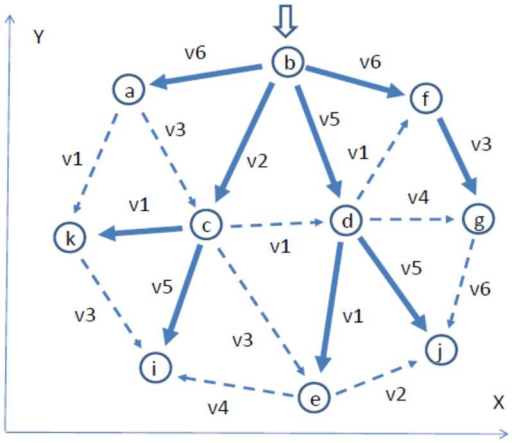

Fig. 5. Creating distributed networked from a single node

5 Network Copying

- **Copying full topology starting from all nodes in parallel with the result recording in each node**

To copy the already existing full topology starting from all its nodes in parallel, with obtaining its textual representation in the already mentioned variables Top and Loc, and then remember them in each node, can be done by:

```
frontal(Topf, Locf);
Topf = (hop_nodes(all);
     NAME & unit(hop_links(all); LINK & NAME));
Locf = (hop_nodes(all); NAME & WHERE);
hop_nodes(all); Top = Topf; Loc = Locf
```

For depicting the work of this scenario, Fig. 4 can be used here too (ignoring however links orientation).

- **Copying full topology starting from a single node with the result recording in each node**

This can be done in a self-evolving spanning tree mode, say, starting from any single graph node, as follows:

```
hop_node(any); frontal(Topf, Locf);
Topf = repeat(blind(NAME & unit(hop_links(all); LINK & NAME))),
          hopfirst_links(all));
Locf = repeat(blind(NAME & WHERE), hopfirst_links(all));
repeat(Top = Topf; Loc = Locf; hopfirst_links(all)))
```

Fig. 5 can be used for this scenario too (ignoring links orientation too).

6 Network Healing

We can also easily write in SGL a full recovery scenario which, initially applied in all nodes, will allow the whole topology self-recover after arbitrary damages (even if a single node still remains alive). Each node, seeing absence of its expected neighbors, will be providing their restoration,

including supplying the restored nodes with overall network data in Top and Loc. If the expected neighbor already exists, it then stops network coverage in this point. The following scenario starts in parallel from all nodes which still exist (each having Top and Loc copies after Section 5).

```
frontal(Topf, Locf);
hop_nodes(all); Topf = Top; Locf = Loc;
repeat(
 split(Topf:NAME); empty(Locf:VAL[2]);
 create(link(VAL[1]), node(VAL[2], coord(Locf:VAL[2])));
 Top = Topf; Loc = Locf)
```

Any number of nodes can be simultaneously destroyed (as follows), and then fully recovered by the above scenario:

```
delete_nodes(a, b, c, d, g, i, e, j)
```

These nodes with links will be recovered by starting in still alive nodes k and f, see Fig. 6.

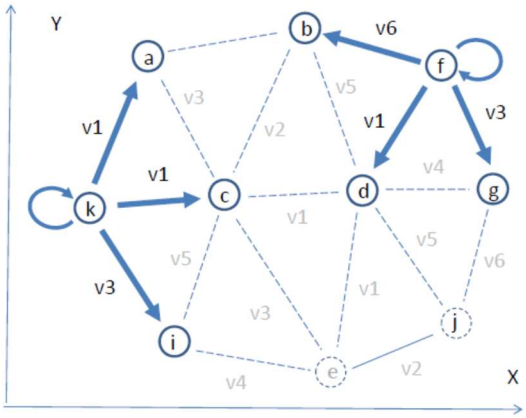

Fig. 6. Distributed system self-recovery starting from the remaining nodes

7 Universal Self-Updating and Self-Healing Solution

In the previous sections we considered different possibilities and solutions of network representation, creation, copying and recovery, which could be launched from outside of the network either in parallel from all nodes or by starting from a single node and covering the rest of the network in a self-evolving spanning tree mode. Using the obtained experience, we can offer a universal and fully autonomous network update and recovery procedure which effectively operates without any global intervention or control, making the network not only symbolic but practically "immortal" too. Moreover, the network itself can dynamically change its volume and structure, growing in time and also moving in physical space.

```
UpRec =
 {whirl(
  sleep(delay);
  sequence(
   (Topf = repeat(blind(NAME & unit(hop_links(all); LINK & NAME)),
                  hopfirst_links(all));
    Locf = repeat(blind(NAME & WHERE), hopfirst_links(all));
```

```
  repeat(update(Top, Topf); update(Loc, Locf);
       if(no(UpRec), (UpRec = UpRecf; blind(run(UpRec)));
       hopfirst_links(all))),
 (Topf = Top; Locf = Loc; UpRecf = UpRec;
  repeat(
   split(Topf:NAME); empty(Locf:VAL[2]);
   create(link(VAL[1]), node(VAL[2], coord(Locf:VAL[2])));
   Top = Topf; Loc = Locf; UpRec = UpRecf; blind(run(UpRec))))))}
```

Initial launching of this self-Update-Recover process can be as follows.

```
hop_nodes(all);
nodal(UpRec = {...}, Top, Loc); frontal(Topf, Locf, UpRecf);
run(UpRec)
```

This will fully and globally work even if started from only a single node, like: **hop_node(any); ...**

This basic UpRec procedure, operating in all network nodes in parallel, regularly self-spreads throughout the whole network, copies its whole structure by this moment of time (which may appear reduced due to damages or having additional nodes and links). It then updates the new vision of whole network in the reached nodes, and also regularly uses this updated whole description for recovery of the absent nodes with their links, making the latter as fully active nodes again, capable to recover the missing network parts when noticed, and so on. The spreading recovery by UpRec stops when it reaches the already existing nodes, supposing these are (or will be) doing the same for their missing neighboring parts, and so on. The SGL solution for UpRec is fully spatial, distributed, powerful and compact (in comparison with other languages, like C or Java, it may be a hundred time shorter and proportionally clearer (similarly to the obtained experience of using SGT for many other parallel and distributed solutions of numerous problems, like in [17-33]).

8 Network Extension

As already mentioned, UpRec procedure works globally with any dynamic network changes (including extending the network with new nodes and links), where new nodes are becoming fully “legitimate” too and may be engaged in subsequent global registration of the network updates, and global self-recoveries. For example, after adding new nodes and links as in Fig. 7 by the following SGL scenario, they will be automatically included into the global “network family” by their existing neighbors (already working with UpRec), and will behave similarly to other network modes.

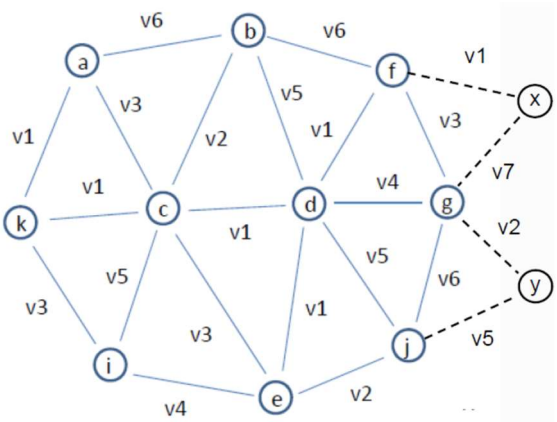

Fig. 7. Extending network with nodes and links

(create_node(x, Cx);
linkup(v1, node(f, Cf)), linkup(v7, node(g, Cg))),
(create_node(y, Cy);
linkup(v2, node(g, Cg)), linkup(v5, node(j, Cj)))

In a similar way, "official" node removal in the self-organized and self-healing network can be easily organized too.

9 Global Networks

The analysis and self-healing solutions for dynamic distributed networks described in previous chapters may be effectively applicable for very large distributed networks which reflect critical infrastructures of both terrestrial and celestial origin, and especially those supporting global and international evolution, economy, space conquest, security too. The considered networking solutions may also fall into the area of *global networks* with some related publications mentioned below.

- Some global network publications

A *global network* [34] is any communication network which spans the entire Earth. The first global network was established using electrical telegraphy and global span was achieved in 1899. The telephony network was the second to achieve global status, in the 1950s. More recently, interconnected IP networks, and the GSM mobile communication network form the largest global networks of all.

Engineering, operations and design of global networks [35] shows how the telecommunications industry has advanced in rapid, significant and unpredictable ways into the 21st century. It describes how to design networks that are fault tolerant and global in scope; how to identify best engineering and operations practices, also examines the role of technology labs in carrier networks.

Global network, linked cities [36] looks at how information flows have bound global cities together in networks, creating a global city web whose constituent cities become global through the networks they participate in. Shows how these globalizing zones are not only replicating many features of the top tier of global cities, but are also generating new socio-economic patterns as well.

Network origins of the global economy [37] discusses how traditional models of understanding processes of social and economic change are failing to capture real-world risk and volatility. It uses

the tools of network analysis to understand great transitions in history, particularly those concerning economic development and globalization, shifts attention away from particular agents toward their dynamic interactions.

- Restricted depth search

Such global networks may be very large, having complex structures and consisting of thousands to millions to billions of nodes distributed in physical and virtual spaces. Any solutions in them, self-recovery including, can be fully covered by the approach described above, where each node, by launching self-spreading recursive code in space, can analyze individually the whole network to its full depth, and recover, if needed, any other nodes, and all these can be done without any central or global control. But for practical reasons, we may reduce the depth of this topology analysis and recovery from individual nodes to some practical level, assuming that very global network damages may be extremely rare. So to effectively "sell" the described UpRec solution for very large networks we can just limit the depth of analysis and recovery for the network structure from individual nodes, as symbolically shown in Fig. 8.

Fig. 8. Global self-analyzing and self-healing network with limited depth analysis from individual nodes

For this, we can reduce the repeated cycling in top-down navigation to practically useful number of repetitions by the Depth parameter as follows.

```
-- For limited depth collection, return and update:
Depth = ...;
Top = repeat(Depth)(blind(append(NAME, unit(hop_links(all); LINK & NAME))),
                hopfirst_links(all));

-- For limited depth analysis and recovery:
Depth = ...;
repeat(Depth)(split(Top:NAME); empty(Loc:VAL[2]);
            create(link(VAL[1]), node(VAL[2], coord(Loc:VAL[2]))))
```

10 Conclusions

We have investigated the application of distributed Spatial Grasp Model and Technology for management of large distributed networked systems, from their expression, creation, copying and modeling to continuous self-analysis and self-recovery from any damages. Based on a compact recursive, self-spreading, self matching, and self-evolving operational code, SGT can provide highest possible integrity of distributed dynamic systems unachievable by any other models and technologies, which are usually based on communicating parts or agents, with known difficulties of achieving the needed whole parameters and behavior. The super-virus mode of operation of the approach offered, where any damages can be immediately self-repaired and covered by the recursive self-spreading active code, makes large distributed dynamic systems actually "immortal" in many important applications. The latter may cover industry, economy, finance, security, defense, robotics, conquest of space, and many other fields. The offered latest version of distributed control technology, by the obtained experience with previous versions in different countries, can be easily implemented on any existing platforms and integrated with other networked systems, forming altogether powerful spatial engines effectively operating in any terrestrial and/or celestial environments. The following plans of this work include preparation of a new book on global security with self-healing and self-repairing features, and patenting of the proposed solutions so far looking sufficiently unique and universal.

References

1. Self Healing Security. Next-generation Threat Management with Predictive and Preventive Healing with Cloud4C Self Healing Operations Platform (SHOP). https://www.cloud4c.com/cybersecurity-services/self-healing-platform
2. An Introduction to Self-Healing Infrastructure & Why It's Important. SX, IBM. https://sxiq.com.au/wp-content/uploads/2023/01/an-introduction-to-self-healing-infrastructure-and-why-its-important.pdf
3. What Is A Self-Healing Network? Definition & How It Works, Nile. https://nilesecure.com/ai-networking/what-is-a-self-healing-network-definition-how-it-works
4. R. Yang, How to implement a self-healing infrastructure, Red Hat, November 29, 2023. https://www.redhat.com/en/blog/how-implement-self-healing-infrastructure#:~:text=Self%2Dhealing%20infrastructure%20is%20a,including%20those%20hosting%20SAP%20workloads.
5. Vl. Fedak, How to create a self-healing IT infrastructure, 24 September 2018, Itsvit. https://itsvit.com/blog/create-self-healing-infrastructure/
6. Self-Healing Infrastructure: Automating Resilience in Cybersecurity. Tech Owl, https://techowlshield.com/self-healing
7. M. Tanha, F. Hashim, S. Subramaniam, Secure and self-healing control centers of critical infrastructures using intrusion tolerance, January 2015, International Journal of Network Security 17(4):365-382. https://www.researchgate.net/publication/282712746_Secure_and_self-healing_control_centers_of_critical_infrastructures_using_intrusion_tolerance
8. X. Gu, N. Jiang, et al., Self-healing Control Technology for Distribution Networks, Wiley; 1st edition (February 7, 2017), $124.24.
9. J. A. Chaudhry, Self-Healing Systems and Wireless Networks Management, CRC Press; 1st edition (October 21, 2013), $75.71.
10. J. Ramiro and K. Hamied, Self-Organizing Networks: Self-Planning, Self-Optimization and Self-Healing for GSM, UMTS and LTE, Wiley; 1st edition (October 27, 2011) , $98.67.

11. M. Zacchello, Network, Heal Thyself: On Self-Healing Networks. How automation, AI and ML are delivering more intelligent networks that can predict, repair and maintain themselves. Equinix Interconnections, August 29, 2023. https://blog.equinix.com/blog/2023/08/29/network-heal-thyself-on-self-healing-networks/
12. M. A.V. Chaban, How self-healing networks help keep the digital world stable and secure, IBM, May 6, 2021. https://www.ibm.com/blog/self-healing-networks-stable-secure-digital-5g-world/
13. D. Burger, What Are Self Healing Networks?, Residential Tech, May 29, 2019. https://restechtoday.com/self-healing-networks/.
14. A. Scala, F. Morone, H. Makse, Self-healing networks: A theoretical approach to smart grids' resilience, Safety and Reliability – Safe Societies in a Changing World, 2018 Taylor & Francis. https://www.researchgate.net/publication/329697742_Self-healing_networks
15. [15] C. Elliott, B. Heile, Self-organizing, self-healing wireless networks. Published in: 2000 IEEE Aerospace Conference. Proceedings (Cat. No.00TH8484), 25-25 March 2000. https://ieeexplore.ieee.org/document/879383
16. [16] Top Network Threats & Risks (And How To Protect Yourself). Nile, 2024. https://nilesecure.com/network-security/top-network-threats-risks-and-how-to-protect-yourself
17. P. S. Sapaty, A distributed processing system, European Patent N 0389655, Publ. 10.11.93, European Patent Office
18. P. S. Sapaty, Mobile Processing in Distributed and Open Environments. New York: John Wiley & Sons, 1999
19. P. S. Sapaty, Ruling Distributed Dynamic Worlds. New York: John Wiley & Sons, 2005
20. P. S. Sapaty, Managing Distributed Dynamic Systems with Spatial Grasp Technology. Springer, 2017
21. P. S. Sapaty, Holistic Analysis and Management of Distributed Social Systems. Springer, 2018
22. P. S. Sapaty, Complexity in International Security: A Holistic Spatial Approach. Emerald Publishing, 2019
23. P. S. Sapaty, Symbiosis of Real and Simulated Worlds under Spatial Grasp Technology. Springer, 2021
24. P. S. Sapaty, Spatial Grasp as a Model for Space-based Control and Management Systems. CRC Press, 2022
25. P. S. Sapaty, The Spatial Grasp Model: Applications and Investigations of Distributed Dynamic Worlds. Emerald Publishing, 2023
26. P. S. Sapaty, Providing Integrity, Awareness, and Consciousness in Distributed Dynamic Systems, CRC Press, 2024.
27. P. S. Sapaty, Spatial Networking in the United Physical, Virtual, and Mental World, Springer, Aug. 15, 2024. https://www.amazon.com/Spatial-Networking-Physical-Virtual-Decision/dp/3031621530/
28. Sapaty P.S., Spatial management of air and missile defence operations. Mathematical machines and systems. N 1, 2023. http://www.immsp.kiev.ua/publications/articles/2023/2023_1/01_23_Sapaty.pdf
29. Sapaty P.S., Providing Distributed System Integrity under Spatial Grasp Technology, Mathematical machines and systems. N 2, 2023. http://www.immsp.kiev.ua/publications/articles/2023/2023_2/02_23_Sapaty.pdf
30. Sapaty P.S., Providing Global Awareness in Distributed Dynamic Systems, International Relations and Diplomacy, Mar.-Apr. 2023, Vol. 11, No. 2, 87-100. doi: 10.17265/2328-2134/2023.02.002. https://www.davidpublisher.com/Public/uploads/Contribute/6486c3d05a6cc.pdf
31. Sapaty P.S., Simulating Distributed Consciousness with Spatial Grasp Model, Mathematical machines and systems. N 3, 2023.

32. Sapaty P.S., Network Centrality Operations under Spatial Grasp Technology. Journal of Advances in Artificial Intelligence and Machine Learning, 2023; 1(1): 1-11. https://www.scivisionpub.com/journals/articleinpress-journal-of-advances-in-artificial-intelligence-and-machine-learning
33. Sapaty P.S., Managing Distributed Systems with Spatial Grasp Patterns, Mathematical machines and systems. N 4, 2023. http://www.immsp.kiev.ua/publications/articles/2023/2023_4/04_23_Sapaty.pdf
34. Global network. https://en.wikipedia.org/wiki/Global_network
35. G. K. Cambron, Global Networks: Engineering, Operations and Design, Wiley-IEEE Press; 1st edition in (November 5, 2012).
36. S. Sassen, Global Networks, Linked Cities, Routledge; 1st edition (April 15, 2016).
37. H. L. Root, Network Origins of the Global Economy: East vs. West in a Complex Systems Perspective, Kindle Edition. Cambridge University Press (March 19, 2020).

Appendix: Updated Summary of SGL Syntax and Main Constructs

Syntactic categories are shown below in italics, vertical bar separates alternatives, parts in braces indicate zero or more repetitions with a delimiter at the right, and constructs in brackets are optional. The remaining characters and words are the language symbols (including boldfaced braces).

grasp → *constant* | *variable* | [*rule*] [({ *grasp*,})]
constant → *information* | *matter* | *special* | *custom* | *grasp*
information → *string* | *scenario* | *number*
string → ‘{*character*}’
scenario → **{**{*character*}**}**
number → [*sign*]{*digit*}[.{*digit*}[e[*sign*]{*digit*}]]
matter → “{*character*}”
special → thru | done | fail | fatal | infinite | nil | any | all | other | allother | current | passed | existing | neighbors | direct | forward | backward | synchronous | asynchronous | virtual | physical | executive | engaged | vacant | firstcome | unique
variable → *global* | *heritable* | *frontal* | *nodal* | *environmental*
global → G{*alphameric*}
heritable → H{*alphameric*}
frontal → F{*alphameric*}
nodal → N{*alphameric*}
environmental → TYPE | NAME | CONTENT | ADDRESS | QUALITIES | WHERE | BACK | PREVIOUS | PREDECESSOR | DOER | RESOURCES | LINK | DIRECTION | THRU | WHEN | TIME | STATE | VALUE | IDENTITY | IN | OUT | STATUS
rule → *type* | *usage* | *movement* | *creation* | *echoing* | *verification* | *assignment* | *advancement* | *branching* | *transference* | *exchange* | *timing* | *qualifying* | *grasp*
type → global | heritable | frontal | nodal | environmental | matter | number | string | scenario | constant | custom
usage → address | coordinate | content | index | time | speed | name | place | center | range | doer | node | link | unit

movement → hop | hopfirst | hopforth | move | shift | follow
creation → create | linkup | delete | unlink
echoing → state | rake | order | unit | unique | sum | count | first | last | min | max |
random | average | sortup | sortdown | reverse | element | position |
fromto | add | subtract | multiply | divide | degree | separate | unite |
attach | append | common | withdraw | increment | decrement | access |
invert | apply | location | distance
verification → equal | nonequal | less | lessorequal | more | moreorequal | bigger |
smaller | heavier | lighter | longer | shorter | empty | nonempty | belong |
notbelong | intersect | notintersect | yes | no
assignment → assign | assignpeers
advancement → advance | slide | repeat | align | fringe
branching → branch | sequence | parallel | if | or | and | orsequence | orparallel |
andsequence | andparallel | choose | quickest | cycle | loop | sling |
whirl | split | replicate
transference → run | call
exchange → input | output | send | receive | emit | get
timing → sleep | allowed
qualification → contain | release | trackless | free | blind | quit | abort | stay |
lift | seize | exit

УДК 37.016:51

О СОВЕРШЕНСТВОВАНИИ МЕТОДОВ ПРЕПОДАВАНИЯ ГЕОМЕТРИИ В ШКОЛЕ

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Аннотация: В данной статье рассмотрены несколько современных методов преподавания геометрии, как например, интерактивные технологии с использованием интерактивной доски, использование программы для виртуальной реальности и приложения для планшетов, при которых преподаватели геометрии создают более увлекательное обучение. Обоснована визуализация сложных геометрических концепций с помощью виртуальных моделей, которые помогают учащимся лучше понимать и запоминать материал.
Ключевые слова: визуализация, виртуальность, проблемно -ориентированный, концепция, преподавания, модель, коммуникативный, демонстрация, дифференциальный, навыки.

Геометрия - это один из основных предметов, изучаемых в школе. Этот предмет помогает ученикам развивать логическое мышление, аналитические способности и умение решать сложные задачи. Поэтому метод преподавания геометрии играет важную роль в формировании у школьников навыков работы с пространственными объектами и фигурами [1].

Один из основных методов преподавания геометрии в школе - это использование визуальных средств обучения. Учитель может применять геометрические модели, графики, диаграммы, видеоуроки и другие визуальные материалы, чтобы помочь ученикам лучше понять геометрические концепции. Это позволяет ученикам легче воспринимать материал и запоминать важные факты.

Еще один важный метод преподавания геометрии - это использование практических задач и примеров. Учитель может задавать ученикам задачи на построение геометрических фигур, вычисление площади и объема, нахождение углов и т.д. Это помогает ученикам применить свои знания на практике и развить навыки решения проблем.

Также важно использовать интерактивные методы обучения, такие как игры, головоломки, индивидуальные и групповые проекты. Это помогает ученикам активнее участвовать в учебном процессе, развивать коммуникативные навыки и сотрудничать с товарищами [2].

Кроме того, хороший учитель геометрии должен быть доступен для учеников, помогать им справляться с трудностями и создавать поддерживающую обучающую среду. Учитель должен стимулировать интерес учеников к предмету и вдохновлять их на самостоятельное изучение.

Таким образом, метод преподавания геометрии в школе играет важную роль в формировании у школьников навыков работы с пространственными объектами и фигурами. Использование визуальных материалов, практических задач, интерактивных методов обучения и поддержка учителя помогают ученикам эффективно изучать геометрию и развивать свои навыки.

Использование интерактивных методов обучения геометрии может значительно улучшить понимание материала и развитие практических навыков у учащихся. Например, применение компьютерных программ для моделирования геометрических фигур позволяет учащимся визуализировать и изучать различные принципы и свойства геометрических объектов. Такие программы также могут способствовать развитию навыков работы с компьютером и улучшению пространственного мышления [3].

Другим примером интерактивного метода обучения геометрии может быть использование геометрических конструкторов, таких как Знайка, для создания различных фигур и исследования их свойств. Это поможет учащимся лучше понять принципы геометрии через практическую деятельность и эксперименты.

Также можно проводить уроки по геометрии с использованием игр и задач, которые способствуют развитию логического мышления и аналитических способностей учащихся. Например, решение головоломок, где требуется применять геометрические принципы для нахождения решения, поможет учащимся развить навыки применения математических знаний на практике. Таким образом, использование интерактивных методов обучения геометрии способствует не только лучшему усвоению материала, но и развитию навыков и умений, которые могут быть полезны в повседневной жизни и будущей профессиональной деятельности учащихся.

Геометрия является важным инструментом в различных областях жизни [4].:

- лекции и демонстрации: преподаватель может использовать лекции и демонстрации для объяснения основных понятий стереометрии, а также для демонстрации различных приемов решения задач.
- практические занятия: студенты могут решать задачи по стереометрии как индивидуально, так и в группах. Практические занятия помогут им лучше понять материал и научиться применять его на практике.
- интерактивные методы: преподаватель может использовать интерактивные методы, такие как игры, кейс-метод или обсуждение случаев из жизни, чтобы сделать обучение более увлекательным и запоминающимся.
- проектная деятельность: студенты могут работать над проектами, связанными с стереометрией, что поможет им применить полученные знания на практике и развить свои навыки решения задач.
- использование современных технологий: преподаватель может использовать современные технологии, такие как интерактивные доски, компьютерные программы или онлайн-курсы, чтобы сделать обучение более эффективным и интересным для студентов.
- индивидуальные консультации: преподаватель может предоставлять студентам возможность для индивидуальных консультаций, чтобы помочь им разобраться с трудными вопросами или задачами по стереометрии.и практики.

Ниже перечислены некоторые из способов, в которых геометрия используется в повседневной жизни [5].:

1. Архитектура и дизайн: геометрия играет ключевую роль в проектировании и строительстве зданий, мебели, украшений и других объектов. Знание геометрии позволяет архитекторам и дизайнерам создавать красивые и функциональные конструкции.
2. Инженерия: геометрия используется инженерами при проектировании и конструировании различных механизмов, мостов, дорог и других инженерных сооружений.
3. Навигация и картография: геометрические принципы используются для определения местоположения объектов на карте, а также для навигации на море, в воздухе и на суше.
4. Производство и технологии: в производстве различных товаров и машин геометрия применяется для создания точных размеров и форм деталей.

5. Медицина: в медицине геометрия применяется при создании моделей органов и тканей для диагностики и лечения различных заболеваний.
6. Информационные технологии: геометрия используется при разработке компьютерных графических программ для создания 3D-моделей, анимации и визуализации данных. Таким образом, знание геометрии позволяет людям более эффективно решать различные задачи и применять этот навык в различных сферах жизни и практики.

СПИСОК ИСПОЛЬЗУЕМОЙ ЛИТЕРАТУРЫ:

1. Гусев В.А. О рассуждениях и доказательствах в курсе школьной геометрии / В.А. Гусев // Математика. - 2003. - № 21. - С. 11-15.
2. Левитас Г.Г. Кому мешает учебник Погорелова? / Г.Г. Левитас // Математика в школе. - 2001. - № 8. - С. 60-62.
3. Маклаков А.Г. Общая психология: Учебник для вузов / А.Г. Маклаков. - СПб.: Питер, - 2005. - 583 с.
4. Фридман Л.М. Теоритические основы методики обучения математике / Л.М. Фридман. - Учеб. пособие изд. 2-е, испр. и доп. - М.: Едиториал УРСС, - 2005. - 248 с.
5. Шарыгин И.Ф. Нужна ли в школе XXI века геометрия? / И.Ф. Шарыгин // Математика в школе. - 2004. - № 4. - С. 72-79.

MEMORY CREATION IN $TlInTe_2$-$TlGdTe_2$ SYSTEM ALLOYS AND MECHANISMS OF OCCURRENCE OF NEGATRON EFFECTS

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Summary: The volt-ampere characteristics (VAC) of solid solutions of alloys of the $TlInTe_2 - TlGdTe_2$ system were studied in the direct current mode by the standard method. It has been established that there is a vast area in which there is a deviation from Ohm's law before the start of the transformation process. In this area, the current increases exponentially depending on the voltage. In this area, the thermal effect can be neglected. An electronic conversion mechanism plays a key role here. It was found that $TlIn_{1-x}Gd_xTe_2$ solid solutions have a conversion property and the threshold voltage decreases with an increase in the amount of gadalinium in the composition.

Keywords: negatory effect, solid solution, threshold voltage, electronic coating, conduction band, chalcogenide glass conductor, current exposure, phonon spectrum

Thallium chalcolanthanates and their complex analogues obtained in the presence of rare earth elements are of interest from the point of view that their physical properties can vary widely. The reason for this is the widespread use of these materials in microchips, automatic control devices and in the manufacture of converters of various types.

In the study of $TlInTe_2 - TlGdTe_2$ systems, along with other interesting properties, it was shown in [1,2] that the properties of memory transformation are also observed in compounds and solid solutions of these systems. The study of the volt-ampere characteristic (VAC) makes it possible to understand the causes of changes in the conductivity of the studied samples during their transition from a state of high resistance to a state of high conductivity, as well as the causes leading to a known instability of electrical conductivity. threshold converters and prepare converters with high threshold voltage stability [3,4].

For this purpose, the VAC of solid solutions $TlInTe_2 - TlGdTe_2$ was studied by a standard method in DC mode. Based on the studied solid solutions $TlInTe_2 - TlGdTe_2$ (x=0,01; 0,02; 0,04; 0,06; 0,08) planar and thin-layer structures were made. These layers are applied to a polished graphite base by thermal evaporation in a vacuum of 10-2 Pa. Copper, aluminum, indium and iron are used as contact materials. In the studied samples, the distance between the electrodes varied widely, and the uniformity of thickness was checked by radiographic microanalysis.

The characteristics of systems prepared on the basis of solutions of various compositions are shown in Fig.1. From these graphs it can be seen that all the studied solutions have transformative properties and the value of the threshold voltage decreases with an increase in the

relative amount of gadolinium in the composition. The observed transformation phenomena can be explained on the basis of electronic, electrothermal and thermal mechanisms.

With the electronic mechanism of transformation, such events as double injection, tunneling of electrons through a potential barrier under the action of an electric field (Poole-Frenkel effect), ionization of valence electrons and additive atoms due to impact, formation of bulk charges, thermal excitation of electrons from capture centers as a result of a decrease in the Coulomb barrier under the action of an electric field, tunnel transitions can be taken into account from metal electrodes to the conduction band, etc.. The electron-thermal conversion mechanism takes into account the combined effect of an electric field and temperature on a semiconductor, varying from low to high conductivity. The thermal conversion mechanism takes into account the heat capacity, thermal conductivity and temperature. The dependences of the conductivity of the active part are considered. There is a vast area in which deviations from Ohm's law are observed before the occurrence of the transformation event. In this area, the current increases exponentially depending on the voltage. In this area, the thermal effect can be neglected. Many interesting properties of solid solutions containing lanthanides, especially 4f - lanthanides with a coating of more than half, are associated with the interaction of magnetic moments of ions. It is usually assumed that 4f electrons are quite compact and well shielded by the closed 5s5p shells located next to it, therefore, the overlap of 4f electrons of neighboring ions is negligible. For this reason, there is an indirect (indirect) interaction involving 5s6p5d electrons, as well as electrons in closed 5s5p shells. The extreme 6s6p5d electrons hold lanthanides in the 3-valence state and form a conduction band, which is successfully implemented in $TlInTe_2 - TlGdTe_2$ systems. Here, by partially replacing 3-valence In ions with 3-valence lanthanide ions, a new class of semiconductor compounds and solid solutions is obtained according to the following scheme:

$$TlX \rightarrow Tl^{+}Tl^{3+}X_2^{2-} \rightarrow Tl^{+}In^{3+}X_2^{2-} \rightarrow Tl^{+}In_{1-x}^{3+}Ln_x^{3+}X_2^{2-} \rightarrow Tl_2^{+}In^{3+}Ln^{3+}X_4^{2-}$$

The properties of the conduction band play a dominant role in determining the physical properties of these materials.

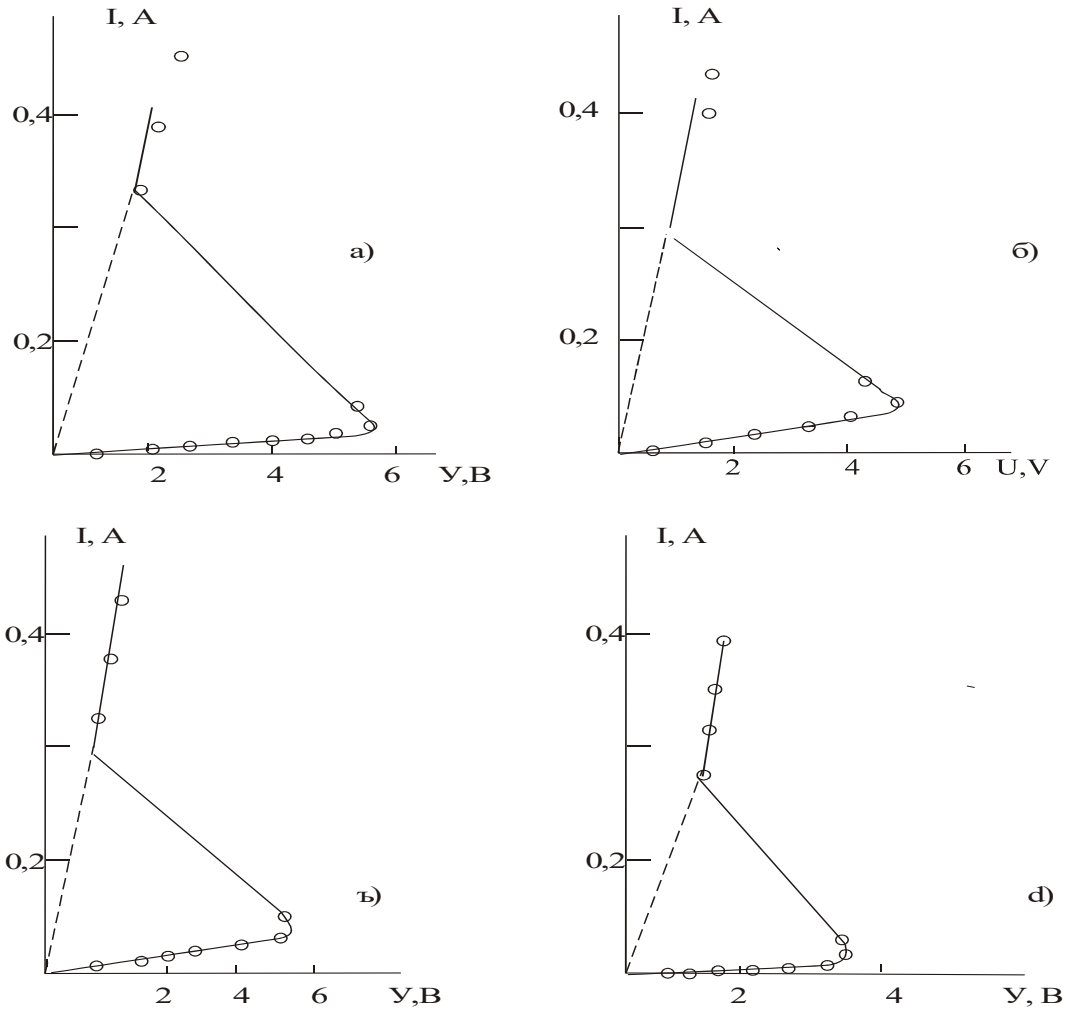

Figure 1. VAX curves of solid solutions $TlIn_{1-x}Gd_xTe_2$:

а-x=0,01; б-x=0,02; с-x=0,06; д-x=0,08

In the presented material, the dependence of the threshold transformation stress characteristic of all alloys and compounds on thickness and composition is studied. Numerous studies of conversion in chalcogenide glassy semiconductors have not provided valuable information about its mechanism. However, for all mechanisms of negative volumetric differential resistance, there is a pattern of formation of a spatially uneven distribution of the field and current power. Many attempts have been made to find out which mechanism (thermal or electronic) plays the dominant role in chalcogenide glassy semiconductors. As a result of the analysis of works devoted to this problem, a more general question arises: does part of the negative differential resistance of the S-type arise due to the action of a field or due to the action of a current? This question can be answered based on the most elementary considerations: field or thermal influences ensure the formation of charge carriers, but the formation of the negative inclined part of the S-negative differential resistance curve occurs due to current influences.

To test the model [5] for measuring threshold parameters in small pulses, the phenomenon of maintaining (presence) a high conductivity region in the part with a cord for a long time after the supply of a converter pulse is used. From the experimental dependence of the threshold voltage on the sample cross-section, it is obtained that the threshold conversion voltage in homogeneous $Tl-In-Te$ layers does not depend on the sample cross-section, and in inhomogeneous layers it decreases as the cross-section increases. Obtaining solid solutions based

on $TlInTe_2$ leads to a change in the crystal structure, which, in turn, necessarily affects this structure and the phonon spectrum of the crystal. The change in the phonon spectrum is manifested in thermal and optical properties, and the change in the zone parameters is manifested in electrical properties.

To explain the mechanism of formation of S-negative differential resistance, as mentioned above, we can talk about the superiority of the role of one or another mechanism, but neither one nor the other mechanism can be denied. Thus, there is a complete qualitative agreement of the phenomenological model with the experimental results. If, as a result of a large inhomogeneity, the current density outside the channel does not exceed $J_{k.b.}$ at any value of the external current and remains less than the minimum value of the current density outside the cord, the conversion does not occur and the channel passes into the cord gradually, without voltage surges. After the current density in the channel becomes equal to the maximum value of the current density in the cord, a vertical part will appear in the VAC , and we will get an ideal voltage stabilizer with a dynamic resistance equal to zero, so in this case an arbitrary change in current will only cause a change in the cord section.

As can be seen from Fig. 1, these conditions are clearly observed in the solid solutions of $TlIn_{1-x}Gd_xTe_2$ studied by us.

Now let's consider the case when the channel is shunted by another part of the sample, in other words, the case when the channel is in a given voltage mode. After the current density in the channel reaches a threshold value, a negative differential resistance S develops in it, but the channel remains resistant to inhomogeneous fluctuations even when the cross-section of the channel, expanding as the current increases, is greater than the critical value. As the current increases, the channel expands and the cross-section of the rest of the sample decreases, its resistance increases and exceeds the critical value at a certain current value. At this time, the channel is transformed into a cord and a conversion event occurs.

Note the following features of this mode:

1) the threshold parameters are affected only by its cross section, and not by the resistivity ρ_k of the material in the channel.

2) with an increase in the cross-section of the sample, with a decrease in its resistance, a large current is required, therefore, with an increase in the cross-section of the sample, the average threshold value of the current density also increases.

Thus, the heterogeneity of the sample not only affects the threshold conversion parameters in chalcogenide glassy semiconductors and their dependence on experimental conditions, but also causes a gradual deterioration of the S-negative differential resistance curve. In long samples, the main part of the delay time is the time of channel formation during voltage distribution along current lines.

However, the results obtained in the study of the VAC compound $TlInTe_2$ and solid solutions of $TlIn_{1-x}Gd_xTe_2$ based on it allow us to conclude that they all have the property of converting electrical memory: with an increase in the average atomic mass, i.e., as indium atoms are partially replaced by lanthanide atoms, the threshold voltage decreases. This is due to the fact that when indium atoms are partially replaced by lanthanide atoms, the displacement of the maximum electron density towards atomic bodies (nuclei) decreases, in other words, the possibility of filling the outer electron shell of the anion to a stable $s^2 p^2$ configuration of the inert gas decreases. When indium atoms are replaced by lanthanide atoms in the $TlInTe_2$ frameworks, the conduction band formed by the 5s and 5p levels of indium also includes the 5d and 6s states of lanthanides. Since the 5s and 5p indium levels are located higher, the conductivity zone of the solution shifts to the region of lower energies, which leads to a decrease in the threshold voltage.

LITERATURE

1. Kostylev S.A., Kodzhespirova I.F., Shkut V.A. Switching in case of localized occurrence of negative differential resistance of the S-type. FTP. 1991, Vol. 25, V. 12, pp. 2184-2188.
2. Kostylev S.A., Shkut V.A. Structure, phys.-chem. properties and applications of non-crystalline semiconductors. Chisinau. 1989, pp. 280-284.
3. Zilichikhis A.L., Irkhin Yu.P. Accounting for the Coulomb interaction between electrons in magnetic semiconductors with a degenerate d-zone. FTT. 1970. vol. 12. No. 7. pp. 1981-1985.
4. Zyuganov A.N., Svechnikov S.V. Injection-contact phenomena in semiconductors. Kiev. 1981. p.255
5. Gakhramanov N.F., Zarbaliev M.M., Agaeva U.M. Solid solutions of $TlIn_{1-x}Ln_xS_2(Se_2Te_2)$ promising materials in negatronics. Materials of the VII International
Scientific and Technical Conference pp.8-11.MAPP. 2013.
6. N. A. Abdullaev, O. Z. Alekperov, Kh. V. Aligulieva, V. N. Zverev, A. M. Kerimova , N. T. Mamedov Journal of Thermoelectricity №1,(2017)
7. N.A. Abdullaev, Kh.V. Aliguliyeva, V.N. Zverev, Z.S. Aliyev, I.R. Amiraslanov , Solid State Physics volume 63, issue 8 , (2021)

Medical Sciences

616:61-053.2-085

Enterosorbents in the complex therapy of CKD in pediatric patients

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Abstract: The presented study assessed the effectiveness of enterosorption in the complex therapy of chronic kidney disease in children. Patients aged 10 to 18 years with a diagnosed CKD of 2-4 degrees were randomized into 2 groups - a therapy group using Polysorb - 19 patients, and a group of standard enterosorbents (activated carbon, tagansorbent) - 19 patients. The effectiveness of enterosorption was assessed based on the dynamics of glomerular filtration rate (GFR) during 9 months of treatment in a hospital and outpatient setting. The data was processed statistically. The results obtained allow us to judge a greater rate of increase in GFR in the group using the Polysorb drug compared to standard sorbents.
Key words: *chronic kidney disease; enterosorption; polysorb; treatment;*

Enterosorption is widely used in the complex therapy of patients with allergy, infectious diseases, gastroenterology and nephrology and is aimed at stopping the action of toxins of various origins and their elimination from the body. For this purpose, peritoneal and hemodialysis, plasmapheresis, and hemosorption are also used.

The main directions of pathogenetic therapy of CKD:

- diet therapy;
- adequate hydrobalance;
- enterosorption;
- correction of deficiencies (vitamin D , iodine, iron, folate)
- correction of hypertension;
- renoprotective therapy;

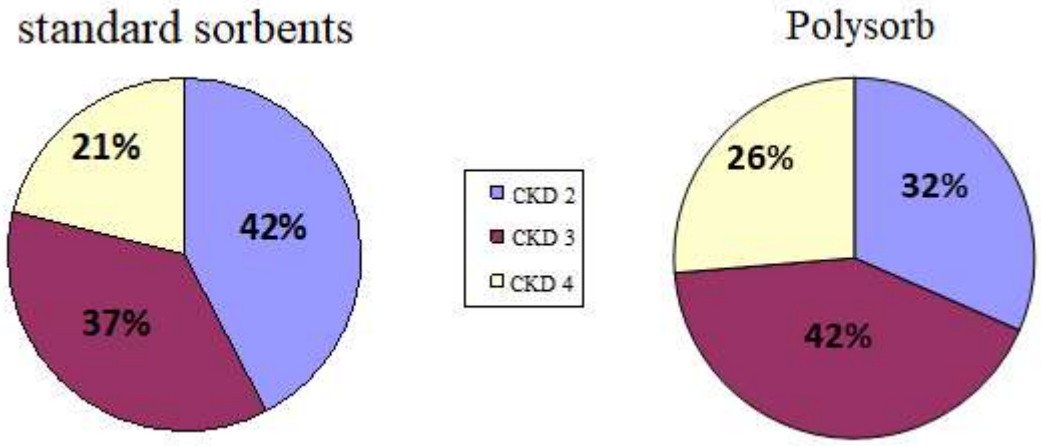
The enterosorbents available in the clinician's arsenal today are represented by activated carbons, ion exchange resins, and lignins, which demonstrate varying degrees of solubility and atraumaticity in relation to the mucous membrane of the gastrointestinal tract. Polysorb is a multifunctional enterosorbent based on highly dispersed silica - used only in the form of an aqueous suspension, it also sorbs some endogenous metabolites, including excess bilirubin, products of nitrogen metabolism, substances of "average molecular weight" responsible for the development of metabolic toxicosis, which causes the possibility of its use in patients with CKD.

Purpose of the study: to analyze the effectiveness of therapy using enterosorbents in the complex treatment of CKD in pediatric patients.

Study tasks:
1) studying the effect of different groups of enterosorbents on the course of CKD in children;
2) comparing the results obtained in patients of both groups;

Methods: general somatic study; laboratory diagnostics; retrospective analysis; statistical analysis. Polysorb was prescribed upon admission of children to the department as initial therapy at the rate of 100 mg of the drug per 1 kg of child weight 2 hours after taking food and other medications; Standard sorbents were prescribed in the following dosages: activated carbon - 150 mg/kg/ day, tagansorbent - 3g/ day.
Simultaneously with enterosorbents, children received standard therapy, in accordance with the approved Republican clinical guidelines.

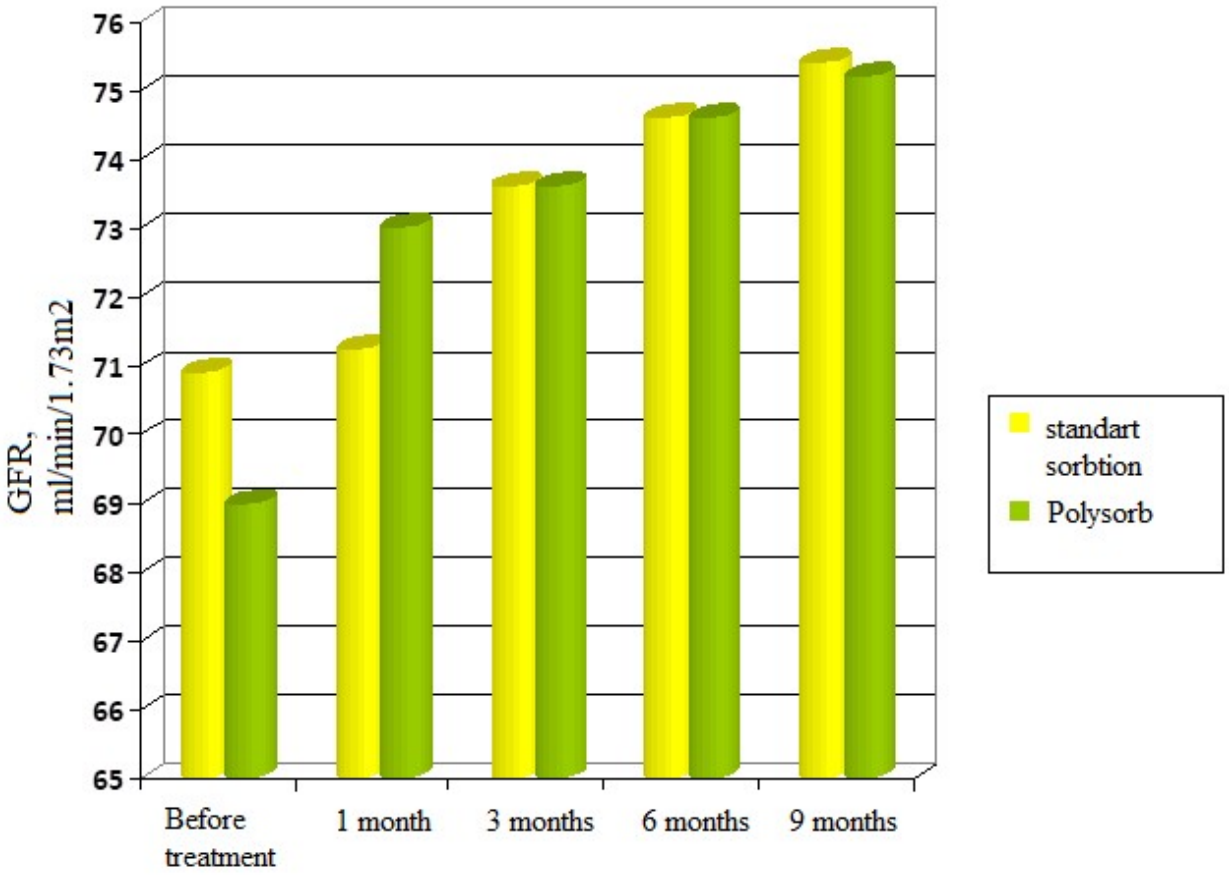
Results and discussion
The study involved 38 patients with an established diagnosis of CKD stages 2-4 of various origins who sought medical help at the Regional Karaganda Children Clinical Hospital. Of these, 21 are female (55.3%), 17 are male (44.7%). The age of the patients ranged from 10 to 18 years and averaged 13.6 years. Patients were randomized into 2 equal sized groups - a standard group enterosorbents and the Polysorb application group. For 9 months, patients received Polysorb at a standard dose of 100 mg/kg body weight per day, or activated carbon at a rate of 150 mg/kg/ day or tagansorbent at a rate of 3 g/ day, in the form of 2-3 weekly courses, with an interval between courses of 2 weeks. The assessment consisted of monthly to quarterly monitoring of biochemical parameters and appropriate visits to the nephrologist.



Pic. 1 Distribution of patients according to the severity of CKD in both groups
All examined patients had an assessment of GFR calculated using the Schwartz formula. All patients tolerated the treatment well and completed the study as planned. Below are the data reflecting the dynamics of the indicators.

Table 1 Calculation of GFR indicators in patients with stage 2 CKD, assessment of the average rate of increase in indicators during treatment.

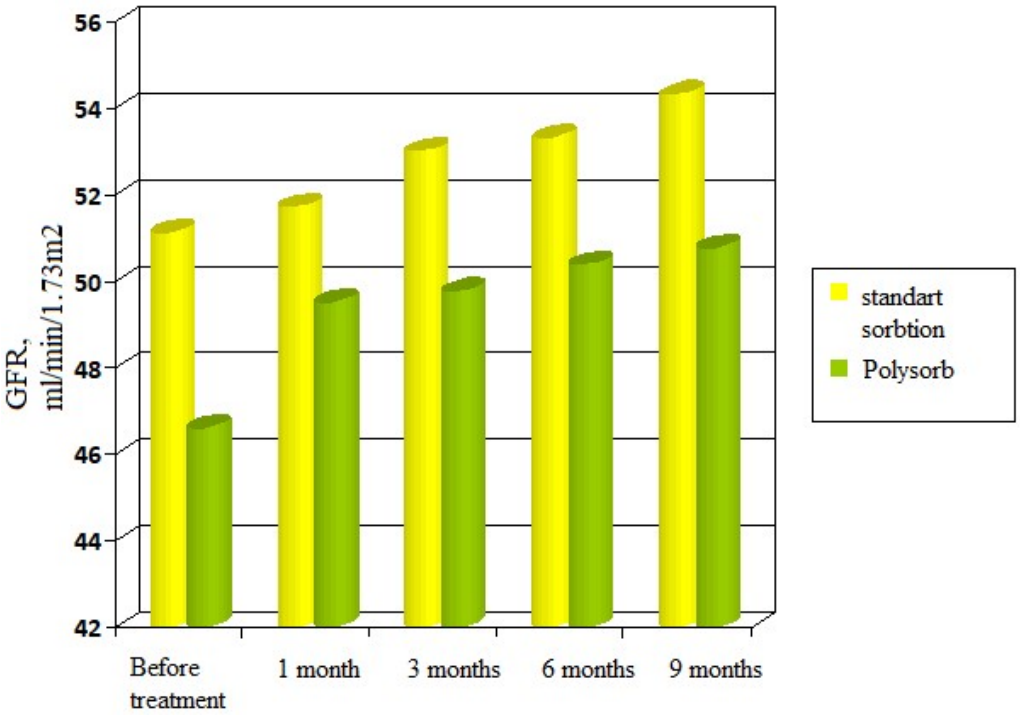
Dynamics of GFR in patients with CKD 2 groups of standard enterosorbents							
Patient number in the subgroup	Before treatment	1 month	3 months	6 months	9 months	Average value	Average growth rate
1	64	64	67	67	68	66	3.33%
2	70	71	73	74	76	72.8	4.12%
3	68	69	71	72	70	70	2%
4	60	61	62	65	66	62.8	5.10%
5	70	70	73	73	74	72	3.05%
6	85	85	87	89	90	87.2	3.20%
7	80	80	84	83	84	82.2	2.70%
8	70	70	72	74	75	72.2	3.90%
Average value	70.9	71.25	73.6	74.6	75.4	73.15	3.40%
Dynamics of GFR in patients with CKD 2 Polisorb application groups							
Patient number in the subgroup	Before treatment	1 month	3 months	6 months	9 months	Average value	Average growth rate
1	70	74	74	75	76	73.8	3.50%
2	62	67	68	69	70	67.2	3.04%
3	65	69	70	71	70	69	3.50%
4	84	87	89	90	90	88	3.40%
5	73	77	76	78	79	76.6	3.40%
6	60	64	65	65	66	63	4.06%
Average value	69	73	73.6	74.6	75.2	72.9	3.48%



Pic. 2 Dynamics of GFR parameters during treatment in patients with CKD 2 in both groups. It is noteworthy that the effect of using the drug Polysorb is observed within a month from the start of therapy, whereas in the standard group enterosorbents, a comparable effect is visible after 3 months.

Table 2 Calculation of GFR indicators in patients with stage 3 CKD, assessment of the average rate of increase in indicators during treatment.

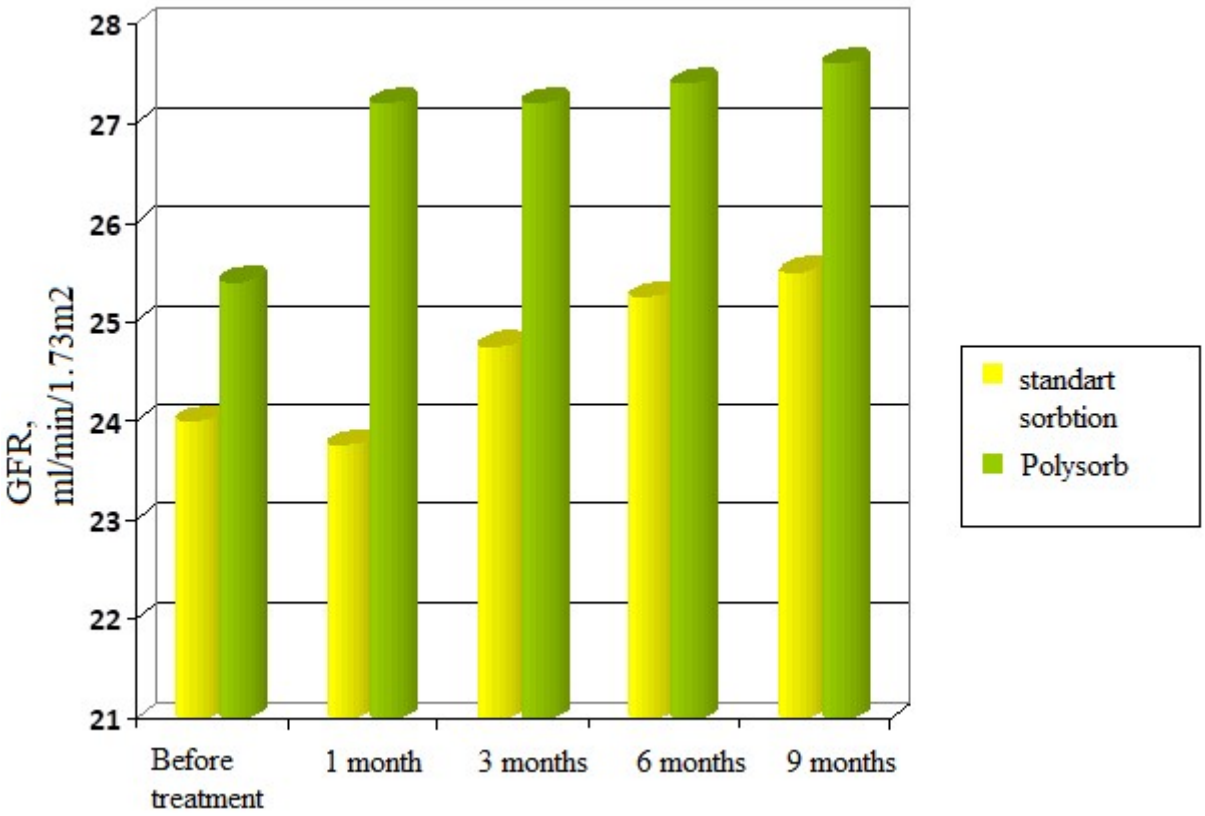
Dynamics of GFR in patients with CKD 3 groups of standard enterosorbents							
Patient number in the subgroup	Before treatment	1 month	3 months	6 months	9 months	Average value	Average growth rate
1	49	50	52	52	52	51	3.14%
2	53	53	54	54	55	53.8	1.86%
3	56	58	57	58	60	57.8	2.77%
4	49	50	51	51	52	50.6	2.77%
5	50	50	52	52	53	51.4	3.10%
6	47	47	49	50	51	48.8	4.50%
7	54	54	56	56	57	55.4	2.89%
Average value	51.1	51.7	53	53.3	54.3	52.7	3%
Dynamics of GFR in patients with CKD 3 Polisorb application groups							
Patient number in the subgroup	Before treatment	1 month	3 months	6 months	9 months	Average value	Average growth rate
1	51	54	54	55	56	54	4.10%
2	48	50	51	52	52	50.6	3.95%
3	49	53	52	53	53	52	3.08%
4	52	54	54	55	55	54	2.60%
5	47	50	51	50	52	50	2.80%
6	39	42	42	43	43	41.8	4.30%
7	50	53	53	54	54	52.8	3.40%
8	37	40	41	41	41	40	4.50%
Average value	46.6	49.5	49.75	50.37	50.75	49.4	3.60%



Pic. 3 Dynamics of GFR parameters during treatment in patients with CKD 3 in both groups. Positive dynamics are noted in both groups. Noteworthy is the faster rate of increase in indicators in the group using the drug Polysorb .

Table 3 Calculation of GFR indicators in patients with stage 4 CKD, assessment of the average rate of increase in indicators during treatment.

Dynamics of GFR in patients with CKD 4 groups of standard enterosorbents							
Patient number in the subgroup	Before treatment	1 month	3 months	6 months	9 months	Average value	Average growth rate
1	27	26	28	29	29	27.8	2.87%
2	19	19	20	20	21	19.8	5.05%
3	26	26	26	27	27	26.4	2.27%
4	24	24	25	25	25	24.6	2.44%
Average value	24	23.75	24.75	25.25	25.5	24.65	3.16%
Dynamics of GFR in patients with CKD 4 Polisorb application groups							
Patient number in the subgroup	Before treatment	1 month	3 months	6 months	9 months	Average value	Average growth rate
1	27	29	29	28	29	28.4	2.10%
2	25	27	28	28	28	27.2	5.15%
3	24	25	25	26	26	25.2	3.97%
4	25	27	26	27	27	26.4	3.03%
5	26	28	28	28	28	27.6	2.89%
Average value	25.4	27.2	27.2	27.4	27.6	26.96	3.40%



Rice. 4 Dynamics of GFR parameters during treatment in patients with CKD 4 in both groups.

Conclusion: The prescribed therapy showed positive dynamics in the form of improvement in renal function in both patients groups. All patients tolerated the treatment well; no side effects requiring discontinuation of the drug were identified in any of the groups. All patients completed the study as planned. In general, the use of enterosorption had a positive effect on the effectiveness of complex therapy; several patients with initial GFR indicators corresponding to CKD stages 2 and 3 (2 patients with CKD 2, and 1 with CKD stage 3), managed to achieve some regression of the disease in the form of an increase in GFR up to CKD grades 1 and 2, respectively . The severity of the rate of increase in GFR in patients in the group using the drug Polysorb was higher in all patients, regardless of the severity of CKD, in comparison with the group of standard sorbents. The data obtained allow us to judge the faster achievement of the desired results from therapy in the case of using the drug Polysorb, however, further observations involving a larger number of patients are necessary to confirm the results.

References:

1. Vershinin A.S., Popilov A.N. Application of enterosorbent Polysorb MP in pediatric practice. RMJ. 2008;18:1178.
2. Polysorb MP (powder for preparing a suspension for oral administration) guidelines for clinical use, - Register of Medicines, approved by the manufacturing company Polysorb CJSC Chelyabinsk, 03/22/2022.
3. Clinical protocol for diagnosis and treatment of the Ministry of Health of the Republic of Kazakhstan: Chronic kidney disease in children, 2019.
4. M.S. Barilko , P.V. Seliverstov, V.G. Radchenko. Modern enterosorption in patients with chronic kidney disease at the predialysis stage. Journal " Pharmateka ", 2016, No. 6, 76-83.
5. Kucher AG, Kayukov IG, Grigorieva ND, Vasiliev AN. Therapeutic nutrition at various stages of chronic kidney disease. Nephrology and Dialysis 2007; 9(2):118-136

6. Smirnov A.V., Kayukov I.G., Yesayan A.M., Dobronravov V.A., Kucher A.G., Tugusheva F.A. Preventive approach in modern nephrology . Nephrology. 2004;8(3):7-14. https://doi.org/10.24884/1561-6274-2004-8-3-7-14
7. Rene G. VanDeVoorde , Bradley A. Warady . Management of Chronic Kidney Disease, from Pediatric Nephrology; 1676-1677; Springer 2009
8. Vozianov AF, Kolesnik NA, Samodumova IM. [Enterosorption in the treatment of chronic kidney failure in patients with surgical diseases of the kidneys] (in Rus.: Enterosorbtsiia v lechenii khronicheskoĭ pochechnoĭ nedostatochnosti u bol'nykh s khirurgicheskimi zabolevaniiami pochek). Lik Sprava . 1992;(2):90-93.

УДК 618.3

ЖҮКТІ ӘЙЕЛДЕРДЕГІ ПРЕЭКЛАМПСИЯНЫҢ КЕЗДЕСУ ЖИІЛІГІ МЕН ЕРЕКШЕЛІКТЕРІ

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Аңдатпа

Өзектілігі: Жүкті әйелдердегі артериялық гипертензияның (АГ) медициналық-әлеуметтік маңызы айтарлықтай жоғары сол себепті жалпы тәжірибелік дәрігерден жүктілік кезіндегі ерекшеліктерді ескере отырып, оны дер кезінде диагностикалау және емдеу тактикасын таңдауда білім мен дағдыларды қажет етеді. Артериялық гипертензияның жүкті әйелдердің ағзасына келтіретін асқынуларының бірі – преэкламсия. Жүктілік фонында преэклампсияның таралу жиілігі әр түрлі. Дегенмен де, преэкламсияның ана мен дамып келе жатқан ұрық денсаулығына тигізетін зиянды әсері жеткілікті. Сондықтан, жүкті әйелдер ағзасына барынша көңіл аударуды талап етеді.

Түйінді сөздер: *Жүктілік, преэкламсия, артериальдық гипертензия, асқыну*

Өзектілігі: Жүкті әйелдердегі артериялық гипертензияның (АГ) медициналық-әлеуметтік маңызы айтарлықтай жоғары сол себепті жалпы тәжірибелік дәрігерден жүктілік кезіндегі ерекшеліктерді ескере отырып, оны дер кезінде диагностикалау және емдеу тактикасын таңдауда білім мен дағдыларды қажет етеді. Артериялық гипертензияның жүкті әйелдердің ағзасына келтіретін асқынуларының бірі – преэкламсия. Жүктілік фонында преэклампсияның таралу жиілігі әр түрлі. Дегенмен де, преэкламсияның ана мен дамып келе жатқан ұрық денсаулығына тигізетін зиянды әсері жеткілікті. Сондықтан, жүкті әйелдер ағзасына барынша көңіл аударуды талап етеді.

Преэклампсияның жүктілік кезеңінде таралу жиілігі әр түрлі, зерттеулер нәтижесінде 5-дан 26,5%-ға дейін тіркелген, әсіресе дамушы елдерде жоғары екендігін көрсетеді [1]. Артериялық гипертензия жүктілік ағымын қиындатып, ұрықтың және жаңа туған нәрестенің жағдайына теріс әсер етеді[2,3]. Преэклампсия ана мен ұрықтың елеулі асқынуларына алып келеді, соның ішінде бауыр, бүйрек функциясының бұзылуларына, миға қан құйылу, шала туылу , мерзімінен бұрын босану және ең қауіптісі өлімге дейін алып келуі мүмкін[4,5].

Зерттеудің мақсаты: Қазақстан Республикасы, Алматы қаласындағы №27 емханадағы преэклампсия кездескен жүкті әйелдердің клиникалық және зертханалық талдауларын зерттеу.

Зерттеу әдісі мен материалдары: Зерттеу жұмысы Қазақстан Республикасы, Алматы қаласындағы №27 емханадағы 20 жүкті әйелдің амбулаториялық ауру тарихынан алынған (форма № 025/у) мәліметтер бойынша жүргізілді. Зерттеу жұмысы барысында мына параметрлер бойынша мәліметтер қарастырылды : жүкті әйелдер жас, АГ, Дене салмағы

индексі (ДСИ), зәрдегі белок, қосымша аурулары, жүктілік мерзімі мен жүктілік саны. Қосымша танымдық ақпараттар PubMed, Google Scholar, CyberLeninka, e-library сайттарынан толықтырылды.
Сандық және сапалық көрсеткіштеріне анализ жасалды. Сандық көрсеткіштер орташа (M) және стандартты (SD) әкетулермен, сапалық көрсеткіщтер жалпы сандармен және пайыздық бөліктермен алынды. Деректер Microsoft Excel және статистикалық программа Jamovi-ға енгізілді және өңделді.

Зерттеу нәтижесі: Қазақстан Республикасы, Алматы қаласындағы №27 емханадағы жүктілігі преэклампсиямен асқынған жүкті әйелдердің жас ерекшеліктерін, жүктіліктің ағымын зерделеп, преэкламсияның жүктілік кезіндегі даму уақытын анықтап және жүкті әйелдерде преэклампсиямен қатар кездескен экстрагенитальды қосымша ауруларын зерттеу бойынша ғылыми жұмыс жасалынды.

Диаграмма – 1
Науқастардың жасына байланысты преэклампсияның кездесу жиілігі

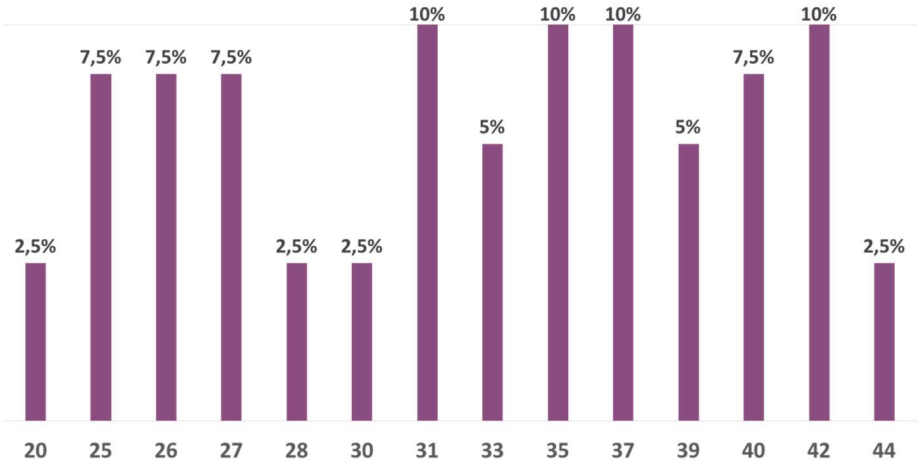


Диаграмма – 2
27 емханадағы преэклампсиямен ауыратын жүкті әйелдердегі зәрдегі анықталған белок мөлшері

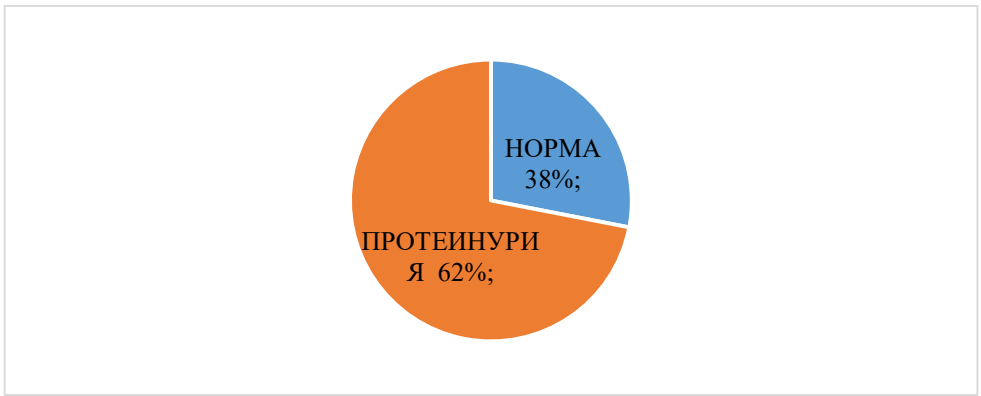


Диаграмма – 3

27 емханадағы преэклампсиямен ауыратын жүкті әйелдердегі зәрдегі анықталған белок мөлшерінің жүктілік аптасына қатынасы

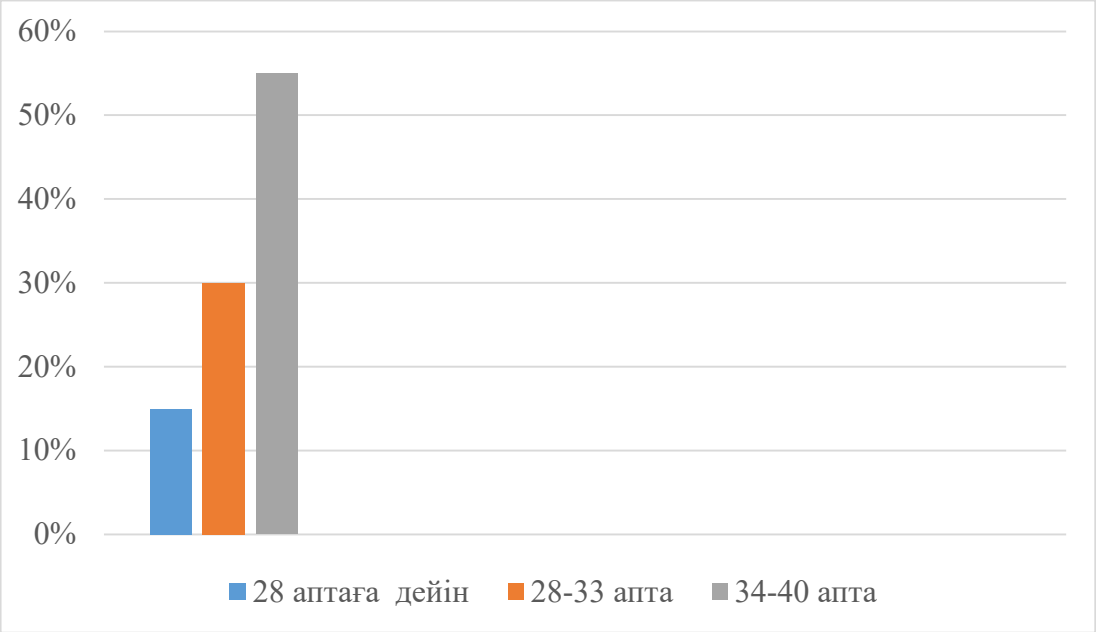


Диаграмма – 4
Преэклампсиямен бірге жүретін қосымша аурулар

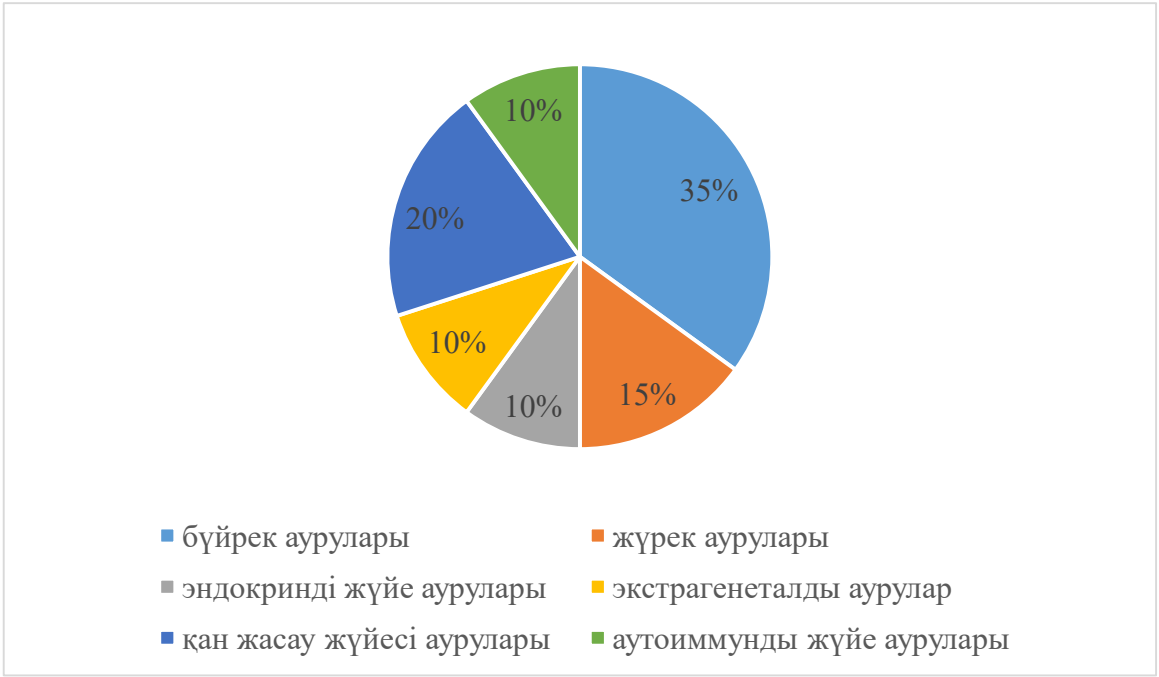
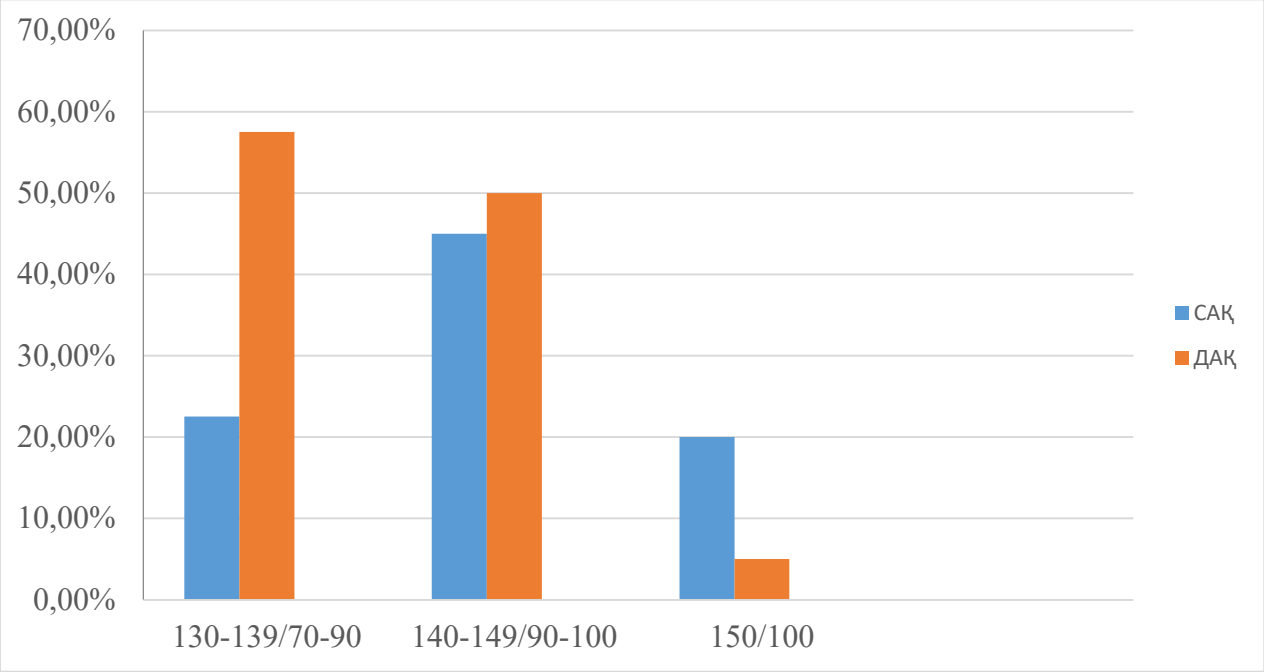


Диаграмма – 5
№27 емханадағы тексеру кезіндегі АҚҚ нәтижелері



Преэклампсия алдын алу шаралары және қауіп топтарын бақылау.

Емханада ЖТД (ВОП) және Акушер гинеколог мамандарының бірлесе жұмыс жасаған тәжірибелеріне негізделе отырып ЖТД (ВОП) міндетіне

- Жүкті әйелдердегі қосалқы және экстрагенитальды ауруларды анықтау,емдеу,асқыну қаупін алдын алу
- Жүктілікке дайындау (витаминокомплекс,иммунет тұрақтандыру т.б)
- Преэклампсияға қауіп тобы әйелдерді анықтау,бақылауға алу,тіркеу

Преэклампсия алдын алу шаралары және қауіп топтарын бақылау

Клиникалық рекомендациялар:

- Преэклампсия жоғарғы қауіп тобы бар барлық жүкті әйелдерді алдын алу мақсатында скрининг бақылау
- Күн сайын АҚ өлшеп отыру
- Гестацияның 11-12 аптасында УДЗ жүргізу барысында жатыр артерияларындағы пульсациялық индексті өлшеп және плацентарлы өсу деңгейін анықтау
- Ауыр жұмыс тәртібі және орнына бас тарту
- дене массасын бақылау мақсатында аптасына 3-4 рет жиілікте 30 минуттан 1,5 сағатқа дейінгі аэробты жаттығулармен айналысу
- Тамақ өнімдерінде кальций жеткіліксіз мөлшерде болса,күнделікті кальций препараттарын 1г қосып қабылдау
- Күнделікті ацетилсалицил қышқылын 12-36 аптаға дейін қабылдау

Қорытынды: Қолданылған әдеби мәліметтер бойынша 2023 жылғы 27 емханадағы жүкті әйелдерді тексеру кезінде преэклампсияның қай мерзімінде пайда болғанына назар аудардық. Жалпы бір жылда тіркеуге алынған жүктілер саны 253 болды, босанған әйелдер саны 264. Зерттеу барысында осы тізімнен 40 жүкті әйелде преэклампсия көрініс берді. Зерттеуде преэклампсияның орташа анықталу мерзімі 33 апта 8 күн. 28 аптаға дейін 15%, 28-33 апта 30% әйелде, 34 аптадан жоғары 55% әйелде тіркелді.

Салыстырмалы түрде 30-42 жас аралығындағы әйелдерде преэклампсия жиі кездесіп 57,5% құрады, және жеңіл өтуімен көрінді.

Жүкті әйелдерде көп жағдайда преэклампсиямен қатар, бүйрек аурулары (32,5%) , анемия (20%)және жүректің ишемиялық аурулары (12,5%) кездескен.

Пайдаланылған әдебиеттер тізімі:

1. Dimitriadis E, Rolnik DL, Zhou W, Estrada-Gutierrez G, Koga K, Francisco RPV, Whitehead C, Hyett J, da Silva Costa F, Nicolaides K, Menkhorst E. Pre-eclampsia. Nat Rev Dis Primers. 2023 Feb 16;9(1):8. doi: 10.1038/s41572-023-00417-6. Erratum in: Nat Rev Dis Primers. 2023 Jul 3;9(1):35. doi: 10.1038/s41572-023-00451-4. PMID: 36797292.
2. Chappell LC, Cluver CA, Kingdom J, Tong S. Pre-eclampsia. Lancet. 2021 Jul 24;398(10297):341-354. doi: 10.1016/S0140-6736(20)32335-7. Epub 2021 May 27. PMID: 34051884.
3. Abraham C, Kusheleva N. Management of Pre-eclampsia and Eclampsia: A Simulation. MedEdPORTAL. 2019 Aug 23;15:10832. doi: 10.15766/mep_2374-8265.10832. PMID: 31773060; PMCID: PMC6868499.
4. Siddiqui MM, Banayan JM, Hofer JE. Pre-eclampsia through the eyes of the obstetrician and anesthesiologist. Int J Obstet Anesth. 2019 Nov;40:140-148. doi: 10.1016/j.ijoa.2019.04.002. Epub 2019 Apr 13. PMID: 31208869.
5. Stiefelhagen P. Die Präeklampsie ist eine lebensbedrohliche Erkrankung [Pre-eclampsia is a life-threatening condition]. MMW Fortschr Med. 2022 Feb;164(3):64-65. German. doi: 10.1007/s15006-021-0640-y. PMID: 35146683.

ЧАСТОТЫ И ОСОБЕННОСТИ ПРЕЭКЛАМПСИИ У БЕРЕМЕННЫХ

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Аннотация

Актуальность: Медико-социальное значение артериальной гипертензии (АГ) у беременных значительно выше, поэтому требует от врача общей практики знаний и навыков в выборе тактики ее своевременной диагностики и лечения с учетом особенностей беременности. Одним из осложнений, которые артериальная гипертензия может вызвать у беременных женщин, является преэклампсия. Частота распространения преэклампсии на фоне беременности различна. Тем не менее, вредного воздействия преэклампсии на здоровье матери и развивающегося плода достаточно. Поэтому организм беременных женщин требуется максимальное внимание.

Ключевые слова: *Беременность, преэклампсия, артериальная гипертензия, осложнения*

THE FREQUENCY AND FEATURES OF PREECLAMPSIA IN PREGNANT WOMEN

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Abstract

Relevance: The medical and social significance of arterial hypertension (AH) in pregnant women is much higher, therefore it requires knowledge and skills from a general practitioner in choosing tactics for its timely diagnosis and treatment, taking into account the peculiarities of pregnancy. One of the complications that hypertension can cause in pregnant women is preeclampsia. The incidence of preeclampsia during pregnancy varies. Nevertheless, the harmful effects of

preeclampsia on the health of the mother and the developing fetus are sufficient. Therefore, the body of pregnant women requires maximum attention.
Keywords: *Pregnancy, preeclampsia, hypertension, complications*

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Зерттеудің ашықтығы: Авторлар осы мақаланың мазмұнына толық жауап береді.

Political Studies

The Impact of Emotional Appeals in Political Misinformation Campaigns

Arman Aisultan

Abstract. This paper examines the impact of emotional appeals in political misinformation campaigns, with a focus on the 2020 U.S. presidential election. It aims to understand how emotions such as fear, anger, and hope are leveraged to manipulate beliefs and behaviors, influencing public opinion and political outcomes. By analyzing the emotional content of misinformation spread during the election, the study seeks to uncover patterns and effectiveness of these appeals. Additionally, the research explores how emotional responses to misinformation vary based on factors like ideology, demographics, and prior beliefs. The findings aim to provide insights for policymakers and the public to navigate political information critically and resist manipulative strategies.

Keywords: Emotional Appeals, Political Misinformation, 2020 U.S. Election, Public Opinion, Manipulation Tactics.

For nearly a quarter of a millennium, the stability of the United States has been underpinned by federalism. The erosion of this phenomenon could have catastrophic consequences for the country. American federalism has at least three dimensions: vertical (the system of checks and balances among the legislative, executive, and judicial branches of government), horizontal (the balance of power between the federal government and the states), and partisan (the ideological competition between the Democratic and Republican parties). One of the most critical aspects of American federalism is regular elections, which divide the political process into time cycles. The 2020 election was expected to be challenging due to the ongoing conflict between the political establishment and President Donald Trump, as well as increasing political polarization. Additionally, the COVID-19 pandemic and its socio-economic consequences, the Black Lives Matter (BLM) protests, and other factors contributed to the "perfect storm" of 2020, posing serious challenges to all three dimensions of American federalism and destabilizing the political system. This paper examines the influence of these events on the horizontal, vertical, and partisan federalism of the United States.

The vertical federalism challenge emerged from the federal-level confrontation between the executive and legislative branches of government, manifested in the intense conflict between Trump and systemic politicians in Congress, including some Republicans. The year began with the first impeachment of President Trump, revealing many contradictions between the White House and Capitol Hill. Although the impeachment did not result in the president's removal, these contradictions persisted and remained a factor in the election campaign.

The challenge to horizontal federalism was driven by the need for centralized pandemic response in the context of the election campaign. The first wave of anti-COVID measures coincided with the start of the presidential primaries, preventing candidates from holding voter meetings. Additionally, the need for anti-COVID restrictions revealed contradictions in horizontal federalism, as many states refused to impose quarantines, mandate masks, or comply with other measures. As a result, some states postponed or even canceled election events, and due to the unprecedented popularity of mail-in voting, many states began to reform electoral laws to limit early voting opportunities. For instance, the turnout for mail-in voting in the 2020 election was

approximately 43%, a significant increase from the 2016 election, where only 21% of voters used mail-in ballots (Pew Research Center, 2021).

The challenge to partisan federalism was marked by the spread of two relatively new ideological movements: BLM and Trumpism. The spontaneous BLM protests, initially related to police violence and the protection of black rights, quickly became filled with political slogans, and candidates' election campaigns in almost all states could not ignore BLM. According to Pew Research Center (2020), about 67% of U.S. adults supported the BLM movement in June 2020, showing significant public engagement. Another movement influencing the ideological preferences of American voters was Trumpism. Although Trump was formally nominated by the Republicans, contradictions with many party members, including political heavyweights, had been evident since the 2016 election campaign. Over four years, Trump failed to smooth these contradictions; on the contrary, many of his actions indicated that he sought to ensure his supporters' presence at various levels of federal and state governments. Some Russian Americanists even believe that Trump "effectively dismantled the Republican establishment and made 'Trumpism' a self-sufficient (quasi-)ideology" (Galeotti, 2022).

The year 2020 was a "stress test" for American federalism, with each of its dimensions being tested for strength, experiencing serious trials, and revealing challenges and existing problems. Two years after the election of a new president, it is clear that many events continue to influence American politics. According to a Gallup poll (2021), only 44% of Americans approved of the way democracy was working in the United States, a significant decline from 58% in 2016. Moreover, the level of political polarization reached unprecedented heights, with 77% of Americans perceiving the nation as divided (Pew Research Center, 2021).

Based on this theoretical approach, we consider that U.S. news media, as an institution sharing a cohesive set of beliefs and values guiding the practice of correcting false information in news coverage, should operate similarly across organizations. Underlying this expectation is the assumption that where journalistic correction is present in news coverage, the practice is guided by this shared set of norms and values. Therefore, for this study's purposes, instances of correction of false information present in coverage by a diverse sample of outlets and media are examined globally, as opposed to by individual outlet, to shed light on how false information can be corrected by the news media as an institution.

The consideration of the news media as an institution is relevant for case selection as well, as the most popular false information cases surrounding the 2016 and 2020 U.S. presidential elections focused on stories that benefitted Donald Trump over his political opponents. Specifically, for 2016, we selected the false story that Pope Francis endorsed Trump (the "Pope case"), which drove the most engagement on Facebook three months before the 2016 election (Silverman, 2016). Additionally, we selected the false claim that Hillary Clinton and her campaign manager ran a pedophilia ring in a pizza shop. This case, also known as "Pizzagate," drove broad coverage from mainstream media even before it resulted in a shooting in said pizza shop (Al-Rawi, 2019; Gillin, 2016; Tsfati et al., 2020). For 2020, we selected the false claim that the presidential election was fraudulent and stolen (the "Stop the Steal" case) (Funke, 2020) and the false story that liberal politicians and celebrities were Satan worshippers and pedophiles (the "QAnon case"), linked to the QAnon conspiracy theory (Drobnic Holan, 2020). Despite news outlets' ideological leanings, based on our institutional approach, we expect to find correcting strategies employed by journalists across media. In that vein, it is important to consider that most U.S. news outlets conduct fact-checks internally or in partnership with external organizations (Graves, 2016).

We selected cases that were most popular on fact-checking sites, social and mainstream media, and/or which had the highest sociopolitical impact as estimated by previous research (Al-Rawi, 2019; Drobnic Holan, 2016; Funke, 2020; Funke & Sanders, 2020; Gillin, 2016; Silverman, 2016; Silverman & Alexander, 2016; Valverde, 2020) to assure ample news media coverage. While

some suggest deliberation at the root of some of these cases (e.g., Silverman & Alexander, 2016), their popularity complicates the task of discerning publics' intention when sharing related information. Therefore, we describe them as false information cases instead of disinformation or misinformation, the intentional or unintentional spread of false information, respectively (Wardle, 2017). We recognize that popular cases of false information might have been reported on differently than those less prominent. However, our goal was to maximize our chances of finding instances of journalistic correction.

In sum, an institutional theoretical approach allows us to conduct a qualitative exploration to identify dimensions present in the correction of false information in coverage across U.S. news media and cases of false information. As seen above, previous literature on the correction of false information has been largely quantitative. The next section explains the focus and contributions of this qualitative inquiry.

Table 1: Key Statistics and Data Points from the 2020 U.S. Presidential Election and Related Studies

Topic	Statistic/ Number	Source	Description
Voter Confidence in Election	59%	Pew Research Center, 2020	Percentage of voters affirming that the 2020 U.S. presidential election was managed correctly.
Confidence Among Trump Supporters	21%	Pew Research Center, 2020	Percentage of Trump supporters who believed the election process was managed correctly.
Confidence in Vote Counting (Democrats)	78%	Pew Research Center, 2020	Percentage of Democratic voters confident that their vote was counted accurately in person.
Confidence in Vote Counting (Republicans)	19%	Pew Research Center, 2020	Percentage of Republican voters confident that their vote was counted accurately in person.
Biden Voters' Confidence in Absentee Voting	95%	Pew Research Center, 2020	Percentage of Biden voters confident in the absentee voting process.
Trump Voters' Confidence in Absentee Voting	19%	Pew Research Center, 2020	Percentage of Trump voters confident in the absentee voting process.
Trust in Biden's COVID-19 Management	58%	Pew Research Center, 2020	Percentage of Biden voters with high confidence in his ability to manage the COVID-19 health crisis.
Trust in Trump's COVID-19 Management	47%	Pew Research Center, 2020	Percentage of Trump voters with high confidence in his ability to manage the COVID-19 health crisis.
Responsibility for Capitol Attack	52%	Pew Research Center, 2021	Percentage of Republicans who believe Trump bears at least some responsibility for the Capitol disturbances.
Biden's Post-Election Conduct (Positive)	64%	Pew Research Center, 2021	Percentage of voters rating Biden's post-election conduct as good or very good.

Trump's Post-Election Conduct (Negative)	76%	Pew Research Center, 2021	Percentage of voters rating Trump's post-election conduct as poor.
Belief in Trump Winning the Election	34%	Pew Research Center, 2021	Percentage of U.S. voters who incorrectly believe that Trump won the election.
Belief in Trump Winning Among Trump Supporters	75%	Pew Research Center, 2021	Percentage of Trump supporters who incorrectly believe that Trump won the election.
Electoral Fraud Narratives (Democrats)	1%	Pew Research Center, 2021	Percentage of Democrats who believe the electoral fraud narratives.
Spread of False Information	30 million shares	Allcott & Gentzkow, 2017	Fabricated stories favoring Donald Trump were shared 30 million times on social media, significantly higher than those favoring Hillary Clinton.

Methodology

In the context of unprecedented political polarization in the U.S., and in the face of Trump's and his followers' attempts to delegitimize the outcome of the 2020 presidential election, it is necessary to analyze the evolution of public opinion from Election Day, November 3, 2020, to the certification by Congress of Joe Biden as president-elect, on January 6, 2021. Given the objectives of this study, the following research questions were posed:

RQ1: What have been the causes of the loss of confidence in Trump manifested by a segment of the American electorate after the U.S. election?

RQ2: What is the electorate's opinion of Trump's populist strategy in the post-election phase?

RQ3: How have Trump's fraud speech and the incidents of the Capitol attack influenced the change of attitudes of the U.S. electorate?

From these questions, the main hypothesis was developed:

MH: Populism emerges as a communicative and discursive strategy in the context of management systems based on capitalism and globalization.

Secondary hypotheses included:

SH1: Political populism, when perceived as such, generates rejection and distrust in the electorate.

SH2: The attack on the Capitol and Donald Trump's reaction after learning the polling data generated a change in the attitude of the Republican electorate.

Methodology

For this study, a mixed-methods approach was employed, combining quantitative and qualitative methodologies based on the comparative analysis of secondary data. Specifically, the responses of 11,818 respondents collected by Pew Research's American Trend Panel (2020) were analyzed, to which we added 5,360 responses from the Pew Research's American Trend Panel (2021).

The data collection involved two waves of surveys:

Wave 78 of the American Trends Panel (Pew Research's American Trend Panel 2020): Conducted by the Pew Research Center, this survey aimed to understand the attitudes of the American electorate after the 2020 presidential election. It was conducted between November 12 and 17, 2020, among 11,818 U.S. adults, including 10,399 U.S. citizens who reported voting in that

election. The survey had a margin of sampling error of ±1.6 percentage points and was weighted to be representative of the U.S. adult population by gender, race, ethnicity, political affiliation, education, and other categories.

Wave 80 of the American Trends Panel (Pew Research's American Trend Panel 2021): This survey examined public reactions to the aftermath of the 2020 presidential election, including views of Biden as president-elect and the assault on Capitol Hill. Conducted between January 8 and 12, 2021, it included responses from 5,360 U.S. adults, with a margin of error of ±1.9 percentage points, ensuring representativeness based on variables such as gender, race, ethnicity, political affiliation, and education.

The analysis focused on comparing responses related to Trump's political management and his discourse on delegitimizing the elections. The results of the study are based on the selection of data, interpretation of results by items, and comparison of responses related to Trump's political management and the discourse of delegitimization of the elections.

In addition to the quantitative data analysis, a qualitative textual analysis of news media coverage of four cases of false information surrounding the 2016 and 2020 U.S. presidential elections was conducted to examine the emphasis, tone, and framing of evidence in correcting strategies used by the news media. The sample included major U.S. media outlets, such as national newspapers (The New York Times, USA Today, The Wall Street Journal, and The Washington Post), broadcast transcripts (NBC, ABC, CBS, PBS, NPR), and cable news transcripts (CNN, MSNBC, Fox News).

The sampling strategy involved defining queries to search in the Factiva database and selecting news media coverage published or aired between September 1 and January 31 of both years, 2016 and 2020. Stratified random sampling at the outlet level was used to select approximately 10% of the stories in each news media outlet for each case. This approach ensured a manageable sample for in-depth qualitative analysis.

The qualitative analysis followed a three-step process: (1) data immersion, (2) first cycle coding, and (3) second cycle coding. First cycle coding involved descriptive coding to compile a list of themes in the data, corresponding to correcting strategies present in the data. Second cycle coding grouped the codes into three categories: emphasis, tone, and evidence framing.

By combining quantitative and qualitative methods, this study aimed to provide a comprehensive understanding of the impact of emotional appeals in political misinformation campaigns and the effectiveness of corrective strategies in the news media.

Research Question 1: Causes of Loss of Confidence in Trump

The data from Pew Research Center's American Trends Panel revealed significant insights into the causes of the loss of confidence in Donald Trump among segments of the American electorate after the 2020 election.

Post-Election Conduct Evaluation

There was a stark divide between Democratic and Republican voters regarding the post-election conduct of Donald Trump and Joe Biden. Nearly seven in ten voters (68%) rated Trump's conduct as only fair or poor, with 54% considering it bad. Conversely, Joe Biden received positive marks from 62% of respondents for his conduct, with nearly three times as many voters rating Biden's conduct as excellent compared to Trump (38% vs. 13%).

While a majority of voters (59%) affirmed that the presidential election was managed correctly, only 21% of Trump's supporters shared this positive view. This indicates the impact of Trump's discourse of conspiracy and denial of election results on his supporters' attitudes.

78% of Democratic supporters expressed strong confidence that their votes were counted accurately, compared to only 19% of Republicans. This discrepancy was even more pronounced in absentee voting, with 95% of Biden voters confident in the system versus only 19% of Trump

voters. The persistent attacks on the electoral process by Trump influenced the trust of his supporters in the vote-counting system.

The evolution of trust in the correct recounting of votes showed that Biden voters' confidence increased by 8% post-election, while Trump voters' confidence dropped by 29%. This demonstrates the growing division and decreased trust among Trump supporters due to the continued narrative of electoral fraud promoted by Trump.

Research Question 2: Voters' Views on Trump's Populist Strategy

Voters' trust in the candidates' ability to manage the COVID-19 health crisis. Biden voters were particularly critical of Trump, with 86% having no confidence in his ability to manage the pandemic, while only 55% of Republicans lacked confidence in Biden. This disparity further reflects the polarized opinions on the candidates' handling of the crisis.

The majority of the public believed that Trump bore at least some responsibility for the Capitol disturbances, with 52% saying he bore a great deal of responsibility. Even among Republicans, 52% acknowledged Trump's responsibility, compared to 95% of Democrats. This acknowledgment of responsibility indicates a shift in attitudes among some of Trump's supporters.

The evolution of the evaluation of Trump's and Biden's behavior post-election. Biden's conduct was viewed positively by 64% of respondents, with a 2% increase since Election Day. In contrast, negative evaluations of Trump's conduct rose from 68% in November to 76% in January. Approval among Republican voters also fell to 60%, down from the 74%-85% range during his term.

Research Question 3: Influence of Trump's Fraud Speech and Capitol Attack

Despite the violence on Capitol Hill, a significant portion of voters (34%) believed Trump won the election, a figure that rose to 75% among his supporters, as shown in Figure 10. Only 22% of Republicans recognized Biden's victory. This indicates the enduring influence of Trump's fraud narrative among his base, even after the Capitol attack.

Table 3. Key Findings and Statistics from the Analysis of Pew Research Data

Research Question (RQ)	Key Finding	Statistic/ Number	Description
RQ1: Causes of Loss of Confidence in Trump	High disapproval of Trump's conduct post-election	68% (Nov 2020), 76% (Jan 2021)	Percentage of voters rating Trump's conduct as poor.
	Positive assessment of Biden's post-election behavior	62% (Nov 2020), 64% (Jan 2021)	Percentage of voters rating Biden's conduct as good or very good.
	Trust in election management among voters	59%	Percentage of voters affirming that the election was managed correctly.
	Trust in election process among Trump supporters	21%	Percentage of Trump supporters with a positive view of the election process.
RQ2: Voters' Views on Trump's Populist Strategy	Voters believing elections were well managed	59%	Percentage of voters who believe the elections were well managed.
	Voters convinced their vote was counted correctly	78% (Democrats), 19% (Republicans)	Confidence in vote counting among Democratic and Republican voters.

	Decline in confidence in vote count among Trump supporters	-29%	Decrease in Trump voters' confidence in the vote count from pre-election to post-election survey.
RQ3: Influence of Trump's Fraud Speech and Capitol Attack	Trump supporters who think Trump won the election	75%	Percentage of Trump supporters who incorrectly believe Trump won the election.
	Overall voters who think Trump won the election	34%	Percentage of U.S. voters who incorrectly believe Trump won the election.
	Responsibility for Capitol disturbances	52% (Republicans), 95% (Democrats)	Percentage of Republicans and Democrats who believe Trump bears at least some responsibility for the Capitol disturbances.
	Biden voters' confidence in candidate's ability to manage COVID-19 crisis	58%	Percentage of Biden voters with high confidence in his ability to manage the COVID-19 health crisis.
	Trump voters' confidence in candidate's ability to manage COVID-19 crisis	47%	Percentage of Trump voters with high confidence in his ability to manage the COVID-19 health crisis.
	Public opinion on Trump's responsibility for Capitol violence	52% (some responsibility), 24% (no responsibility)	Percentage of the public believing Trump bears some responsibility for Capitol violence versus those who believe he bears none.
	Assessment of Joe Biden's conduct post-election	64% (good or very good)	Percentage of voters who considered Biden's conduct post-election as good or very good.

The qualitative analysis revealed varying degrees of emphasis on correct and false information in news media coverage. Correct information was emphasized by focusing on true events without repeating false claims. For instance, news coverage on the Pizzagate case focused on the shooting incident without elaborating on the false pedophilia claims. In contrast, repeating and debating false information, as seen in coverage of Trump's false tweets about the election, emphasized false information.

The tone of coverage varied in assertiveness. Assertive language, using terms like "utterly false" and "deliberate lie," was employed to strongly refute false claims, as seen in the Pizzagate case. Emotionally intense language, such as "insane" and "ridiculous," was used to describe conspiracy theories like QAnon. However, less assertive language, such as "misleading" and "alleged," was also noted, which could undermine the effectiveness of corrections.

Evidence framing included using external sources like witnesses and official entities (e.g., FBI) to support corrections. For instance, the owner of the pizza parlor in the Pizzagate case provided firsthand evidence to disprove the false story. Including sources well-regarded by specific audiences, such as law enforcement for conservative publics, enhanced the credibility of corrections.

The results indicate a profound impact of emotional appeals in political misinformation campaigns on public opinion. The polarization between Democratic and Republican voters, fueled by emotional and conspiratorial narratives, underscores the challenges in correcting false information. Assertive tone and careful framing of evidence are crucial for effective corrections.

The enduring belief in false narratives among segments of the electorate highlights the need for robust fact-checking and educational initiatives to foster critical thinking and resilience against misinformation.

References:

1. Al-Rawi, A. (2019). Social Media and Pizzagate: The Role of Hyper-Partisan Websites and Bots in Promoting False Information. Social Media + Society, 5(3).
2. Drobnic Holan, A. (2020). How QAnon emerged as a real-world political threat in 2020. PolitiFact. Retrieved from https://www.politifact.com/
3. Funke, D. (2020). The false claim that the presidential election was fraudulent and stolen. PolitiFact. Retrieved from https://www.politifact.com/
4. Funke, D., & Sanders, L. (2020). The top 10 fake news stories of 2020. PolitiFact. Retrieved from https://www.politifact.com/
5. Galeotti, A. E. (2022). The Political Disinformation and Voting Behavior: Cognitive Distortions and the Public Sphere. Journal of Political Studies, 66(6), 28-33.
6. Gillin, J. (2016). Pizzagate: From rumor to hashtag to gunfire in D.C.. PolitiFact. Retrieved from https://www.politifact.com/
7. Graves, L. (2016). Deciding what's true: The rise of political fact-checking in American journalism. Columbia University Press.
8. Pew Research Center. (2020). Public Support for Black Lives Matter Has Decreased Since June but Remains Strong Among Black Americans. Retrieved from https://www.pewresearch.org/
9. Silverman, C. (2016). This Analysis Shows How Viral Fake Election News Stories Outperformed Real News on Facebook. BuzzFeed News. Retrieved from https://www.buzzfeednews.com/
10. Silverman, C., & Alexander, L. (2016). How Teens In The Balkans Are Duping Trump Supporters With Fake News. BuzzFeed News. Retrieved from https://www.buzzfeednews.com/
11. Tsfati, Y., Boomgaarden, H. G., Strömbäck, J., Vliegenthart, R., Damstra, A., & Lindgren, E. (2020). Causes and Consequences of Mainstream Media Dissemination of Fake News: Literature Review and Synthesis. Annals of the International Communication Association, 44(2), 157-173.
12. Valverde, M. (2020). How the election was stolen: The 'stop the steal' campaign. PolitiFact. Retrieved from https://www.politifact.com/
13. Wardle, C. (2017). Fake News. It's Complicated. First Draft. Retrieved from https://firstdraftnews.org/

Art History

Outstanding representative of Azerbaijani sculpture- Omer Eldarov

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Abstract. The outstanding sculptor Omar Eldarov, who has his own rich inner world, is a genius who created unforgettable images.
The first signs of the emergence of this style appeared at the end of the 19th century. Architects gave up stone and wood and succeeded in creating large-scale buildings thanks to the use of glass, iron and concrete constructions. Will and elegance, improvisation and perfection, depth and the ability to feel are the main things that accompany Omar Eldarov's creativity. The influence of his creativity on the artistic environment of our country cannot be underestimated. The harmony of the inner content and form in the sculptor's works prompts a person to think involuntarily.
The sculptures created by Omar Eldarov always attract attention with their dynamism. The courage, optimism and moral responsibility inherent in his character are embodied in the artist's work, especially in the artistic expression of images.
Keywords: Omar Eldarov, sculpture, image, material, historical personality

Ömər Həsən oğlu Eldarov 21 dekabr 1927-ci ildə Dağıstan Muxtar Respublikasının Dərbənd şəhərində anadan olmuşdur.Azərbaycan Rəssamlıq Məktəbinin heykəltaraşlıq bölməsini bitirmişdir.Ömər Eldarov peşə təhsilini artırmaq məqsədilə Peterburqdakı İ.Repin

adına Rəngkarlıq, Heykəltaraşlıq və Memarlıq İnstitutunun Heykəltaraşlıq fakültəsində təhsilini davam etdirib.

Öz zəngin daxili aləmi olan görkəmli heykəltaraş Ömər Eldarov unudulmaz obrazlar yaratmış dahi şəxsiyyətdir .

Bu üslubun yaranmasının ilkin işartıları 19-cu əsrin sonlarında özünü göstərdi.Memarlar daş və ağacdan imtina edərək şüşə, dəmir- beton konstruksiyalardan istifadə sayəsində irihəcimli tikililəryaratmağa nail oldular.İradə və zəriflik, improvizasiya və kamillik , dərinlik və duymaq bacarığı Ömər Eldarov yaradıcılığını müşayiət edən başlıca xüsusuyyətlərdir.Onun yaradıcılığının ölkəmizin bədii mühitinə təsirini qiymətləndirməmək olmaz.Heykəltaraşın əsərlərində daxili məzmunla formanın harmoniyası insanı qeyri- ixtiyari düşünməyə sövq edir.

Ömər Eldarovun yaratdığı heykəllər öz dinamikliyi ilə daim diqqəti cəlb edir.Onun xarakterinə xas olan cəsurluq, nikbinlik və mənəvi məsuliyyət sənətkarın yaradıcılığında ,xüsusən obrazların bədii ifadəsinə təcəssüm olunur.

Ömər Eldarov şairə Natəvan şəxsiyyətinə bir neçə dəfə müraciət etmişdir.Zəngin geyinmiş ,ampir üslubunda olan kresloda oturmuş zadəgan qadının tunc heykəli harmoniyanın və incə zövqün ən yüksək təzahürünün nümunəsi kimi bu gün də paytaxtımızın mərkəzi meydanını bəzəyir.

İnsanların həyatındakı romantikaya və dinamikaya meyil, qəhrəmanların daxili vəziyyəti,onların qəhrəmanlıq mübarizəsindən doğan duyğuları - bütün bunlar müəllif düşüncəsinin dərinliyini ,onun humanist istiqamətini xarakterizə edən cəhətlərdir.

Ustad lirik və vətənpərvərlik ruhunda olan obrazların bədii həllində etik prinsipləri önə çəkir.Bu ,Hüseyn Cavidə həsr olunmuş heykəltaraşlıq ansamblında qabarıq hiss olunur.Cavidin pyeslərinin ideyasını ön plana çəkən Ömər Eldarov heykəldə dramaturqun əyilməz ruhunu təcəssüm etmişdir.Heykəltaraş şairi yüksək mənəvi, yaradıcı düşüncələrə daldığı anda təsvir etmişdir.Əsərin memarlıq - kompozisiya həlli bu güclü , mürəkkəb və yaradıcı ehtiraslı şəxsiyyətin obrazını açmağa yönəlmişdir.

Lirik , mövzusu onun bütün yaradıcılığını müşayiət edir.Portretlər, büstlər, heykəllər -- hər birinin psixoloji təsiri çox güclüdür.

Ömər Eldarov böyük rəssam Səttar Bəhlulzadənin portretinə də fəlsəfi - romantik yanaşmışdır.Bu obraz dahinin yaradıcı ruhunun təcəssümüdür.Bakının Əmircan qəsəbəsində qoyulan S.Bəhlulzadənin qəbirüstü heykəlində məkan kompozisiya dinamika obraz bir - birini çox gözəl tamamlayır.

Ömər Eldarov tarixdə iz qoyan möhtəşəm mədəniyyət nümunələri yaradıb.Azərbaycan Rəssamlıq Akademiyasının rektoru vəzifəsində fəaliyyət göstərib.

ƏDƏBİYYAT SİYAHISI:

1.Əliyev Z. “Çağdaş heykəltəraşlığımızın lideri”. Mədəniyyət 2009. s 4
2.Qacar G. “Ömər Eldarov”. Bakı 2013. 96 s

Economic Sciences

АНАЛИЗ ЭФФЕКТИВНОСТИ И ЭКОНОМИЧЕСКОЙ ЦЕЛЕСООБРАЗНОСТИ ОРГАНИЗАЦИОННЫХ МОДЕЛЕЙ СЛУЖБЫ ЭКСТРЕННОЙ СОСУДИСТОЙ ХИРУРГИИ

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Аннотация

Современная система здравоохранения сталкивается с вызовом обеспечения высококачественной и доступной медицинской помощи при ограниченных ресурсах. Эффективность и экономическая целесообразность организационных моделей службы экстренной сосудистой хирургии играют ключевую роль в повышении качества лечения пациентов с сосудистыми заболеваниями. Данная статья представляет собой сравнительный анализ различных моделей организации экстренной сосудистой хирургии на международном и национальном уровнях. Основное внимание уделено структуре служб, методам управления, используемым технологиям и подходам к финансированию. Результаты анализа показывают, что оптимизация управления и финансирования, интеграция инновационных технологий и внедрение унифицированных стандартов могут значительно улучшить качество и доступность медицинской помощи. На основе анализа сформулированы рекомендации для усовершенствования работы служб экстренной сосудистой хирургии, направленные на повышение их эффективности и экономической целесообразности.

Ключевые слова: экстренная сосудистая хирургия, медико-экономическая оценка, организационные модели, эффективность, экономическая целесообразность, здравоохранение, оптимизация, инновационные технологии, управление затратами, качество медицинской помощи, доступность медицинских услуг.

Введение

В эпоху быстрого развития медицинских технологий и одновременного ужесточения экономических рамок здравоохранения, вопросы эффективности и экономической целесообразности оказания медицинской помощи выходят на передний план. Экстренная сосудистая хирургия, являясь одним из наиболее динамично развивающихся направлений медицины, сталкивается с особыми вызовами в контексте обеспечения своевременной и качественной помощи пациентам при ограниченных ресурсах. Важность данной проблематики обусловлена критическим значением времени при лечении сосудистых заболеваний, когда задержка в оказании помощи может привести к серьезным, иногда необратимым последствиям для здоровья пациента. В этой связи анализ эффективности и экономической целесообразности различных организационных моделей службы

экстренной сосудистой хирургии приобретает особую актуальность. Целью данной статьи является проведение комплексного обзора и сравнительного анализа существующих подходов к организации экстренной сосудистой хирургии на международном и национальном уровнях, выявление наиболее эффективных моделей и практик управления. Особое внимание уделяется изучению влияния организационной структуры, применяемых технологий, методов финансирования и управления на качество и доступность медицинской помощи, а также на экономическую эффективность службы в целом.

Для достижения поставленных целей будет использован широкий спектр методологий медико-экономического анализа, включая оценку затрат-эффективности, затрат-полезности и затрат-выгоды. Анализ будет опираться на актуальные исследования, статистические данные, а также на примеры из практики различных стран, демонстрирующие разнообразие подходов к организации экстренной сосудистой хирургии и их влияние на исходы лечения. Введение в данную тематику подчеркивает не только экономические, но и социальные аспекты здравоохранения, выделяя значимость обеспечения доступной и качественной медицинской помощи как одного из ключевых приоритетов общества. Результаты данного анализа могут служить основой для разработки рекомендаций по оптимизации работы служб экстренной сосудистой хирургии, направленных на повышение их эффективности и улучшение качества медицинского обслуживания.

Выбранным объектом исследования является Республиканское государственное предприятие на праве хозяйственного ведения "Национальный госпиталь Медицинского центра Управления делами Президента Республики Казахстан" (РГП "НГ МЦ УДП РК"), находящееся по адресу: 050091, город Алматы, Алмалинский район, улица Панфилова, дом 139, Республика Казахстан. Данное учреждение представляет собой высокоспециализированный медицинский комплекс, оказывающий широкий спектр медицинских услуг населению. Кроме того, зарубежный опыт будет рассмотрен с целью выявления лучших практик и подходов, которые могут быть адаптированы и внедрены для оптимизации работы сосудистой службы в Казахстане.

Основная деятельность РГП "НГ МЦ УДП РК" включает в себя работу как больниц широкого профиля, так и специализированных медицинских учреждений. Больница предоставляет услуги лабораторий и технических служб, в том числе рентгенологические услуги, услуги в области радиологии и анестезии. Кроме того, здесь проводится общая врачебная практика, медицинские консультации и лечение в сфере общей медицины, предоставляемые врачами общего профиля, а также работает ряд медицинских лабораторий. Параллельно, зарубежный опыт поможет оценить различные модели организации служб экстренной сосудистой хирургии, выявить успешные практики управления качеством и эффективностью, которые могут быть релевантны для условий Казахстана.

В частности, Центр сердечно-сосудистой хирургии в составе РГП "НГ МЦ УДП РК" предлагает такие услуги, как аортокоронарное шунтирование, эндовенозная лазерная коагуляция варикозных вен нижних конечностей, эндоваскулярная баллонная ангиопластика и стентирование артерий нижних конечностей, шунтирование артерий нижних конечностей, установка стент-графта в брюшную или грудную аорту и флебэктомия при варикозном расширении вен нижних конечностей. Эти данные подчеркивают комплексный и мультидисциплинарный подход к лечению пациентов с сосудистыми заболеваниями, что является ключевым аспектом в оказании эффективной медицинской помощи.

Таким образом, данный анализ направлен на выявление ключевых факторов, влияющих на эффективность и экономическую целесообразность оказания экстренной

сосудистой хирургической помощи, определение проблемных областей и возможных путей их решения. Особое внимание будет уделено вопросам интеграции инновационных медицинских технологий, оптимизации процессов управления и логистики, а также усилению междисциплинарного взаимодействия в рамках оказания медицинской помощи. Результаты данного исследования предоставят ценные данные для разработки рекомендаций по улучшению работы службы экстренной сосудистой хирургии, повышению ее эффективности и экономической целесообразности, что, в свою очередь, способствует улучшению качества медицинского обслуживания и обеспечению доступности необходимой помощи для пациентов с сосудистыми заболеваниями.

Краткий обзор литературы

В данном разделе представлены ключевые исследования, касающиеся эффективности существующих моделей организации экстренной сосудистой хирургии. Рассматриваются различные аспекты и подходы, выявляя их сильные и слабые стороны в контексте обеспечения качественной и доступной медицинской помощи. Также анализируется экономическая целесообразность этих подходов, что позволяет оценить их устойчивость и возможности оптимизации в рамках современных требований здравоохранения.

Кьерсти Вендт анализирует тенденции в лечении сосудистых заболеваний в Норвегии с 2001 по 2014 год и связанные с этим процессы принятия организационных решений на региональном и местном уровнях в период с 2007 по 2019 годы. Исследование выявило рост общего числа операций по сосудистой хирургии при интактных аневризмах брюшной аорты и снижение случаев разрыва аневризм. Также наблюдалось увеличение числа реваскуляризаций нижних конечностей при одновременном сокращении операций открытого типа и увеличении эндоваскулярных процедур во всех этих группах. Анализ показал, что в решениях по централизации лечения сосудистых заболеваний на основе медицинских и экономических преимуществ руководители и их профессиональные консультанты сталкивались с желанием местных групп профессионалов, пациентов, общественности и политиков лишь адаптировать существующие системы, что в итоге приводило к "усилению процесса нерешительности" на местном уровне [1].

Работа Видале С. и Агостони Э.К. "Organizing Healthcare for Optimal Acute Ischemic Stroke Treatment", опубликованная в журнале "J Clin Neurol" в 2020 году, делает акцент на значительном сдвиге в лечении острого ишемического инсульта за последние годы, особенно на ранней реперфузионной терапии, главным образом, с использованием системного введения рекомбинантного активатора плазминогена. Следующие испытания показали, что комбинирование этого лечения с эндоваскулярной терапией эффективно у выбранных пациентов. Увеличение сложности лечения острого инсульта привело к значительной реорганизации ухода за пациентами с инсультом. Обзор подчеркивает эволюцию лечения острого ишемического инсульта и описывает основные организационные модели, основанные на системе "центр-спица". Недостаток доказательств для сравнения эффективности различных парадигм означает, что также сообщается о некоторых моделях анализа решений, прогнозирующих наилучшие организационные пути, с особым упором на временные рамки рабочего процесса в до- и внутригоспитальных условиях [2].

Другая статья Вендт К., Морк Б.Е., Берг О.Т., Фоссе Е., опубликованная в "Journal of Health Organization and Management" в 2020 году, занимает особое место в данном обзоре, поскольку исследует процессы принятия решений в области сосудистой хирургии в Норвегии с 2007 по 2019 год на региональном и местном уровнях. Исследование подчеркивает

организационные вызовы, с которыми сталкиваются лица, принимающие решения, пытаясь соответствовать технологическому развитию и возрастающим требованиям к более рациональному распределению медицинских услуг. Отмечается, что процессы принятия решений были ресурсоемкими, затяжными и привели к незначительным организационным изменениям в предоставлении сосудистых услуг. Исследование выявляет особенности взаимодействия заинтересованных сторон на разных уровнях, их стратегические игры и политические процессы, что дает понимание сложностей в принятии решений в условиях быстрого технологического развития и роста требований к эффективности распределения услуг [3].

Также в нашем обзоре освещается важная проблема неравенства в оказании медицинской помощи в сфере сосудистой хирургии, на что указывают ключевые исследования, в том числе работы Баршеса N.R. и Минк S.D., опубликованные в "Journal of Vascular Surgery" в 2021 году. Авторы подчеркивают, что лица, отнесенные к категории чернокожих, подвергаются почти в два раза большему риску ампутации ног, в то время как чернокожие, латиноамериканцы и женщины реже получают доступ к гемодиализу через аутогенный свищ и менее вероятно подвергаются каротидной эндартерэктомии при симптоматическом стенозе сонной артерии и ремонту аневризмы брюшной аорты. Исследователи призывают к новым подходам для устранения этих неравенств, предлагая хирургам использовать данные для выявления групп, наиболее нуждающихся в медицинской помощи, и сотрудничать с общественными организациями для создания устойчивых здоровьесберегающих эффектов. Неравенство в здравоохранении является не только различием между группами, но и указывает на худшие исходы здоровья для неблагополучных групп, что делает его вопросом социальной справедливости и отражает этические приоритеты общества [4].

Всследование Дэвида А. Кромвелла, опубликованное в журнале "BMJ Open Quality", посвященное влиянию пути от первых симптомов до оценки состояния пациентов с подозрением на хроническую угрожающую конечностям ишемию (CLTI) на качество медицинской помощи освещается про задержки на этом пути ассоциируются с ухудшением исходов по смертности и потере конечностей. В исследовании рассматриваются процессы, используемые службами сосудистой хирургии для оказания неотложной помощи пациентам с подозрением на CLTI, направленным из сообщества. В результате работы с 45 участниками из двенадцати сосудистых подразделений были созданы карты процессов, отражающие различные пути доступа для срочных направлений от общих практиков и других специалистов первичного звена, а также разнообразие процессов триажа и оценки, что указывает на значительное разнообразие в организации служб. Исследование подчеркивает, что несмотря на локальный контекст и новаторские подходы сосудистых подразделений, сложность процессов может быть уменьшена за счет их упрощения, что потенциально приведет к улучшению качества ухода за пациентами [5].

Изученные работы предоставляют глубокий анализ различных аспектов организации экстренной сосудистой хирургии, начиная от процессов принятия решений и организационной адаптации до управления здравоохранением для оптимального лечения острого ишемического инсульта, а также рассматривают вопросы неравенства в сосудистой хирургии и процесс оценки для хронической угрожающей жизни ишемии конечностей. Эти исследования подчеркивают сложность и многоаспектность управления сосудистыми заболеваниями, указывают на значимость политических и социальных факторов в принятии медицинских решений и выявляют необходимость в новых подходах к лечению и улучшению качества медицинской помощи. Они также акцентируют внимание на разнообразии доступа и процессов оценки, отражающих местный контекст и инновационные решения в области сосудистой хирургии, но одновременно выявляют

потенциал для упрощения и стандартизации процедур для достижения лучших результатов лечения и снижения неравенства в здравоохранении.

Методология исследования

В рамках методологии данного исследования были определены ключевые критерии и показатели для оценки эффективности и экономической целесообразности моделей организации экстренной сосудистой хирургии. Среди основных критериев выделены: качество медицинского обслуживания, доступность и своевременность оказания помощи, степень удовлетворенности пациентов и медицинского персонала, а также затраты на оказание медицинских услуг. Для сбора данных использовались как первичные, так и вторичные источники, включая медицинские записи, опросы медицинских работников и пациентов, анализ финансовых отчетов учреждений здравоохранения. Анализ данных проводился с помощью статистических методов и программ для обработки больших данных, что позволило оценить влияние различных моделей организации службы на исходы лечения и экономические показатели. Таким образом, методология исследования была направлена на комплексную оценку взаимосвязи между организационной структурой медицинских услуг и их эффективностью и экономической целесообразностью.

Анализ существующих моделей организации

В разделе анализа существующих моделей организации особое внимание уделяется кейс-стади Республиканского государственного предприятия на праве хозяйственного ведения "Национальный госпиталь Медицинского центра Управления делами Президента Республики Казахстан" (РГП "НГ МЦ УДП РК"). Данный случай позволяет рассмотреть уникальный опыт организации экстренной сосудистой хирургии в контексте национальной здравоохранительной системы Казахстана и сравнить его с международными моделями. Описание моделей организации в РГП "НГ МЦ УДП РК" включает анализ структуры управления, логистики пациентов, процессов диагностики и лечения, а также междисциплинарного взаимодействия в рамках оказания экстренной помощи пациентам с сосудистыми заболеваниями. Важным аспектом является использование инновационных медицинских технологий и методов, способствующих повышению качества и доступности медицинской помощи.

Сравнение национальной модели с международными практиками выявляет ключевые различия и сходства в организации экстренной сосудистой хирургии, включая стандарты обслуживания, эффективность применяемых процедур и стратегий оптимизации ресурсов. Особое внимание уделяется анализу экономической целесообразности каждой модели, оцениваются затраты на оказание медицинских услуг и их соотношение с достигаемыми клиническими исходами.

Кейс-стади: РГП «НГ МЦ УДП РК»

В рамках данного кейс-стади предпринимается анализ организационной структуры и деятельности службы экстренной сосудистой хирургии Республиканского государственного предприятия на праве хозяйственного ведения «Национальный госпиталь Медицинского центра Управления делами Президента Республики Казахстан». Исследование направлено на оценку эффективности и экономической целесообразности применяемых подходов в оказании экстренной медицинской помощи, что позволяет выявить ключевые факторы успеха и возможные направления для оптимизации работы службы.Отделение

интервенционной кардиологии Республиканского государственного предприятия на праве хозяйственного ведения «Национальный госпиталь Медицинского центра Управления делами Президента Республики Казахстан» (РГП «НГ МЦ УДП РК») занимает ведущие позиции в области лечения сердечно-сосудистых заболеваний в Казахстане. Основываясь на данных, отделение осуществляет широкий спектр кардиохирургических и сосудистых операций, используя современные технологии и оборудование PREMIUM класса от ведущих мировых производителей. Деятельность центра ориентирована на максимальную безопасность и качество лечения пациентов, что подтверждается международными стандартами JCI.

Особенностью отделения является его способность оказывать как плановую, так и экстренную помощь пациентам с различными формами сердечно-сосудистых заболеваний, включая ишемическую болезнь сердца, атеросклероз сосудов нижних конечностей, варикозное расширение вен и многие другие. Важным аспектом работы является возможность проведения комплексного обследования и предоперационной подготовки в условиях одной из крупнейших многопрофильных лабораторий региона.

Команда врачей отделения, прошедших специализацию и обучение за рубежом, в том числе в Израиле, Италии, Германии и США, имеет многолетний опыт проведения кардиохирургических и сосудистых операций. Это позволяет РГП «НГ МЦ УДП РК» успешно реализовывать сложные хирургические вмешательства, включая аортокоронарное шунтирование, стентирование коронарных артерий, эндоваскулярное лечение аневризм аорты и множество других процедур.

Анализ организационной структуры и деятельности этого отделения демонстрирует его высокую эффективность и экономическую целесообразность, обеспечиваемые использованием передовых медицинских технологий, высокой квалификацией персонала и индивидуальным подходом к каждому пациенту. Все это в совокупности способствует повышению качества жизни пациентов и сокращению сроков их восстановления после операций. Важным аспектом работы отделения является внедрение малоинвазивных методов лечения, таких как селективная коронароангиография, стентирование коронарных артерий, ангиопластика и стентирование сосудов нижних конечностей, что способствует улучшению качества жизни пациентов и сокращению сроков госпитализации. Эффективность и экономическая целесообразность такой модели организации заслуживает детального анализа на фоне международного опыта, предполагая возможность выявления оптимальных подходов к организации служб экстренной сосудистой хирургии.

В кейсе РГП "НГ МЦ УДП РК" демонстрируется высокая эффективность и экономическая целесообразность современных подходов к организации экстренной сосудистой хирургии. Уникальность данной модели заключается в комплексном применении передовых медицинских технологий и методов лечения в сочетании с высоким уровнем сервиса и комфорта для пациентов. Многопрофильность и широкий спектр предоставляемых услуг, подтвержденный международными сертификатами качества, в том числе аккредитация JCI, говорит о стремлении больницы не только к улучшению качества лечения, но и к повышению доступности высокотехнологичной медицинской помощи для различных категорий населения. Особое внимание заслуживает успешное применение телемедицины и возможность получения консультаций ведущих мировых специалистов, что делает РГП "НГ МЦ УДП РК" образцовым примером эффективного сочетания инновационных методов лечения и организационных решений в области сосудистой хирургии.

Результаты исследования

Сравнительный анализ моделей организации служб экстренной сосудистой хирургии выявил значительные различия в эффективности и экономической целесообразности между исследованными случаями. Модель РГП "НГ МЦ УДП РК" демонстрирует высокую эффективность благодаря интеграции современных технологий, квалификации специалистов и международной аккредитации, что способствует улучшению качества лечения и увеличению доступности медицинских услуг. Экономическая целесообразность данной модели подтверждается оптимизацией использования ресурсов, привлечением внешних инвестиций и возможностью предоставления услуг на платной основе.

Ключевыми факторами, влияющими на эффективность и экономическую целесообразность, являются:

1. Применение высокотехнологичного оборудования и современных методов лечения, позволяющих сократить время реабилитации и улучшить качество жизни пациентов.
2. Компетентность и постоянное обучение медицинского персонала, обеспечивающее высокий уровень оказываемых услуг.
3. Интеграция с телемедицинскими платформами для расширения доступа к специализированным консультациям и ускорения диагностики.
4. Финансовая модель, сочетающая государственное финансирование и частные инвестиции, что позволяет расширять спектр услуг и делать их доступными широкому кругу пациентов.
5. Системный подход к управлению качеством и безопасностью пациентов, включая международную аккредитацию и сертификацию.

Таким образом, интеграция инновационных технологий, квалификация персонала, доступность и качество услуг являются ключевыми факторами, определяющими успешность и экономическую эффективность организации службы экстренной сосудистой хирургии.

Рекомендации:

На основе проведенного анализа моделей организации службы экстренной сосудистой хирургии могут быть сформулированы следующие рекомендации:

1. Оптимизация организационной структуры:
   - Разработка и внедрение единой информационной системы для обеспечения оперативного обмена данными между отделениями и специалистами, что позволит ускорить процесс принятия решений и улучшить координацию лечебного процесса.
   - Централизация определенных услуг внутри региональных сетей для обеспечения более высокого уровня специализации и качества лечения, а также для повышения экономической эффективности за счет масштаба.
2. Улучшение процессов:
   - Введение стандартизированных клинических путей для основных видов вмешательств, что поможет сократить вариативность в лечении и повысить его качество.
   - Организация обучающих программ для персонала по последним методам диагностики и лечения сосудистых заболеваний, что способствует повышению компетенций специалистов и улучшению исходов для пациентов.
   - Реализация принципа "зеленых коридоров" для пациентов с острыми состояниями, гарантируя им приоритетное и своевременное обследование и лечение.
3. Повышение эффективности и экономической целесообразности:
   - Внедрение телемедицинских технологий для предварительной консультации и оценки пациентов, что позволит оптимизировать процесс направления пациентов на лечение, сократить время ожидания и расходы на транспортировку.

- Проведение регулярного анализа экономической эффективности оказываемых услуг для выявления возможностей сокращения издержек без ущерба для качества медицинской помощи.

- Развитие партнерства с частным сектором и привлечение инвестиций для обновления медицинского оборудования и внедрения инновационных методов лечения.

Эти рекомендации направлены на создание более эффективной и экономически целесообразной системы оказания экстренной сосудистой хирургии, способной обеспечить высокий уровень качества медицинской помощи и доступность услуг для всех категорий пациентов.

Заключение

Исследование эффективности и экономической целесообразности организационных моделей службы экстренной сосудистой хирургии выявило ключевые аспекты, определяющие успешность и устойчивость таких систем. Оптимизация организационной структуры и процессов, интеграция передовых технологий, повышение квалификации медицинского персонала и применение инновационных методов лечения способствуют повышению качества и доступности медицинских услуг для пациентов. Финансовая устойчивость и экономическая эффективность достигаются за счет грамотного управления ресурсами, привлечения инвестиций и разработки гибких моделей финансирования. Анализ показал, что ключ к успеху лежит в комплексном подходе к управлению и непрерывном совершенствовании качества оказываемых услуг. В итоге, исследование подтвердило важность стратегического планирования и инновационного развития в сфере экстренной сосудистой хирургии для обеспечения высокого уровня медицинской помощи и удовлетворения потребностей пациентов.

Список использованной литературы:

1. Wendt, Kjersti. Vascular Disease Management: Knowledge Development and the Politics of Organizational Adaptation: докторская диссертация. – 2021. – Режим доступа: http://urn.nb.no/URN:NBN:no-86897.
2. Vidale S., Agostoni E.C. Organizing Healthcare for Optimal Acute Ischemic Stroke Treatment // J Clin Neurol. – 2020. – Vol. 16, № 2. – С. 183–190. DOI: 10.3988/jcn.2020.16.2.183. – Режим доступа: PMC7174131. – PMID: 32319234.
3. Wendt K., Mørk B.E., Berg O.T., Fosse E. Medicine and interest politics: a study of decision-making processes in the area of vascular surgery in Norway // Journal of Health Organization and Management. – 2020. – Vol. 34, Issue 4. – Open Access. – Дата публикации статьи: 29 апреля 2020. – Дата публикации выпуска: 9 июня 2020. – ISSN: 1477-7266.
4. Barshes N.R., Minc S.D. Healthcare disparities in vascular surgery: A critical review // Journal of Vascular Surgery. – 2021. – Vol. 74, Issue 2, Suppl. – P. 6S-14S.e1. – DOI: 10.1016/j.jvs.2021.03.055.
5. Cromwell D.A. The symptom to assessment pathway for suspected chronic limb-threatening ischaemia (CLTI) affects quality of care: a process mapping exercise. – BMJ Open Quality. – [Электронный ресурс]. – Режим доступа: http://orcid.org/0000-0002-9455-6960.
6. АО "Центральная клиническая больница". 2024. [Официальный сайт больницы]. – Ссылка для доступа: https://sovminka.kz/ru/glavnaya/

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Abstract

The contemporary healthcare system is confronted with the challenge of providing high-quality and accessible medical care with limited resources. The efficiency and economic feasibility of organizational models of emergency vascular surgery services play a pivotal role in enhancing the quality of treatment for patients with vascular diseases. This article presents a comparative analysis of various organizational models of emergency vascular surgery at both international and national levels. Special attention is given to the structure of services, management methods, technologies used, and approaches to financing. The results of the analysis indicate that optimizing management and financing, integrating innovative technologies, and implementing standardized protocols can significantly improve the quality and accessibility of medical care. Based on the analysis, recommendations are formulated for the improvement of emergency vascular surgery services aimed at enhancing their efficiency and economic feasibility.

Keywords: emergency vascular surgery, health economics evaluation, organizational models, efficiency, economic feasibility, healthcare, optimization, innovative technologies, cost management, quality of medical care, accessibility of medical services

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Аннотация

Заманауи денсаулық сақтау жүйесі шектеулі ресурстармен жоғары сапалы және қолжетімді медициналық көмек көрсету мәселесімен бетпе-бет келіп отыр. Шұғыл тамыр хирургиясы қызметтерінің ұйымдық үлгілерінің тиімділігі мен экономикалық орындылығы қан тамырлары аурулары бар науқастарды емдеу сапасын арттыруда шешуші рөл атқарады. Бұл мақалада халықаралық және ұлттық деңгейде шұғыл қан тамырлары хирургиясының әртүрлі ұйымдық үлгілерінің салыстырмалы талдауы берілген. Қызметтердің құрылымына, басқару әдістеріне, қолданылатын технологияларға, қаржыландыру тәсілдеріне ерекше назар аударылады. Талдау нәтижелері басқару мен қаржыландыруды оңтайландыру, инновациялық технологияларды біріктіру және стандартталған хаттамаларды енгізу медициналық көмектің сапасы мен қолжетімділігін айтарлықтай жақсартуға мүмкіндік беретінін көрсетеді. Талдау негізінде жедел қан тамырлары хирургиясы қызметтерін жетілдіру бойынша олардың тиімділігі мен экономикалық орындылығын арттыруға бағытталған ұсыныстар тұжырымдалады.

Түйін сөздер: шұғыл қан тамырлары хирургиясы, денсаулық сақтау экономикасын бағалау, ұйымдастыру модельдері, тиімділік, экономикалық орындылық, денсаулық сақтау, оңтайландыру, инновациялық технологиялар, шығындарды басқару, медициналық көмектің сапасы, медициналық қызметтердің қолжетімділігі.

СТРАТЕГИЧЕСКИЕ АСПЕКТЫ ОПТИМИЗАЦИИ БИЗНЕС-ПРОЦЕССОВ КОНДИТЕРСКИХ ПРЕДПРИЯТИЙ КАЗАХСТАНА В УСЛОВИЯХ КОНКУРЕНЦИИ С ГОСУДАРСТВАМИ СНГ

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Аннотация. В статье проведен анализ позиции казахстанского предприятия кондитерской отрасли «Lotte Рахат» в глобальных и национальных рейтингах, а также объемов их производственной деятельности. Выделен лидер кондитерского рынка среди ключевых конкурентов из стран СНГ – компания «Roshen» и др. Проведен детальный анализ микросреды предприятия, выявлены основные конкурентные преимущества и проблемы его функционирования. Выполнено сравнение бизнес-процессов предприятия-лидера (управленческих, основных и вспомогательных) с ключевыми факторами его успеха, выделены проблемные бизнес-процессы, требующие стратегического совершенствования.
Ключевые слова: бизнес-процессы, усовершенствование, конкуренция, кондитерская отрасль, стратегические перспективы, страны СНГ, Казахстан.

JEL Classification: E23, D24, R32

Введение

В условиях современной глобализации и нарастающей конкуренции на мировых рынках, казахстанская кондитерская отрасль сталкивается с рядом вызовов и возможностей, требующих стратегического подхода к оптимизации бизнес-процессов. С учётом географической близости и экономических связей со странами СНГ, конкуренция с предприятиями данного региона приобретает особое значение. Важность данной темы обусловлена необходимостью повышения конкурентоспособности казахстанских кондитерских предприятий на региональном и международном уровнях.

Целью данной статьи является исследование стратегических аспектов оптимизации бизнес-процессов кондитерских предприятий Казахстана в условиях конкуренции с государствами СНГ. Для достижения этой цели в работе проведен комплексный анализ позиций казахстанских кондитерских предприятий в мировых и национальных рейтингах, оценены объемы их производственной деятельности, выявлены ключевые конкурентные преимущества и проблемы. Особое внимание уделено лидеру кондитерского рынка СНГ – компании «Roshen», бизнес-процессы которой служат эталоном для сравнительного анализа.

Актуальность исследования обуславливается необходимостью разработки эффективных стратегий для повышения эффективности и конкурентоспособности казахстанских кондитерских предприятий. В статье представлено сравнение управленческих, основных и обеспечивающих бизнес-процессов с ключевыми факторами успеха, что позволяет выявить проблемные области, требующие стратегического

совершенствования. Вопросы конкурентоспособной среды в сфере кондитерской отрасли разглядывали такие ученые как И.В. Головин, И.А. Дудло, С.М. Ильяшенко, А.В. Кузьменко, С.С. Олейник, А.Ф. Павленко и др. Основой исследований бизнес-процессов предприятия стали научные труды М. Хаммера, Д. Чампи, А. Шеера и др.

Настоящее исследование способствует пониманию текущего состояния и перспектив развития казахстанской кондитерской отрасли, предлагая стратегические подходы для улучшения её конкурентных позиций в условиях интеграции и глобальной конкуренции.

Методология исследования. В процессе исследования применены методы систематизации и обобщения, анализа и синтеза, рейтинговой оценки, метод сравнений, графический и табличный метод представления результатов исследования.

Основная часть

Сегодня производство кондитерских изделий является одной из самых развитых отраслей пищевой промышленности Казахстана и стран СНГ в целом. Рынок кондитерской продукции Казахстана высококонкурентен и насыщен с функционирующими на нем предприятиями [1, с. 123]. Следует отметить, что рынок кондитерских изделий Казахстана характеризуется стремительной динамикой изменений во вкусах потребителей, поэтому, соответственно, исследование рынка кондитерских изделий важно для определения перспектив его дальнейшего развития и конкурентных стратегий на уровне предприятий соперников. Для более углубленного анализа следует выявить самых ключевых конкурентов стран СНГ, которые реализовывают свою продукцию на рынке РК. По результатам аналитических исследований, выявлено, что Украина является одной из самых активных стран по ценителям сладостей в мире, потребляя ежегодно примерно 15 кг кондитерских изделий на человека, тогда как в США этот показатель составляет всего 10 кг [2, с. 12].

В целом на украинском рынке существует достаточно много кондитерских компаний, которые пытаются приспосабливаться к современным условиям потребительского рынка, также, реализуя свою продукцию на рынке Казахстана. По рейтингу издания Candy Industry Magazine в 2023 г. в список «Global Top 100 Candy Companies» попали 4 украинских кондитерских компании: «Roshen» и «Millennium» (табл. 1). В свою очередь, с рынка Казахстана попала только компания «Lotte Рахат» (27 место), учитывая, что Lotte Рахат, с недавнего времени стала принадлежать Кореи. Это довольно хороший результат: лучшие показатели пока имеют кондитерские отрасли только двух западноевропейских стран – Германии (13 предприятий) и Швейцарии (6 предприятий) [3].

Таблица 1 – Анализ позиций кондитерских предприятий Казахстана и Украины в рейтинге «Global Top-100 Candy Companies»

№	Кондитерская компания	2019	2020	2021	2022	2023
1	Lotte Рахат	19	26	26	24	27
2	Roshen	24	25	27	27	23
3	«АВК»	67	64	-	65	-
4	«Millennium»	-	-	-	74	77
5	«Конти»	43	43	44	80	-
Примечание – составлено авторами на основании источника [3]						

Как видно из данных табл. 1, наиболее конкурентным предприятием среди иностранных компаний на украинском кондитерском рынке является «Roshen». По поводу компании «Конти», – она стабильно выступает среди сорока лучших, ведь в 2016-2019 гг. компания занимала 38-44 позиции, однако в 2020 г. резко опустилась до 80-й, а в 2023 и

вовсе не вошла в список. «АВК» периодически исчезала из рейтинга, а компания «Millennium» появилась в нем только в 2022 г. Таким образом, по данным международного рейтингового агентства Candy Industry в период с 2019 по 2023 гг. к рейтингу «Global Top- 100 Candy Companies» [5] постоянно входило только две украинские компании – «Roshen» и «Konti».

В рамках анализа отрасли отметим, что отрасль кондитерской промышленности является одной из наиболее усовершенствованных и развитых в пищевой индустрии. Существующие производственные мощности кондитерских изделий не только обеспечивают потребности внутреннего рынка, но и создают мощный экспортный потенциал, ведь экспорт украинской продукции происходит в 50 странах мира, включая рынок Республики Казахстан. Украинские компании стимулируют отсутствие пошлины на сладости в ЕС. Лидеры украинского рынка: Roshen, Konti Group и АВК активно используют возможность и выводят новинки кондитерских изделий на зарубежные рынки.

Отмечаются темпы роста экспорта – 120% (страны бывшего СНГ) и 60% (ЕС). Возрос сбыт продукции в Америку, Казахстан, Монголию, также Ирак [4]. По данным Совета по экспорту продовольствия среди лидеров рынка по объемам экспорта следует отметить корпорацию «Roshen», объем экспорта которой составлял 51,2 % от общего объема экспорта кондитерских изделий на начало 2020 г. На втором месте – ООО «Распределительный центр «Плюс» – 20,6 %, что также входит в Roshen Group, то есть суммарно лидер рынка поставляет 71,8 % общего экспорта кондитерских изделий [7]. Компания ЧАО «Монделис Украина» получила долю 7,2% в общей структуре экспортируемых кондитерских изделий; компания «Три стар» экспортировала 3,2 % от общего объема кондитерских изделий и доли предприятий «Ликом» и ЧАО «Харьковская бисквитная фабрика» составляли 1,2 %. Компания Roshen активно развивает экспортный сбыт. Общий объем производства составляет 450 тыс. тонн в год, выручка – 800 млн дол. США. Продукция представлена в 35 странах мира, в частности в Афганистане, Азербайджане, Армении, Грузии, Европе, Израиле, Ираке, Иордании, Казахстане, Канаде, Кыргызстане, Китае, Кувейте, Молдове, Монголии, Новой Зеландии, США, Таджикистане, Туркменистан, Украина. Таким образом, можно видеть значительную активную работу в области сбыта кондитерской продукции на территорию Казахстана. В 2014 г. Украина потеряла рынки сбыта в Крыму. Закрытие российского рынка и препятствия транзиту на территории России оказали существенное влияние на состояние отрасли в целом, и в частности на компанию «Roshen», которая уменьшила объемы продаж и потеряла позиции в мировом рейтинге [6-7]. Компания столкнулась с новыми вызовами в условиях пандемии COVID-19, когда пришлось переориентироваться на новые рынки, изменять систему сбыта продукции и систему наработанных логистических цепей. Новый удар, как и многие украинские предприятия, компания потерпела при полномасштабном военном вторжении 24.02.2022 г. Далее приведем конкурентный анализ компаний кондитерской промышленности РК и компаний Украины в таблице 2.

Название компании	Страна	Год основания	Основные продукты	Объем производства (тонн/год)	Рыночная доля (%)	Количество сотрудников	Основные рынки сбыта
LOTTE Рахат	Казахстан	1942	Шоколад, конфеты, печенье	85,000	10.0	4,000	Казахстан, СНГ, Европа, Азия
Roshen	Украина	1996	Шоколад, конфеты, печенье	450,000	25.0	10,000	Украина, СНГ, Европа, Азия
Конти	Украина	1997	Шоколад, конфеты, печенье	200,000	12.0	8,000	Украина, СНГ, Европа, Азия
АВК	Украина	1991	Шоколад, конфеты, печенье	150,000	10.0	5,000	Украина, СНГ, Европа
Житомирские Ласощи	Украина	1944	Шоколад, конфеты, печенье	100,000	7.0	3,500	Украина, СНГ, Европа
Лукас	Украина	1995	Шоколад, конфеты, печенье	50,000	5.0	2,000	Украина, СНГ

Примечание – составлено авторами на основании источника [8]

Из таблицы видно, что LOTTE Рахат (Казахстан) и украинские компании Roshen, Конти, АВК, Житомирские Ласощи, Лукас имеют долгую историю существования, что свидетельствует о их стабильности и устоявшихся позициях на рынке. Roshen и Житомирские Ласощи - компании с самой продолжительной историей в Украине, что подчеркивает их опыт и устойчивое положение [9].

Все компании производят широкий ассортимент кондитерских изделий, включая шоколад, конфеты и печенье, что свидетельствует о насыщенности рынка и высокой конкуренции в этих сегментах. Roshen является лидером по объему производства (450,000 тонн/год), что значительно превосходит показатели других компаний. Конти и АВК также демонстрируют высокие объемы производства (200,000 и 150,000 тонн/год соответственно), что подтверждает их значительное присутствие на рынке. LOTTE Рахат производит 85,000 тонн/год, что ставит её на средние позиции по сравнению с украинскими конкурентами [10].

Roshen обладает самой большой рыночной долей (25%), что делает её ведущим игроком на украинском рынке. Конти и АВК занимают значительные рыночные доли (12% и 10% соответственно), что подтверждает их сильные позиции. LOTTE Рахат имеет 10% рыночной доли в Казахстане, что свидетельствует о её важной роли на национальном рынке, но на фоне украинских конкурентов её позиции средние [11].

Roshen (10,000 сотрудников) и Конти (8,000 сотрудников) имеют самые большие штаты, что отражает их масштабные операции. LOTTE Рахат имеет 4,000 сотрудников, что соответствует её объему производства и рыночной доле.

Все компании активно работают не только на внутренних, но и на международных рынках. Roshen, Конти и АВК особенно активно экспортируют продукцию в Европу и Азию. LOTTE Рахат также имеет значительный экспортный потенциал, что свидетельствует о её конкурентоспособности на международной арене.

LOTTE Рахат занимает важное место на рынке Казахстана, но ей предстоит усилить свои позиции, чтобы конкурировать с ведущими украинскими компаниями, такими как Roshen и Конти. Высокие объемы производства и значительное количество сотрудников компаний-конкурентов указывают на необходимость дальнейших инвестиций в модернизацию и расширение производственных мощностей LOTTE Рахат. Важным аспектом

для LOTTE Рахат является усиление маркетинговой стратегии и расширение присутствия на международных рынках, чтобы увеличивать свою рыночную долю и объемы экспорта. Эти выводы могут помочь LOTTE Рахат в разработке стратегий для улучшения своих конкурентных позиций и дальнейшего роста [12].

Теперь отметим, что для сохранения своей лидирующей позиции и улучшения деятельности предприятия в стратегической перспективе LOTTE Рахат (Казахстан) целесообразно расширить ассортимент изделий, найти пути уменьшения их себестоимости с сохранением качества продукции. Для решения этой непростой задачи предприятию необходимо осуществить механизацию и автоматизацию производства, рационализацию использования теплоэнергетических ресурсов, модернизацию оборудования и, самое важное, провести усовершенствование основных, обеспечивающих и управленческих бизнес-процессов [13].

В стратегической перспективе усовершенствование бизнес-процессов желательно начинать с постоянного мониторинга внешней и внутренней среды предприятия. Наиболее полную информацию по оптимизации бизнес-процессов предприятия нам может предоставить оценка факторов ближайшего окружения предприятия (микросреды) (таблица 3).

Следовательно, наибольшее влияние на ближайшее окружение предприятия оказывают конкуренты и потребители, поэтому в оптимизации бизнес-процессов предприятия нужно ориентироваться именно на эти категории ближайшего окружения предприятия.

На следующем этапе целесообразно выделить основные конкурентные преимущества кондитерского предприятия LOTTE Рахат [14], что будет положено в основу совершенствования бизнес-процессов предприятия:

1) широта ассортиментных позиций и дифференциированность продукции;

2) высокие стандарты качества в производимой продукции;

3) эффективная система управления;

4) доступ к качественным ресурсам;

5) контроль сырья для производства продукции
по показателям качества и безопасности;

6) умеренная ценовая политика предприятия;

7) наличие узнаваемого бренда компании, дающей возможность потребителю выделить продукцию Lotte Рахат среди представленной на рынке продукции конкурентов;

8) квалификация персонала;

9) эксклюзивность многих видов продукции и уникальность рецептуры отдельных видов продукции предприятия;

10) прогрессивность технологических действий. Наряду с основными конкурентными преимуществами у компании есть и определенные проблемы, которые необходимо учитывать в разработке стратегии развития компании [15,16].

Таблица 3 – Оценка факторов микросреды LOTTE Рахат

№	Факторы	Значимость j-ой группы факторов во влиянии на деятельность предприятия	Значимость (вес) и-го фактора в соответствующий группе факторов	Экспертная оценка влияния фактора на отрасль (от негат. (-5) к поз. (+5))	Интегральная оценка влияния фактора (группы факторов) (баллы) («+» или «-»)
1	Потребители	0.4			
1.1	Утрата постоянных потребителей 1.1 внутри страны		0,3	-4	-0,48
1.2	Потеря клиентов за границей		0,2	2	0,16
1.3	Эластичность спроса		0,3	2	0,12
1.4	Зависимость ассортиментной политики к потребностям потребителей		0,2	1	0,8
	Итого		1		0
2	Поставщики	0,3			
2.1	Утрата постоянных поставщиков		0,3	2	0,18
2.2	Удорожание материалов и сырья		0,3	1	0,09
2.3	Сроки доставки		0,4	1	0,12
	Итого		1		0,39
3	Конкуренты	0,3			
3.1	Появление новых (международных) конкурентов		0,3	-1	-0,09
3.2	Утрата лидирующей позиции		0,3	-1	-0,09
3.3	Агрессивная стратегия конкурентов		0,4	-2	-0,12
4	ИТОГО	1	1	-	-0,3
Примечание – составлено авторами на основании источника [17]					

Выделив основные конкурентные преимущества и проблемы предприятия, можно определить ключевые факторы успеха (КФУ) компании (высокое качество продукции, навыки продаж, лидирующая позиция на рынке, имидж производителя, эффективный операционный менеджмент, производственные возможности, наличие собственной розничной торговли и ведомость торговой марки) и сопоставить их с бизнес-процессами предприятия (таблица 4) [18,19].

Таблица 4 – Матрица сопоставления бизнес-процессов с КФУ LOTTE Рахат

№	Название бизнес-процесса	Ключевые факторы успеха								Количество КФУ	Оценка работы бизнес-процесса
		Высокое качество продукции	Умение продавать свой товар	Лидирующая позиция на отечественном рынке	Имидж производителя	Эффективный операционный менеджмент	Производственные возможности	Наличие собственной розничной торговли	Ведомость торговой марки		
Управленческие бизнес-процессы											
1	Сбор информации и анализ данных	*				*				2	3
2	Система контроля качества продукции	*			*	*	*			4	5
3	Проверка всех активов и пассивов					*				1	4
4	Управление отделом маркетинга		*	*					*	3	4
5	Управление персоналом					*				1	3
Основные бизнес-процессы											
6	Изучение рынка товара			*					*	2	2
7	Разработка и производство	*		*	*		*			4	5
8	Порционная фасовка					*				1	5
9	Упаковка и хранение	*					*			2	5
10	Оценка качества конфет и распределение	*								1	5
11	Реализация готовой продукции		*			*				2	5
Обеспечивающие бизнес-процессы											
12	Информационное обеспечение		*	*	*				*	4	3
13	Техническое обеспечение	*				*	*			3	5
14	Правовое обеспечение							*		1	4
15	Маркетинговое обеспечение		*	*	**				*	4	2
16	Материально-техническое обеспечение	*			*		*	*		4	4
Примечание – составлено авторами на основании источника [18,19,20]											

Наибольшую степень важности имеют такие бизнес-процессы, как управление финансами, система контроля качества продукции, производство, оценка качества продукции, реализация готовой продукции и обеспечение технической безопасности. Наиболее проблемными бизнес-процессами являются: разработка новой рекламной кампании, оценка качества рекламного материала, улучшение квалификации молодых специалистов [21,22].

Заключение

В ходе проведенного исследования стратегических аспектов оптимизации бизнес-процессов кондитерских предприятий Казахстана в условиях конкуренции с государствами СНГ была глубоко проанализирована текущее состояние отрасли и выявлены ключевые направления для её развития.

Анализ показал, что казахстанские кондитерские предприятия обладают значительным потенциалом для роста и развития, однако сталкиваются с рядом серьезных вызовов в условиях жесткой конкурентной среды. Пример компании Roshen, являющейся лидером кондитерского рынка Украины, которая продемонстрировала успешные стратегии и практики, которые могут быть адаптированы для улучшения позиций казахстанских компаний на внутреннем и внешнем рынках.

Сравнительный анализ бизнес-процессов показал, что казахстанские предприятия нуждаются в модернизации технологий, улучшении управленческих систем и расширении ассортимента продукции. Проблемы в области качества продукции, недостаточная автоматизация производственных процессов и слабая маркетинговая стратегия являются основными барьерами для повышения конкурентоспособности на международной арене.

В статье предложены рекомендации по стратегическому совершенствованию бизнес-процессов, включающие внедрение инновационных технологий, улучшение системы качества, усиление маркетинговых усилий и развитие экспортного потенциала. Рекомендуется также усилить корпоративное управление, инвестировать в научно-исследовательскую деятельность и расширить дистрибуционную сеть для достижения более значимых рыночных позиций.

Настоящее исследование подчеркивает необходимость комплексного подхода к решению проблем, с которыми сталкиваются казахстанские кондитерские предприятия. Реализация предложенных стратегий и мероприятий позволит не только улучшить их конкурентные позиции в условиях конкуренции с государствами СНГ, но и обеспечить устойчивое развитие отрасли в долгосрочной перспективе.

В будущем, для дальнейшего развития кондитерской отрасли Казахстана, целесообразно продолжить исследование динамики изменения конкурентной среды, а также анализировать новые тренды и технологии в международной кондитерской индустрии. Применение инновационных методов и стратегий будет способствовать не только улучшению качества продукции, но и повышению конкурентоспособности казахстанских кондитерских компаний на мировом рынке.

Отметим, что Украинский рынок кондитерских изделий представлен большим количеством субъектов, удовлетворяющих требованиям потребителей. По поводу конкурирующих позиций на иностранном рынке – в 2022 - 2023 г. в список «Global Top - 100 Candy Companies» попали 4 украинские кондитерские компании: «Roshen», «АВК», «Millennium» и «Konti», что говорит о неотставании украинского рынка от мирового потребительского рынка. Наибольшее конкурентное преимущество среди иностранных компаний на украинском кондитерском рынке имеет предприятие «Roshen», которому присуща конкурентная стратегия «Сохранение доли рынка и сохранение лидирующей позиции».

Постоянные изменения внешней среды, рост неопределенности и риска в функционировании предприятий заставляют их искать новые инструменты и методы усовершенствования бизнес-процессов в стратегической перспективе. В статье проанализированы и выделены основные бизнес-процессы лидера кондитерской отрасли Казахстана и Украины, требующие усовершенствования в стратегической перспективе. Выбору методов и инструментов усовершенствования бизнес-процессов будут посвящены дальнейшие научные исследования.

Список использованных источников

1. Вислоухова С., Шевчук А. Кондитерские изделия нового поколения // https://cyberleninka.ru/article/n/konditerskie-izdeliya-novogo-pokoleniya
2. Аналитика рынка кондитерских изделий. URL: http://www.ukrainian-food.org/ru/post/section/analitika-rinku-konditerskih-virobiv
3. Recep Gunes, Ibrahim Palabiyik, Nevzat Konar, Omer Said Toker. Soft confectionery products: Quality parameters, interactions with processing and ingredients. Food Chemistry Volume 385, 15 August 2022, 132735 // https://doi.org/10.1016/j.foodchem.2022.132735
4. Рынок кондитерских изделий Украины: тенденции. URL: https://koloro.ua/ru/blog/brending-i-marketing/analiz-rynka-konditerskikh-izdeliy-ukrainytendentsii.html
5. Тычинская А.И., Наумова М.А. Рынок кондитерских изделий Украины. Вестник студенческого научного общества ДонНУ имени Василия Стуса.2017. С. 122-126.
6. 2019-2023 Global Top-100 Candy Company Candy Industry. URL: https://www.candyindustry.com/2021/global-top-100-candy-companies
7. Olugbenga O. Oluwasina, Blessing Femi Demehin, Olugbenga Olufemi Awolu, Festus O. Igbe. Optimization of starch-based candy supplemented with date palm (Phoenix dactylifera) and tamarind (Tamarindus indica L.) Arabian Journal of Chemistry Volume 13, Issue 11, November 2020, Pages 8039-8050 // https://doi.org/10.1016/j.arabjc.2020.09.033
8. Nevzat Konar, Recep Gunes, Ibrahim Palabiyik, Omer Said Toker. Health conscious consumers and sugar confectionery: Present aspects and projections. Trends in Food Science & Technology Volume 123, May 2022, Pages 57-68 // https://doi.org/10.1016/j.tifs.2022.02.001
9. Mukhamad Najib, Wita Juwita Ermawati, Farah Fahma, Endri Endri, Dwi Suhartanto. FinTech in the Small Food Business and Its Relation with Open Innovation. Journal of Open Innovation: Technology, Market, and Complexity Volume 7, Issue 1, March 2021, 88 // https://doi.org/10.3390/joitmc7010088
10. Бондаренко Г.С. Управление конкурентоспособностью компании: автореф. дис. к.е.н. Харьков: ХГЭУ, 2001. 20 с.
11. Ермак С.А., Жабровец Ю.А. Конкурентные позиции предприятий кондитерской отрасли.Стратегические приоритеты
12. Seidel Saskia, Nora Mareï, Corinne Blanquart. Innovations in e-grocery and Logistics Solutions for Cities. Transportation Research Procedia Volume 12, 2016, Pages 825-835 // https://doi.org/10.1016/j.trpro.2016.02.035
13. Mauliza, S., & Indrayani Dalimunthe, G. (2022). Formulation and Evaluation of The Preparation of Hard Candy Source of Sweet Orange (Citrus Sinensis (L.) Osbeck) As A Nutracetical. International Journal of Science, Technology & Management, 3(5), 1465-1470 // https://doi.org/10.46729/ijstm.v3i5.611
14. Ермак С.А., Плотницкая В.В. Инновационные аспекты развития рынка кондитерских изделий.Бизнес информ, 2016. №11. С. 398-403.
15. Development and quality evaluation of honey based carrot candy. J. Food Sci. Technol., 48 (4) (2011), pp. 502-505, 10.1007/s13197-010-0212-0

16. Тарасенко Н.А., Баранова З. А., Третьякова Н.Р. Методологии создания потребительской ценности кондитерских изделий // https://cyberleninka.ru/article/n/metodologii-sozdaniya-potrebitelskoy-tsennosti-konditerskih-izdeliy

17. Киселев С. В 2023 году потребление шоколада в Казахстане выросло на 13%. 23.02.2024 // https://dairynews.today/kz/news/v-2023-godu-kazakhstan-ie-konditery-proizveli-106-9-tys-tonn-shokolada-i-konditerskikh-izdeliy-iz-sh.html

18. Ермак СО, Жабровецов Ю.О. Competitive positions of confectionery enterprises of Ukraine.Strategic priorities for the entrepreneurship, trade and exchange activities: материалы III Международной медицинской и практики конференций (Май 11-12, 2022, Запорожья). Запорожья, 2022. pp. 221-223. [в Украину].

19. Горлов С.М., Першакова Т.В., Яковлева Т.В., Семиряжко Е.С. Перспективы рынка производства шоколадных изделий, обогащенных функциональными ингредиентами. DOI 10.24412/2311-6447-2022-3-187-192

20. Analysis of the confectionery market of Ukraine: trends. URL: https://koloro.ua/ru/blog/brending-i-marketing/analiz-rynka-konditerskikh-izdeliy-ukrainy tendentsii.html [в Russian].

21. Amir Gharehgozli, Eleftherios Iakovou, Yanling Chang, Ryan Swaney. Trends in global E-food supply chain and implications for transport: literature review and research directions. Research in Transportation Business & Management Volume 25, December 2017, Pages 2-14 // https://doi.org/10.1016/j.rtbm.2017.10.002

22. Confectionery market analysis. // http://www.ukrainian-food.org/ru/post/section/analitika-rinku-konditerskih-virobiv [in Russian].

ИНСТРУМЕНТЫ СТРАТЕГИЧЕСКОГО УПРАВЛЕНИЯ В ДЕЯТЕЛЬНОСТИ МЕДИЦИНСКИХ ОРГАНИЗАЦИЙ

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Аннотация

В настоящей статье рассматриваются инструменты стратегического управления в деятельности медицинских организаций. Знание инструментов стратегического управления, их особенностей и преимуществ позволит руководителям своевременно реагировать на кризисы, текущие проблемы и принимать решения в процессе оказания медицинских услуг.

Ключевые слова: система здравоохранения, стратегическое управление, инструменты стратегического управления, медицинская организация, всеобщее управление качеством, стандарты аккредитации, SWOT- анализ.

STRATEGIC MANAGEMENT TOOLS IN MEDICAL ORGANIZATIONS' ACTIVITIES

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Abstract

This article discusses the tools of strategic management in the activities of medical organizations. Knowledge of strategic management tools, their features and advantages will allow managers to timely respond to crises, current problems and make decisions in the process of providing medical services.

Key words: health care system, strategic management, strategic management tools, medical organization, universal quality management, accreditation standards, SWOT- analyze.

Система здравоохранения во всем мире функционирует и развивается в постоянно меняющихся условиях, что является результатом политических, экономических, демографических, технологических изменений. Реформирование сферы общественного здравоохранения привело к усилению конкуренции и ее росту. Для создания сильной системы здравоохранения со стабильными медицинскими организациями, способными реагировать на кризисы, текущие проблемы, ориентированными на сохранение и улучшение своих управленческих моделей поведения, стилей ведения медицинской деятельности в части оказания медицинских услуг требуется поиск новых инструментов стратегического управления или совершенствование прежних.

Термин «стратегия», «стратегическое управление», «стратегические инструменты», «стратегические показатели» часто используются в системе здравоохранения и в этом существует необходимость. Стратегическое управление имеет решающее значение для достижения долгосрочных целей больниц и координации их с другими организациями здравоохранения [1]. Однако, это не практикуется широко, и для того, чтобы

ориентироваться в неспокойной среде здравоохранения необходим интегративный подход [2]. Больницы, также переходят от традиционной производственной ориентации к более активной маркетинговой позиции [3]. Стратегическая роль организационных знаний, также важна, о чем свидетельствует совместная программа по созданию систем измерения эффективности в больницах [4].

Руководители и менеджеры медицинских организаций внедряют и адаптируют инструменты стратегического управления для выживания в условиях изменчивой среды. В стратегическом управлении ключевыми факторами являются инструменты стратегического управления, которые позволят разработать успешный стратегический план.

Существует множество исследований, которые описывают вопросы миссии, стратегии и стратегического управления и анализируют инструменты стратегического управления.

Устойчивое развитие системы здравоохранения связано со стратегическим управлением. Инструменты стратегического управления становятся важными в медицинских организациях из-за растущей сложности и неопределенности в здравоохранении [5]. Многие медицинские организации, это 71,4% разрабатывают стратегические планы, хотя их распространение и реализация различаются. 28,6% медицинских организаций не имеют стратегического плана [6]. Авторы Лега Ф. и другие считают, что государственные медицинские организации часто принимают несколько стратегических документов, которые могут быть нескоординированными и пересекающимися, потенциально обусловленными внешними заинтересованными сторонами, а не внутренними приоритетами [7].

В системе здравоохранения медицинские организации внедряют инструменты стратегического управления, разработанные более полувека в академической области делового администрирования. Широкое применение в организациях различных отраслей по результатам многих исследований [8] получили 26 основных инструментов стратегического управления. Перечислим некоторые из них. SWOT – анализ, PEST-анализ, STP-анализ, VRIO-анализ, PESTEL-анализ, BCP (план непрерывности бизнеса), Strategy canvas, анализ удовлетворенности клиентов, финансовый анализ, анализ доли рынка, анализ ключевых факторов успеха, анализ сценариев, анализ цепочки создания ценности, анализ пяти сил М.Портера, управление знаниями, анализ удовлетворенности сотрудников, управление цепочками поставок, матрица Ансоффа, маркетинг -микс, CRM, бенчмаркинг, заявление миссии, видения и стратегии, Кайдзен, TQM (всеобщее управление качеством), сбалансированная система показателей. В будущем необходимо изучить и проанализировать каждый инструмент в деятельности медицинских организаций, время их использования, степень эффективности, ограничения и проблемы.

Такие инструменты стратегического управления, как сбалансированная система показателей и стратегические карты по мнению автора Чан Л. [9] применяются в медицинских организациях, но их внедрение сопряжено с трудностями. Использование стратегического управления в здравоохранении направлено на повышение эффективности детальности медицинской организации, что содействует долгосрочному мышлению и своевременному реагированию на изменения окружающей среды [5], [6].

Инструменты стратегического управления направлены на создание эффективного потока информации для высшего руководства с целью принятия верных решений и доведения их до заинтересованных сторон. В некоторых исследованиях [10] анализируется взаимосвязь между рисками и риск менеджментом и рассматриваются такие инструменты, как матрица вероятностей и дерево ошибок.

В качественном обзоре исследования автора Накаяма Т. [8] проведено сравнение использования инструментов стратегического управления по отраслям, где выявлено, что самый популярный инструмент SWOT – анализ является наиболее используемым (88%), в 22

из 25 исследований по всему миру. Самый низкий уровень применения в организациях имеет VRIO-анализ и Strategy canvas, они являются относительно новыми инструментами в сравнении с другими инструментами стратегического управления.

В литературе отсутствует общепринятый список или количество инструментов стратегического управления, поскольку влияние на деятельность организаций оказывают различные факторы, и их множество. Инструменты стратегического управления в исследованиях определяются по - разному (методы, техники, модели), то есть точной классификации нет. В международных базах данных авторами Сонер М., Карабачак Х. обнаружены исследования по инструментам стратегического управления [11] (таблица 1).

Таблица 1 - Инструменты стратегического управления, представленные в международных базах данных

№	Инструменты	Количество исследований в международных базах данных (2023)				
		Scopus	Web of science	Sciencedirect	Google scholar	EBSCO
1	TQM	2465	1642	232	784000	5088
2	Заявления миссии и видения	721	276	147	536400	2095
3	Стратегическое планирование	4898	3721	1119	2030000	12709
4	Управление взаимоотношениями с клиентами	1538	1031	125	399000	2967
5	Управление цепями поставок	8172	5666	1086	1080000	12562
6	Бенчмаркинг	14948	11795	6154	1690000	25952
7	Сбалансированная система показателей	2025	1576	231	294000	4835
8	Ключевые компетенции	1384	919	237	386000	2884
9	Аутсорсинг	10322	7419	1124	1300000	35093
10	Стратегические альянсы	1684	602	391	1470000	3126
Источник – [7].						

Из данной таблицы мы видим, что инструменты бенчмаркинг, аутсорсинг и стратегическое планирование имеют большее количество исследований и выступают ключевыми инструментами.

Авторами Сонер М., Карабачак Х. в работе «Идеалы и реалии в инструментах стратегического управления» [11] также, при сравнении осведомленности об инструментах стратегического управления выявлено, что на первом месте располагается инструмент TQM (всеобщее управление качеством), на втором месте заявления о миссии и видении, на третьем месте - стратегическое планирование, далее управление взаимоотношениями с клиентами, управление цепями поставок, бенчмаркинг, сбалансированная система показателей (Balanced Scorecard-Corporate Report Card), ключевые компетенции, аутсорсинг, стратегические альянсы.

Таким образом, в медицинских организациях, руководители, менеджеры и лица, принимающие решения, должны быть хорошо знакомы с инструментами стратегического

управления, использовать их своевременно и надлежащим образом и быть информированными о проблемах внедрения при принятии тех или иных инструментов и понимать их эффективность.

Рассмотрим и кратко приведем два инструмента стратегического управления, применяемые в медицинских организациях Республики Казахстан.

Поскольку на первом месте располагается инструмент TQM (всеобщее управление качеством), то мы утверждаем, что управление качеством в системе здравоохранения Республики Казахстан построено на национальных стандартах качества, международных стандартах качества (JCI) и системе менеджмента качества (ISO). Национальная и международная аккредитация позволяет оценить эффективность работы медицинской организации и обеспечить ее деятельность соответствию стандартам качества и безопасности при оказании медицинской помощи пациентам, а система менеджмента качества поддерживает актуальное состояние менеджмента организации путем принятия инновационных и технологически усложненных решений приоритетных задач.

Приведем итоги 56 аккредитованных медицинских организаций за декабрь 2023 -июнь 2024 год, центра аккредитации и качества в здравоохранении [12]. Данные медицинские организации (рисунок 1 и рисунок 2) получили сертификат национальной аккредитации (высшая категория, первая категория, вторая категория).

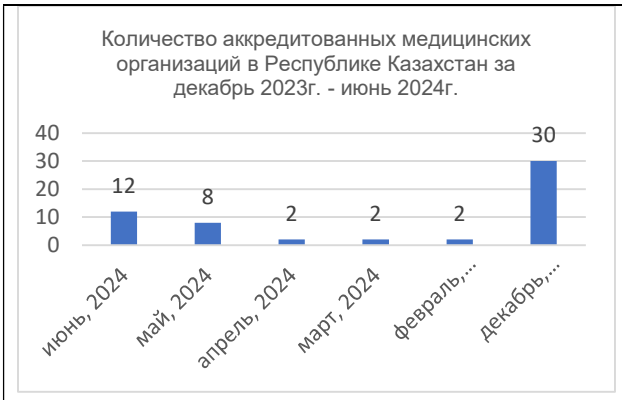

Рисунок 1 - Количество аккредитованных медицинских организаций в Республике Казахстан за декабрь 2023г. - июнь 2024г.

Рисунок 2 - Количество медицинских организаций в соответствии с категорией национальной аккредитации Республики Казахстан за декабрь 2023г. - июнь 2024г.

В таблице 2 приведены аккредитованные медицинские оргнанизации на июнь 2024 год.

№	Название медицинской организации	Категория
1	ТОО «Центр «ЭКО» и филиалы г.Астана, г.Шымкент	высшая
2	ТОО «Институт репродуктивной медицины», г.Алматы	высшая
3	КГКП «Городской онкологический центр» управления здравоохранения, г. Шымкент	высшая
4	ТОО «Клинико-диагностический реабилитационный центр «SANAD	первая
5	КГП на ПХВ «Поликлиника № 4 г. Семей» управления здравоохранения области Абай	первая
6	КГП на ПХВ «Акмолинский областной центр фтизиопульмонологии имени Коныратбека Курманбаева» при управлении здравоохранения Акмолинской области	первая
7	ТОО «Медицинский центр Рауан», г. Туркестан	первая
8	ГКП на ПХВ «Областной онкологический диспансер» УЗ акимата ЗКО	первая
9	КГП на ПХВ «Городская клиническая больница № 7» Управления общественного здравоохранения г. Алматы	первая
10	КГП на ПХВ «Центральная городская клиническая больница» Управления общественного здравоохранения г. Алматы»	первая
11	Учреждение «Больница «АКМАРАЛ» Туркестанская область, г. Туркестан	первая
12	КГП «Поликлиника №2 города Караганды» управления здравоохранения Карагандинской области	вторая
Источник - составлено на основе [12].		

В Казахстане на июнь 2024 года акредитованы международными стандартами JCI 9 больниц и они получили золотую печать одобрения, из более, чем 1000 организаций здравоохранения по всему миру [13]. Аккредитованными стандартами JCI являются следующие медицинские организации: 1) Корпоративный фонд университетский медицинский центр, г. Астана. Больничная программа от 25 февраля 2012 года; 2) АО «Национальный центр нейрохирургии», г. Астана. Больничная программа от 23 марта 2013 года; 3) НАО «Национальный детский реабилитационный центр», г. Астана. Программа долгосрочного ухода от 24 мая 2014 года; 4) НАО «Национальный научный кардиохирургический центр», г.Астана. Больничная программа от 24 октября 2014 года; 5) АО «Центральная клиническая больница», г.Алматы. Больничная программа от 21ноября 2015 года; 6) РГП на ПХВ «Больница Медицинского центра Управления делами Президента Республики Казахстан», г.Астана. Больничная программа от 09 апреля 2016 года; 7) Международный онкологический центр «Умит» Товарищества с ограниченной ответственностью «Томотерапия», г.Астана. Больничная программа о 25 июня 2021 года; 8) АО «Научно-исследовательский институт кардиологии и внутренних болезней», г.Алматы. Больничная программа от 28 августа 2021 года; 9) ТОО Научно-клинический центр кардиохирургии и трансплантологии, г. Тараз. Больничная программа от 28 января 2023 года.

Наличие золотой печати аккредитации JCI доказывает всей мировой элите, что данные казахстанские медицинские организации в совершенстве оказывают полный спектр медицинских услуг, что позволяет им: уменьшать изменчивость и сводить к минимуму риски для безопасности пациентов, улучшать клинические и операционные расходы, повышать квалификацию медицинского персонала и знание передовых практик, обеспечивать дифференциацию в конкурентной среде здравоохранения и улучшать возможности по

привлечению пациентов, укреплять доверие сообщества, заявляя о вложенных усилиях в предоставлении услуг самого высокого качества; привлекать защищать и удерживать лучших специалистов, приверженных обеспечению качественного ухода и безопасности пациентов. Сертификат JCI подтверждает соответствие медицинской деятельности этих больниц требованиям стандартов качества и безопасности, что выступает одним из важных условий допуска на конкурентный рынок в стране-экспортере медицинских услуг [14] и открывают возможности для сотрудничества, обмена опытом с клиниками любой страны мира [15].

Таким образом, мы отмечаем, что руководители медицинских организаций заинтересованы в росте качества оказываемых услуг, и получение сертификата национальной и международной аккредитации этому подтверждение.

Рассмотрим еще один часто применяемый инструмент стратегического управления SWOT – анализ, который оценивает сильные, слабые стороны организации, возможности и угрозы, с которыми сталкивается медицинская организация. SWOT – анализ позволяет выявить ключевые аспекты среды, в которой функционирует медицинская организация и разработать стратегии для устойчивого позиционирования на рынке здравоохранения.

SWOT – анализ приведем на примере Акционерного общества «Научно - исследовательский институт кардиологии и внутренних болезней», г.Алматы.

АО «НИИКиВБ» реализует такие основные приоритетные направления деятельности, как оказание, высокотехнологичной, специализированной и квалифицированной медицинской помощи; выполнение научной деятельности в области здравоохранения; реализация образовательной деятельности, включающая последипломное и дополнительное профессиональное образование, подготовка кадров в области внутренней медицины через резидентуру, в том числе специалистов из ближнего и дальнего зарубежья; оказание организационно-методической и практической помощи организациям здравоохранения регионов республики по основному профилю деятельности института; внедрение и развитие современных информационных и телемедицинских технологий в научно- образовательную и практическую деятельность республики. В 2016 г. пройдены процедуры институциональной и специализированной аккредитации по программам резидентуры образовательной деятельности. Выдан сертификат на соответствие стандарту надлежащей клинической практики (GCP) (2017г.). Заключено стратегическое партнерство с Сеульским национальным университетским госпиталем, Федеральным ГБУ «Национальный медицинский исследовательский центр» им. В.А. Алмазова (2017г.), НИИ кардиологии Томского НИМЦ. В 2018г АО «НИИКиВБ» получен международный сертификат ISO-9001-2015 менеджмента качества. АО «НИИКиВБ» имеет национальную аккредитацию и международную аккредитацию JCI.

АО «НИИКиВБ» развивает и постоянно совершенствует систему управления медицинской организацией. Внедрена система менеджмента качества, позволяющая обеспечить постоянное улучшение качества оказания медицинских услуг путем проведения регулярного мониторинга результативности основных бизнес-процессов и системы менеджмента организации на основе методологии международного стандарта ISO 9001:2015. В структуре АО «НИИКиВБ» создана Служба внутреннего аудита, основной целью которой является предоставление независимой и объективной информации, предназначенной для обеспечения эффективного управления путем внедрения системного подхода в совершенствование процессов управления рисками, внутреннего контроля и корпоративного управления.

Учитывая все преимущества и недостатки в функционировании деятельности АО «НИИКиВБ» и на основе информации и данных официального сайта [16] опишем сильные, слабые стороны, возможности и угрозы (SWOT – анализ).

Таблица 2 - SWOT – анализ АО «Научно-исследовательский институт кардиологии и внутренних болезней»

Сильные стороны (S – Strengths)	Слабые стороны (W – Weaknesses)
Единственное специализированное учреждение (современная кардиология, кардиохирургия, интервенционная кардиология и внутренние болезни) Удобное месторасположение Высококвалифицированные специалисты, признанные в странах ближнего и дальнего зарубежья Современное высокотехнологичное оборудование экспертного класса Международное сотрудничество Определенный уровень автономности Современная научно-исследовательская и клиническая база Высокая конкурентоспособность	Низкий уровень стратегии, видения общих целей и слабая корпоративная культура Недостаточная четкость организации работы Высокая централизация бюджета и отсутствие делегирования прав и ответственности за расходование средств Несовершенство системы оценки результативности деятельности; Недостаточный уровень менеджмента и координации научно-исследовательской и клинической работой с ППС и резидентами, а также соответствующей инфраструктурой Устаревшая техническая база Несовершенство системы мотивации персонала Отсутствие налаженной системы повышения квалификации научно-клинического и преподавательского персонала
Возможности (O – Opportunities)	Угрозы (T- Threats)
1. Разработка и внедрение современных новых технологий диагностики и лечения 2. Обмен опытом и повышение квалификации специалистов в странах ближнего и дальнего зарубежья 3. Увеличение инвестиций в приоритетные направления развития организации 4. Расширение научно-исследовательской сферы деятельности 5. Увеличение доли международных проектов и грантов 6. Расширение долгосрочных взаимоотношений со стратегическими партнерами 7. Добавление сопутствующих услуг 8. Наращивание положительного имиджа 9. Совершенствование системы развития человеческих ресурсов 10. Разработка политики и процедур по основным бизнес-процессам 11. Разработка системы мотивации персонала и прозрачной схемы оплаты труда	Ужесточение регулятивных законодательных норм Повышение уровня конкурентности НИИ и НЦ РК Экономический кризис Рост количества обоснованных жалоб пациентов Снижение репутации Отток высококвалифицированных кадров

SWOT – анализ, это ценный инструмент стратегического управления, нацелен на определение и разработку стратегий, стратегических направлений, принятие управленческих решений, оценку конкурентных позиций, управление изменениями и рисками.

SWOT – анализ применялся в различных контекстах здравоохранения, включая частные медицинские организации [17], телереабилитацию пациентов, перенесших инсульт [18], медицинскую поддержку детей школьного возраста [19]. Проводя SWOT – анализ, медицинские организации могут повысить свою конкурентоспособность, улучшить эффективность обслуживания и разработать целевые стратегии для решения проблем и использования возможностей [20]. Такой подход позволяет медицинским организациям адаптироваться к меняющимся рыночным условиям, оптимизировать распределение ресурсов и в конечном итоги улучшить результаты здравоохранения.

Таким образом, определение инструментов стратегического управления для каждой медицинской организации представляет собой индивидуальный подход с учетом ее уникальных возможностей и сильных сторон. Наиболее часто применяемые инструменты стратегического управления, это всеобщее управление качеством и SWOT – анализ. В литературе существует множество описанных и проанализированных инструментов стратегического управления, однако отсутствует их общепринятый список и количество инструментов. В будущих исследованиях необходимо изучить и проанализировать каждый инструмент стратегического управления, время его использования и степень эффективности, ограничения и проблемы.

Список использованных источников:

1. Zovko V. Strategic management process in hospitals. World Hospital Health Serv. 2001; 37(1):2-5, 33-4. PMID: 11372254
2. Paul F. Buller, L.Timpson The strategic management of hospitals: toward an integrative approach Health Care Management Review 198611(2) : p 7-13.
3. McDevitt, Paul Learning by doing strategic marketing management in hospitals Health Care Management Review, 198712(1):p 23-30.
4. Knowledge Strategic Management in the Hospital Industry January 2005 DOI: 10.4018/978-1-59140-459-0.ch022 In book: Creating Knowledge-Based Healthcare Organizations
5. Huebner, C.; Flessa, S. Strategic Management in Healthcare: A Call for Long-Term and Systems Thinking in an Uncertain System. Int. J. Environ. Res. Public Health 2022, 19, 8617. https://doi.org/10.3390/ ijerph19148617
6. Jaworzynska M. Using tools of strategic management in medical facilities of Lublin region Engineering Management in Production and Services, Volume 9, Issue 2, 2017 pages: 82-89.
7. Lega F., Longo F., Rotolo A. Decoupling the use and meaning of strategic plans in public healthcare Lega et al. BMC Health Services Research 2013, pages: 2-11 http://www.biomedcentral.com/1472-6963/13/5
8. Nakayama T. Empirical Study on the Application of Strategic Management Tools and Techniques in the Japanese Companies // European Journal of Business and Management www.iiste.org ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.10, No.10, 2018
9. Chan, Y. Lilian. “How strategy map works for Ontario's health system.” International Journal of Public Sector Management 22 (2009): 349-363.
10. Qehaja A.B, Kutllovci E., Pula, J. S., Strategic Management Tools and Techniques: A Comparative Analysis of Empirical Studies, Croatian Economic Survey, 2017, Vol. 19, No. 1, pp. 67-99.
11. Soner M., Karabacak H. Ideals and Realities in Strategic Management Tools // YÖNETİM VE EKONOMİ, 2023, pages:759-771.

12. Центр аккредитации по качеству в здравоохранении. https://acqh.kz/itogi-akkreditaczii/
13. Список действующих организаций, аккредитованных JCI. https://www.jointcommissioninternational.org/who-we-are/accredited-organizations/#sort=%40aoname%20ascending&numberOfResults=25&f:@aocountry=[Kazakhstan
14. Грин С. И., Крюкова К. К., Иванов И. В., Матыцин Н. О., Щесюль А. Г., Берсенева Е. А. Экспорт медицинских услуг как драйвер формирования национальной системы управления качеством и безопасностью медицинской деятельности. Проблемы социальной гигиены, здравоохранения и истории медицины. 2020; 28(3) DOI: http://dx.doi.org/10.32687/0869-866X-2020-28-3-459-463
15. Касьянова А. Д., Князюк Н. Ф. Роль международных стандартов качества в деятельности медицинских организаций как основа безопасной среды для пациента. Бизнес-образование в экономике знаний, №3, 2020
16. Официальный сайт. АО «Научно-исследовательский институт кардиологии и внутренних болезней». https://ncvb.kz/.
17. Коробкова О. К., Рыбкис В.А. «Внутренняя стратегия и SWOT-АНАЛИЗ внутренней среды частной медицинской организации на рынке медицинских услуг, 2015.
18. Nikolaev VA, Safonicheva OG, Nikolaev A.A. SWOT analysis of telerehabilitation after stroke: asynchronous format. Russian Journal of Preventive Medicine. 2022; 25 (10):71-78. (In Russ.)
19. Dereziuk, A. V., Yaremyna I. V., Holovchanska-Pushkar S. E., Baidiuk I. A. Efficiency improvement of health care institutions activities using swot-analysis. Reports of Vinnytsia National Medical University, 2023: DOI:10.17116/profmed20222510171

Literature

Language Reforms and Development of the Azerbaijani Language

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Historical Background

The Azerbaijani language, part of the Turkic language family, has undergone significant changes and reforms, particularly in the 20th century. Its evolution has been influenced by political, social, and cultural factors, which have shaped its current form.

Early 20th Century Reforms

In the early 20th century, Azerbaijan was part of the Russian Empire, and later the Soviet Union. The Soviet era brought substantial changes to the Azerbaijani language, particularly in its script and vocabulary.

1. Latinization Movement (1920s-1930s):
   - Objective: Simplify and modernize the language to increase literacy and ease communication within the diverse Soviet Union.
   - Implementation: In 1929, the Arabic script, traditionally used for Azerbaijani, was replaced with a Latin-based alphabet. This change aimed to break cultural ties with the Persian and Ottoman influences and align more closely with Soviet linguistic policies.
   - **Impact:** The Latin script was more phonetic and easier to learn, contributing to higher literacy rates. However, it also distanced Azerbaijani from its historical literary heritage written in Arabic script.

2. **Cyrillization (1930s-1940s):**
   - **Objective:** Further integrate Azerbaijan into the Soviet system and facilitate the learning of Russian.
   - **Implementation:** In 1939, the Latin script was replaced with a Cyrillic-based alphabet. This shift was part of a broader Soviet policy to promote Cyrillic alphabets across its territories to create a more unified Soviet identity.
   - **Impact:** The Cyrillic script aligned Azerbaijani more closely with Russian, making it easier for Azerbaijanis to learn Russian. However, it further alienated the language from its Turkic and Islamic roots.

Post-Soviet Era Reforms

With the dissolution of the Soviet Union in 1991 and Azerbaijan's subsequent independence, the country undertook efforts to reassert its national identity, which included language reforms.

1. **Reintroduction of the Latin Alphabet (1990s):**
- **Objective:** Restore cultural and historical ties with the Turkic world and modernize the language.
- **Implementation:** In 1991, Azerbaijan adopted a new Latin-based alphabet, which remains in use today. This move was symbolic of Azerbaijan's desire to distance itself from Russian influence and reconnect with its Turkic roots.
- **Impact:** The reintroduction of the Latin alphabet facilitated communication with other Turkic-speaking countries and aligned Azerbaijani more closely with the global community. It also required a period of adjustment as the population adapted to the new script.

2. **Modernization of Vocabulary:**
- **Objective:** Purify the language from Russian loanwords and revive traditional Azerbaijani terms.
- **Implementation:** Efforts were made to replace Russian borrowings with native Azerbaijani words or borrowings from other Turkic languages. This process involved the work of linguists, academics, and government bodies to standardize and promote these changes.
- **Impact:** The vocabulary modernization helped reinforce national identity and cultural independence. It also enhanced the distinctiveness of the Azerbaijani language, making it more reflective of the country's heritage.

Contemporary Issues and Developments

In the modern era, the Azerbaijani language continues to evolve, facing new challenges and opportunities.

- **Globalization and Technological Influence:**
- **Impact:** The rise of the internet and digital communication has introduced new foreign loanwords, particularly from English. This presents a challenge in maintaining linguistic purity while embracing global trends.
- **Response:** Language purists advocate for the creation of Azerbaijani equivalents for new concepts, while others accept the incorporation of foreign terms as part of linguistic evolution.

- . **Education and Media:**
- **Role:** The education system and media play crucial roles in the standardization and dissemination of the Azerbaijani language. Textbooks, literature, television, and online content all contribute to shaping the language.
- **Challenges:** Balancing the preservation of linguistic heritage with the need to adapt to modern realities remains a key challenge. Ensuring high-quality Azerbaijani language education and media content is essential for maintaining language vitality.

- . Dialects and Regional Variations:
- **Diversity:** Azerbaijani has several dialects and regional variations, which enrich the language but also pose challenges for standardization.
- **Efforts:** Linguists and policymakers work to document and promote these dialects while fostering a standard language that can be understood nationwide.

4. Cultural Revival:
- Objective: Revive and celebrate Azerbaijani cultural heritage through literature, arts, and public discourse.

- Implementation: Cultural festivals, literary awards, and government initiatives support the use and appreciation of the Azerbaijani language in various forms.

Conclusion

The Azerbaijani language has undergone significant reforms and developments, particularly in the 20th and 21st centuries. These changes reflect the broader political and cultural shifts in Azerbaijan's history, from Soviet influence to independent nationhood. Today, the Azerbaijani language continues to evolve, balancing the preservation of its rich heritage with the demands of a modern, globalized world.

Journalism

Social and psychological aspects and models of advertising

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Annotation
The impact of advertising on consumers has been studied in detail and exhaustively by a number of researchers who study the psychological aspects of advertising. The psychological aspect of advertising includes basic functions, its influence and impact on psychological mechanisms, basic psychological models of advertising and consumer behavior. In the short term, advertising helps to increase awareness and trust in the company, and in the long term, it helps to build product/brand attachment and a positive reputation.
Keywords: The impact of advertising, Psychological mechanism of advertising, Social advertising, consumer behavior

The psychological mechanism of the influence of advertising can be described in two ways. First - the role of psychological processes in convincing the user what to think about and what to do. The second way - to assess the level and nature of the impact of advertising on the consciousness and subconscious of consumers (Shubina, 2011). Otherwise, advertising can be defined as a communication process, as it provides information about the product/service to the target group. Therefore, the main purpose of advertising is to influence (as a result of providing information) to the awareness and behavior of consumers in the right direction. Advertising uses knowledge when preparing information about the characteristics of the human psyche, behavior and consumer pattern in a way that creates the possibility of influencing human activity or behavior. One of the most discussed issues is the advertising psychological mechanisms of exposure to human consciousness and behavior. There are several basic models in this regard, each of which has evolved on a certain mainstream of psychology. Ad psychology includes models such as behavioral model, cognitive model, information model, etc. The concepts of conditioning, positive and negative response are fundamental in the psychology of behavior. Conditioning (both classical and instrumental) means creating a relationship between stimulus and reaction. Advertising specialists use two strategies: the first causes a positive response of consumers to advertising, the second - a negative response to competitive advertising.

A positive response in an advertisement can be defined as an impact on a person's consciousness and behavior, which is perceived as a reward. The second strategy regarding air conditioning is to cause a negative response. The negative response to advertising is an attempt to eliminate certain behaviors by "losing" advertising customers with respect to competing products/services or activities. This strategy is used in the light of a positive response using generalization and/or differentiation procedures. In which the generalization procedure is very important, in turn, all the conditioned and generalization processes occur with the help of looking at the stimulus and the reaction to their hearing (the so-called attention-grabbing mechanism).

1. Differentiation theory (combination of inhibition with inhibition) - each amplifier increases the

tendency to repeat the reaction, but its lack leads to an increase in inhibitory tendencies. 2. Relational theory of differentiation - the differentiation condition is the process of comparing the stimulus. A person reacts to the relationship between these stimuli, replacing the relationship between two stimuli, which mainly acts for another pair of stimuli. The cognitive model can be represented by Tolman's theory of intensional behavior (Shubina, 2011). With Festinger's cognitive dissonance theory (1957) or the concept of Miller, Gallanter, and Pribram (1960) with the concept of a phased organization of intensional behavior. Tolman's intentional behavior theory refers to the concept of a "cognitive map" that allows a person to act intentionally. Festinger's theory of cognitive dissonance suggests that creating a state of internal stress as a result of the simultaneous origin of two mutually exclusive opinions (e.g. cigarette advertising) stimulates a person to reduce it by a certain activity or excuse.

For example, an advertisement for cigarettes and cigarettes that take conflicting thoughts leads to a feeling of internal stress, after which a person tries to reduce this unpleasant stress. Such a smoker may stop smoking or reject the advice of professionals, saying that "everyone must die for something." Cigarette companies help to post information about the dangers of nicotine and alcohol in the packaging, because they know that advertising for the majority of recipients is of much greater motivated importance than mental conflict. There should also be a theory of scripts that suggests that human activity is governed by socially defined (individual and cultural) scenes of experience, called "scenarios". Consumer behavior and ad psychology use this knowledge: for example, people behave the same in all public places and in socially defined situations such as bar, exam, theater. The main purpose of the information model is to model the process of receiving information. In this model, "information intake" means the active transformation of information by its organization in a system of cognitive structures that includes perception, attention, memory, emotions and motivation. The consumer behavior model defines internal processes as an interactive series of attempts between the distinctive elements of the structure. User goals are seen as planning the realization of specific behaviors.

The impact of advertising on consumer behavior is a communication process that takes place between the sender and the receiver. This process is aimed at transforming and understanding the content of messages, including two processes - coding and decryption. The purpose of notification coding is to change the content of a specific form of message, as visual, verbal, audio, etc. decoding involves decoding the content included in the advertising message. This process may be affected by various factors related to the characteristics of the sender and/or receiver. Linear models of consumer behavior are slightly more complex, focusing on the main elements of cognitive processes, which leads to the understanding of advertising, its delivery, memorization of content, and modeling specific behavior. The disadvantage of these models of consumer behavior, first of all, is their linear and simplicity - while human behavior is nonlinear and much more complex.

The main purpose of each ad is to influence the awareness and behavior of consumers. There are several important effects of the influence of advertising from here. To understand the essence, mechanisms and possibilities of social advertising, some of its effects should be presented. The results of the advertisement are as follows: Establishing yourself as a leader in the field of advertising.

The main idea is to inspire a sense of superiority by buying a product or service presented in an advertisement. It should also be noted that every advertisement tries to satisfy instincts and internal needs. It is important to remember that on the one hand, advertising "creates" a number of people's needs, which constantly offer a trusted product or service and reassure them of their needs (persuasive buy). On the other hand, the rule on compliance between advertising and real customer needs must be met. The last significant effect of advertising is related to a person's self-esteem. To be more successful, advertising can affect self-esteem. The basic assumption is that by

"elevating" self-esteem, it is possible to motivate people to any activity, in particular, to purchase a advertised product or service.

Social aspects of advertising

One of the important issues is the social purpose of advertising, which clearly has any kind of advertising. In the social aspects, we discourage the behavior of consumers as a result of the impact of advertising, which has come as a result of the exit of a particular ad. The criticism that "most advertising messages are tasteless" and that "promotion does nothing to harm the well-being of the public" sometimes ignores the fact that there is no universally accepted set of standards and priorities within our social framework.

We live in a mixed economy with different needs, desires and aspirations; What is tasteless for one group can be quite satisfying for another (Chan, 2017). Advertisements gain popularity among the population as a result of the intense launch of advertisements, because the information provided at the same time has a decisive effect on a person's psycho-emotional state and nebula.

One of the important aspects of social advertising is to change consumer behavior, here it can be referred to as the impact of negative habits (tobacco smoking, alcohol, etc.), or such as calling for vaccination, making certain financial donations by citizens at various charity events, etc. These types of advertisements may have less economic content, but they are inherently important for the well-being of the public due to the general characteristics.

In many cases, we have facts when young children demand products that have neither the necessary knowledge nor the need and demand, in this regard advertising can affect children from the age of minor, children are also conductors whose desires and wasteful needs make their parents pay money for something that does not exist, hence the advertisement has an indirect impact which from a social point of view It's an important issue.

Conclusion

To say that rekalam can shape the emotions and attitudes of society not only on a particular product, but also on production and production. Advertisements should not mislead the population through the information provided. Deliberately misleading the user by advertising is an important problem on which both moral and legal liability exists. Advertising affects the lifestyle of millions of people and in many cases speech, because advertisements such as TV advertisements are extensively supplied to broad layers of society, and establish various emotional or verbal aspects that again and again influence people's lives and their decisions.

References

Chan, K. (2017). Social issues of advertising. Hong Kong: City University of Hong Kong Press.
Shubina, I. (2011). Social advertisement: the nature, psychological aspect and successfulness. University of Humanities, 23.
Monle, L., & Johnson, C. (2005). Principle of advertising: A Global Perspective. Woshington: Routledge.

Agricultural Sciences

High-Paraffin Crude Oil from Shromisubani: A Versatile Resource for Sustainable Development

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This research reviews the properties, processing methods, and potential applications of high-paraffin crude oil from Shromisubani in various sectors, including agriculture. The article also discusses environmentally safe processing methods and sustainable development perspectives. The study shows that rational use of this unique resource is possible with economic benefits while minimizing negative environmental impacts.

The Shromisubani oil field is located in western Georgia, in the eastern part of the Colchis Lowland. Geologically, this region represents a sedimentation zone where organic material has been accumulating and transforming for millions of years. The location of the Shromisubani field at 35 meters above sea level and proximity to the Black Sea contribute to a moderate subtropical climate. These climatic conditions historically supported rich vegetation, which in turn influenced the oil formation process.

Its location in the Supsa river valley indicates that oil reservoirs may have formed in geological structures associated with river sediments. The geological pressure and temperature in this region likely facilitated the formation of paraffins in the oil.

The type and age of sediments: This part of the Colchis Lowland is characterized by Mesozoic and Cenozoic-era sediments. The organic material that transformed into oil may have been rich in compounds that promote paraffin formation.

The presence of the Supsa and Shuti rivers indicates potential migration pathways that may have influenced the oil composition during its formation and migration processes. This part of the Colchis Lowland was historically characterized by swampy areas, creating an anaerobic environment. Such an environment promotes the transformation of organic material, which can lead to the formation of high-paraffin oil.

The presence of the Supsa and Shuti rivers indicates an active sedimentation process, which may have influenced the formation of oil reservoirs and, consequently, the oil composition.

Although geographical location plays a significant role in forming oil characteristics, high paraffin content is a complex property that depends on many factors, including:

Type of initial organic material
Geological history (temperature, pressure, time)
Microbiological processes
Geochemical transformations

To determine the exact reasons for the high paraffin content of Shromisubani oil, detailed geological and geochemical studies are needed. However, we can assume that its unique geographical location and the region's geological history played a significant role in the formation of this characteristic.

Here's the English translation of the scientific text you provided:

The research is based on a review of existing literature, laboratory analyses, and the opinions of industry experts. The physical and chemical properties of oil, processing methods, and potential areas of application are analyzed. A comparative analysis was conducted with the processing practices of similar types of oil in other countries.

As a result of the review, we established the physical and chemical properties. The crude oil from Shromisubani is characterized by a high paraffin content (20–25%), which leads to its high pour point (approximately 35–40 °C) and high viscosity at low temperatures. The oil density at 15 °C is approximately 0.85-0.89 g/cm2. The sulfur content is relatively low, ranging from 0.1-0.3%. These properties present both challenges (e.g., transportation difficulties) and unique opportunities (e.g., high-quality paraffin production) in oil processing.

The processing of Shromisubani oil is possible in the following main directions:

a) Fuel production: gasoline, diesel fuel, and aviation kerosene. Fuel derived from high-paraffin oil is characterized by a high cetane number in the case of diesel and good anti-knock properties in the case of gasoline.
b) Lubricant production: oils and greases. Lubricants derived from Shromisubani oil are distinguished by their high quality and stability at extreme temperatures.
c) Paraffin production: candle making, cosmetic products, insulation materials. The high paraffin content allows for the production of high-quality paraffin, which is one of the main advantages of this oil.
d) Bitumen production: for road construction and roofing materials. Bitumen derived from Shromisubani oil is characterized by its high adhesive properties.
e) Petrochemical products: raw materials for plastics and synthetic fibers. High-paraffin oil is a good starting material for many petrochemical processes.
f) Chemical processes: olefin production, aromatic hydrocarbon production. This direction provides the opportunity to obtain high-value-added products.

Here's the English translation of the additional scientific text you provided:

The research revealed several relatively environmentally safe directions:

a) Paraffin production: This process generates relatively fewer harmful emissions. Paraffin products are often biodegradable, which reduces their long-term environmental impact.
b) Creation of biodegradable lubricants: Modern technologies allow for the production of more environmentally clean lubricants that quickly decompose in the natural environment.
c) Production of special chemical products: For example, production of raw materials needed for the pharmaceutical or cosmetic industry. These processes often require less energy and generate less waste.
d) Use of green technologies: implementation of CO_2 capture and storage technologies in the processing process; use of renewable energy sources in processing plants.

Shromisubani oil processing products have multiple uses in agriculture:

a) Agrochemical production: Some components of pesticides and herbicides can be obtained through oil processing.
b) Fertilizer components: Some oil derivatives are used in the production of complex fertilizers.
c) Fuel and lubricants for agricultural machinery: production of high-quality fuel and oils needed for tractors and other machinery.

d) Mulching material: Paraffin-based mulching materials effectively retain soil moisture and inhibit weed growth.
e) Soil conditioners: Some oil products are used to improve soil structure, especially on acidic or alkaline soils.
f) Irrigation system components: plastic pipes and fittings made from oil derivatives are widely used in irrigation systems.

Sustainable use of Shromisubani oil requires a complex approach:

a) Implementation of circular economy principles: minimizing waste and reusing it in the production of other products. For example, waste gases generated during processing can be used as an energy source.
b) CO_2 capture and storage technologies: The implementation of these technologies will significantly reduce the ecological footprint of processing plants.

Here's the English translation of the final part of your scientific text:

c) Integration of renewable energy sources: The use of solar and wind energy in processing plants will reduce fossil fuel consumption.
d) Production of biofuel components: using certain oil fractions in biofuel production reduces the consumption of pure petroleum products.

Thus, the high-paraffin crude oil from Shromisubani represents a unique resource whose properties are determined by the region's special geological history and geographical location in the Colchis Lowland.

Its high paraffin content creates both challenges and opportunities in terms of processing and utilization, which requires innovative approaches in the petrochemical industry.

The rational exploitation of Shromisubani oil is possible in many areas, including fuel production, lubricants, paraffin production, and agriculture, which underscores its economic importance.

In the face of modern ecological challenges, special attention should be paid to the sustainable use of this resource, which implies the implementation of environmentally safe processing methods and consideration of circular economy principles.

Further research on Shromisubani oil and the search for innovative ways of using it can become a significant factor not only for local economic development but also for the advancement of the global petrochemical industry.

Historical Sciences

POWER AS AN AESTHETIC VALUE

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Abstract. The article is devoted to the aesthetic dimension of power. Power is presented as a technique of constructing a subject that satisfies the basic aesthetic need of a person in a world commensurate with him. The individual and society gain proportionality to themselves in power. The author describes the adventures of the ruling and subordinate subjects from self-determination to complete dissolution in the world of objects.

Keywords: power, aesthetics, government, subject, will (to power), compulsion.

Introduction.

It is probably difficult to determine the time when power became the subject of special reflection. It seems that power is so fundamental to human existence (or not only for it?) that the thematization of any aspect of it can be understood as the discovery or concealment of power. "Power as the reality of myth and ritual" [1], and "No power!". In his mouth, this motto sounded like a call for absolute silence, which is why, however, not as getting rid of power, but only as its sharpening.

However, we can quite confidently indicate texts in which the problem of power is posed aesthetically. As we have previously shown [2], in the texts of the "axial time", the exercise of power in society is understood primarily in the aesthetic dimension. Later, over the centuries until the end of the nineteenth century, aesthetic motives in the philosophy of power weakened.

A comparison of the Greek and Chinese "classics", for all their differences, reveals significant similarities in the understanding of power. Both the West and the East distinguish between power and government, with the former being evaluated negatively, and the latter positively. Power is understood as violence, imposing oneself (one's will, one's word, one's way) on another, while under government, according to Plato, Laozi and Confucius, there is no need to give orders at all. The board allows each of the participants in this relationship to become themselves, to realize their nature.

Government is beautiful, and attraction to the beautiful, involvement in the pre-red creates an ideal society. Power is ugly and destructive for society.

However, for reasons usually not explained by these thinkers, the aesthetic appeal of government turns out to be an insufficient incentive for its establishment. And then the power returns to their lives and reasoning. Confucianism is corrected by legalism, and Plato requires laws implicitly including power, and even based on a lawless Night Meeting. And only Aristotle finds a wonderful way out – love. However, for some reason her sermon gives rise to Alexander the Great. Willy-nilly, a question creeps in: what if the aesthetics of power are no less seductive than the aesthetics of government?

The main part.

This position was already stated by Socrates' opponent, Frasimachus, in The State, when he introduced a public assessment of the ruler. Let's remember:

" If someone, not only deprives citizens of their property, but also enslaves them themselves, turning them into slaves... they call him prosperous and prosperous, and not only compatriots, but also foreigners, precisely because they know that such a person has fully committed injustice..." [3].

Of course, from Plato's own point of view, this appeal to the public opinion should have precisely debunked the ruler. But in fact, it turns out the opposite: Frasimachus accurately expresses the perception of power as a phenomenon for others. And these others see the complete injustice of destroying the people around them as independent subjects, and – in contradiction to the thesis of Plato and Aristotle, Confucius and Laozi themselves – do not turn away, but worship this injustice. And, probably, precisely because, by destroying others, the ruler constructs himself from the resulting material. In this reading, it is not government that is the path to becoming a subject, as it seemed to the "classics", but power. The Board is probably fine, but it is precisely because of this that it is so difficult, if not impossible, for him to fulfill the mission entrusted to him. "The beautiful is difficult," and even given only in disinterested contemplation. And as far as the social order is concerned, disinterest becomes a particularly important, literally pragmatically significant characteristic.

Only those who have other resources for the formation of their own subject can afford such disinterested work. But if they have such resources, will they need this work? Wouldn't it be better for them to study science, go

to a monastery, write poetry and paintings? Apparently, government requires heroism, not only from the ruler, but also from the governed. But mass heroism, due to the contradiction in definition, remains a utopia of Soviet ideology or an ideal model of Arendt's description of ancient Athens [4].

Centuries later, Frasimach's understanding of power will find a new and philosophically happier life thanks to F. Nietzsche. However, Nietzsche set his goal with the help of the concept of "will to power" to refute, and not at all to affirm the subject.

To demand from force that it does not manifest itself as a force, that it is not a desire for domination, a desire for pacification, a desire for domination, a thirst for enemies, resistance and triumphs, is as meaningless as to demand from weakness that it manifest itself as a force. ... The subject (or, more popularly, the soul), This must have been why it was hitherto the best dogma of faith on earth, because it gave most mortals, the weak and oppressed of all kinds, the opportunity for subtle self–deception – to interpret weakness itself as freedom, and the reversion of its existence as merit [5].

Nietzsche did not succeed in such a radical denial of the subject, as he himself sometimes tried to imagine it. It couldn't have worked out, obviously. Let us recall that Schopenhauer, complementing the Kantian understanding of the world as a representation, introduces the concept of will in the context of the concept of force defined by Newtonian science. He introduces it precisely in order to be able to understand the world as a representation in the images of subjective life. Nietzsche, borrowing the concept of will, further strengthens his inherent connection with the subject with the addition of "power". However, this is not a Divine or human subject, but a superhuman one. Nietzschean will to Power there is a will to oneself, to constant self-creation. Nietzsche tries to describe a view that has always been deeply and most deeply rooted in the privileged classes: power does not need a subject, but it is the nature of the ruling. On the contrary, the subject needs a master, from the latter the first receives the will, i.e., in general, the ability to be. The aesthetics of power, so understood, is the aesthetics of power that

crushes all boundaries and is fundamentally indeterminate. If the aesthetics of government is in its logic, then the aesthetics of power is in its unpredictability. If government can be explained, then power can only be described. And therefore power is entirely aesthetic. It does not take us beyond the limits of an aesthetic relationship – to the Truth, the One, etc. Power is self–directed admiration. On their unpredictability and impermanence, on their lack of control over anyone's will, on the fact that all others are mirrors of variability and all the power of this power.

However, it is clear that the Nietzschean pathos of the dissolution of the imperious in the subject of the ruling is one-sided. "The king is played by the retinue", and it is impossible to completely abandon the consideration of the "ruling–subordinate" relationship, even if the latter is reduced to the level of the material, object [6]. After all, it is in this respect that the ruler reveals himself to be such: it is impossible to assert that you own and dispose of a thing if there is no possibility to show this possession.

Dependence on the subject kind of undermines the self-determination of the government, its essence. In fact, the government is both refuted and not refuted by the discovery of this dependence, therefore we have introduced the turnover "as if". On the one hand, any dependence contradicts the concept of the ruler, on the other – it is immeasurably included in it. And the ruler finds himself in a vicious circle: he is constantly forced to prove his power to himself and others, to refute his dependence on his subordinate. The simplest strategy is to destroy the one who is subordinate. Itself the unreasonableness of this action confirms the absoluteness of power. This strategy, however, requires endless resources: someone (something) new must replace the one who has been humiliated. Therefore, there are two ways for a ruler of this type: either to be in a state of continuous war for these resources, or to limit his will to destroy his subjects, his will to power.

Rulers with a developed sense of power can afford more sophisticated self-affirmation strategies. After all, it is possible to destroy a subject not only by destroying him as a physical body. A subordinate can be destroyed in his various hypos: in the hypostasis of an honest worker (you can dismiss rumors about him that he takes bribes), in the hypostasis of a wonderful family man (you can fabricate a video depicting him in a bathhouse with prostitutes), etc. Even better, if it is possible to destroy him in his own eyes, for example, to force a mother to choose which of her two children.

He will be doomed to perish. It should be noted that in all the above examples, we are not talking about achieving any pragmatic benefits for the ruler: a specific method of bullying is chosen precisely based on considerations of compliance with the method of self-identification of the subject. It is curious that often others do not even notice the manipulative actions of the ruler, he does not manifest himself in their eyes as the ruler. His complex survives in a deeply intimate sphere – with a subordinate one-on-one.

The rulers who have reached the limit of power can afford the most subtle game: to destroy the subject precisely as under authority, to change places with him. To make a slave a master is the apotheosis of human power.

Secondly, not just a sophisticated, but also a wise authority feels the riskiness of the current situation. The stake in the game is the world order. An object cannot be a subject, the substitution of one for another leads to death. For 100 years, humanity has been tormented by the nightmare of the "uprising of machines" – "pure" objects that serve only to carry out the will of the master. A wise ruler cannot afford this risk. But at the same time, the government cannot limit itself to simple manipulation of an object, since in this regard it is unable to destroy itself. A metal ball hits another one. This second one starts rolling. Does the former rule over the latter? In order to assert this, it is necessary that the second one demonstrate his unwillingness to move anywhere. That is, it is necessary that he was not quite an object. Or even more precisely: to make him a subject, reduce him to the role of an object. Only then will the first ball be the subject.

Recalling and paraphrasing Buber, we can say that the "great basic word" of power is "I am You", where "You" is said in order to be immediately replaced by "It". Obviously, it's about politics very often it is not the case that the ruler is forced to use force and be constituted as a ruler in response to the active resistance or passive intransigence of the governed, as political thinkers have argued since Plato. On the contrary, the ruler must always find and overcome resistance, even if the subject himself did not think about resistance. In this overcoming, power reveals itself, as Nietzsche wrote about it [7].

If the subject has given a reason, then the ruler must definitely use it, without fear of exaggerating the scale of resistance. Among other benefits, this situation allows the authorities to impersonate the board as necessary.

But power is aesthetically attractive not only for those who claim to be superhuman, to "possess the right" in the face of a "trembling creature." The "barbarian" and "evil" described above [8]. The enemy is also valuable for those who are subject. He turns out to be a great ruler for them. Power is not only a form of becoming a dominant subject, and not even only a dominant and imperious one as a parasite of the subjectivity of the former. Power is valuable as a form of formation of a social subject, and this formation occurs due to the personification of society by the figure of the ruler.

Conclusion.

But is it possible to talk about power without a subject? Is it possible to talk about the power of the object? Or, remembering Aristotle's favorite phrase, it is, of course, possible to speak, but is it possible to think? Indeed, when it comes to "the objective course of things", we mean a certain compulsion of objectivity in relation to the subject. It turns out a paradoxical change of positions: the object becomes the subject, the determinant, and the subject is deterministic. It is characteristic that objective compulsion is characterized by repeatability and predictability. It is only necessary to put. Predictability is questioned, and objective compulsion is immediately problematized. Or it becomes irrelevant, as in Prigogine synergetics, where strange attractors and bifurcation points turn out to be physical for us the justification of our freedom. Or it becomes biased when the will of some subject is revealed behind earthquakes and tsunamis: perhaps Divine, perhaps human, conducting nuclear tests. It is simple to eliminate this subject: it is enough to state that a tsunami always occurs when certain conditions develop. That is, to introduce repeatability and predictability. That is, to remove the power.

References.

1 Carter, I. 2008. ‘How Are Power and Unfreedom Related?’, in C. Laborde and J. Maynor (eds), Republicanism and Political Theory. Oxford: Blackwell, 58–82.

2 Dean, M. 2009. ‘Three Conceptions of the Relationship between Power and Liberty’, in S. Clegg and M. Haugaard (eds), Handbook of Power. London: Sage, 178–93.

3 Dowding, K. 1991. Rational Choice and Political Power. Edwan Elgar: Aldershot.

4 Friedrich, C. J. 1963. Man and His Government: An Empirical Theory of Politics. New York: McGraw-Hill.

5 Kramer, M. H. 2003. The Quality of Freedom. Oxford: Oxford University Press.

6 Lukes, S. 1974. Power: A Radical View. London: MacMillan Press.

7 MacCallum G. C. 1967. ‘Negative and Positive Freedom’, The Philosophical Review 76(3): 312–34.

8 Morriss, P. 2002. Power: A Philosophical Analysis. Manchester: Manchester University Press.

О КАВКАЗСКИХ ДЕВИЧЬИХ БАШНЯХ

МЕХТИЕВА АЙТЕН АЛИ
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Аннотация
Наблюдаются определенные объективные закономерности в зависимости от распространения и технологии строительства Девичьих башен. Эти башни таким образом были подвергнуты воздействию существующих традиций не только на построенных территориях, но и в соседних регионах. Это подтверждается археологическими памятниками. Одним из памятников, считающимися ценным источником, занимающими значимое место в истории народов данного региона, являются Кыз калалары (Девичьи башни). Девичьи башни, построенные в северных районах Азербайджана, подобны дагестанским и в целом северокавказским башням играют значительную роль в защите и сохранении этих традиций до наших дней. Итак, изучение объектов, вроде Девичьих башен, необходимо. Это имеет большое значение в изучении истории Кавказа.
Ключевые слова: Кавказ, Азербайджан, Девичьи башни, Дагестан, памятник, оборонительные сооружения

ABOUT THE CAUCASIAN MAIDEN TOWERS

MEHDIYEVA AYTEN ALI

Abstract
In conformity with spread areas, definite objective laws are observed in construction techniques of Maiden Towers. Thus, these towers were subjected to affection of existing traditions not only in constructed areas, but also in neighbor regions. This is affirmed with archeological materials. One of the monuments considered a valuable source, occupying a significant place in the history of the peoples of this region, is the Kyz Kalalary (Maiden Towers). Maiden Towers, constructed in Northern regions of Azerbaijan are similar to Dagestan and in general to Northern Caucasus towers and play significant role in protection and preservation of those traditions up to date. So, studying of objects, like Maiden Towers, are necessary. This is very significant in studying of Caucasian history.
Keywords: Caucasus, Azerbaijan, Maiden Towers, Dagestan, monument, defensive structures

Кавказ, обладающий выгодным географическим местоположением, богатыми природными ресурсами, имеющий стратегическое значение, сыграл значимую роль в процессе исторического развития. Этот район связывал Восток и Запад, оказывал большое воздействие на экономическое, политическое и культурное развитие древних цивилизаций. Азербайджан, на протяжении многих лет находился в центре различных интересов многих народов. Основной причиной этому послужило то, что основные торговые пути, связывающие Европу и Азию, проходили через Кавказ.

Отображение этого фактора в материальной культуре региона наблюдается с растущим интересом к изучению материальной культуры проживающих здесь народов. Отдаленное изучение региона не дает положительных результатов, или же полученные результаты несут односторонний характер [12, с.33].

При исследовании Кавказа были обнаружены памятники различного характера. Они хранят в себе древнюю историю и считаются ценными источниками [10, с.18]. Одним из памятников, считающимися ценным источником, занимающими значимое место в истории

народов данного региона, являются Кыз калалары (Девичьи башни). Самые древние изображения Девичьих башен обнаружены на территории Гобустана. Азербайджанский ученый И.М.Джафарзаде, описывающий данные изображения в Гобустане, уделил особое внимание окружению памятника священными атрибутами, идеологическим факторам, играющим основную роль в строительстве башни [6, с.133]. Архитектор Д.А.Ахундов, внимательно изучивший Гобустанские рисунки, заявил, что эти изображения связаны с башнями которые были построены позже. По его мнению, эти изображения должны расцениваться как начальные описания многих храмов и башен в Азербайджане [3, с. 10]. Одной из этих башен являются Кыз кала (каласы). Д.А.Ахундов заявил, что распространение Девичьей башни на широком ареале не является случайностью, строительство этого памятника связано с верой народов, строящих его. Этот памятник был создан под воздействием как местных, так и древних цивилизаций [2, с.79]. Исследование многих азербайджанских ученых, а так же изучение разных письменных источников установило, что Девичьи башни и есть культовые памятники [4, с. 150].

Девичьи башни также отличаются своими характерными чертами в архитектуре народов мира. Кыз каласы можно встретить не только в Баку, но и в различных регионах Азербайджана и Турции, в России (Дагентане, Башкирии), Средней Азии и Иране. Распространение этих башен на довольно огромном пространстве, их название Кыз кала (каласы), порождает большой интерес к их изучению.

Девичьи башни отличаются от памятников Древнего мира и Средневековья, находящихся на территории Азербайджана и в соседних регионах, а также обладают характерными свойствами. Одним из этих свойств является то, что они, являясь отдельными памятниками, связывали в единый исторический комплекс населенные пункты и оборонительные крепости [2, с.29].

Широко распространенные в Азербайджане Кыз каласы также, объединяет в себе качества, присущие кавказскому региону. Кыз каласы можно встретить почти во всех регионах республики, обладают местными строительными особенностями, национальными формами, обрядами и несут оборонительный характер, а также, они сохранили в себе архитектурные традиции Древнего мира и Средневековья.

Несмотря на то, что территории расположения Кыз каласы отличаются по природно – географическим свойствам, большинство этих памятников построено в горах и в горной местности [14]. Поэтому нужно обратить внимание на смысл названия Кыз каласы (кала). Так как, обозначение слова «Гыз» (Кыз) огузским этнонимом и такими топонимами как гуз, гыз, гыр, гур, то, что оно дошло до нашего времени, говорит о фонетических вариантах этого слова: Генгур (Азербайджан), Курган (Средняя Азия), Гургур (Ираг), Гочгор (Алтай), Гузанлы, Гарагыз, Гыргаласы (Азербайджан), Кызыл – Кала (Карачаево – Черкесия), Кызыл (Тува), Кизляр, Кызляркала (Дагестан), Кызгала – тау (Башкирия) (Россия). Фонетические варианты гуз, гыз, гыр, гур и т.д., входящие в состав различных ономастических единиц, приняли архаичную форму, некоторые вышли из обихода, или же сохранились под названием различных топонимов и памятников [16, с.106].

Большинство вышеуказанных топонимов связано с горами, многие памятники, носящие название Девичья башня, построены в горах, скалистой и недоступной местности. Вероятно, что одной из причин строительства таких величественных памятников как Девичьи башни в этих местностях является то, что в древние времена люди поклонялись горам. Таким образом, строительство Бакинской Кыз каласы на большой скале, Шемахинской Кыз каласы на высокой горе, Гядабекской Кыз каласы на горе, куда невозможно подниматься в определенное время года, Исмаиллинской Кыз каласы на хребте высокой горы, не несет случайный характер.

Рисунок 1. Кизляр (Дагестан)

Одна из Девичьих башен – Кызлар кала расположена на территории Дагестана (Рисунок 1). Эта башня, сейчас больше известна как Кизляр, описана в ценном историческом источнике – «Дербент – наме». В этом источнике говорится о наличии крепости Сурхаб при описании боев между арабами и хазарами в VII веке. Именно крепость Сурхаб стала называться Кизляр в XVII – XVIII вв. [8].

Расположенный в низовьях реки Терек город Кизляр в настоящее время вместе с названным по нему районом входит в состав Республики Дагестан. В сравнительно недалеком прошлом по его имени назывался целый край – Кизлярщина. Для нынешного Дагестана этот город имеет немаловажное значение. В местной среде его часто именуют северной столицей Дагестана наряду Махачкалой и Дербентом. Условность столичного статуса в обстоятельствах современной жизни не затмевает того, что двумя с лишним веками ранее Кизляр претендовал на роль центра вошедших в состав Российского государств Кавказских территорий [7, с.38].

Дата основания города точно не известно. По мнению Г.Орзаева, началу Кизляра положило основание в XVI веке поселение, которое образовали выходцы из Средней Азии. Кумыки, жившие по соседству, именовали его Карасув – кент (от тюркского кара – чёрный, су – вода, кент – поселение) или Кызлар – кала. Интересно, как можно согласовать Карасув – кент или Абсияхкент с названием Кызлар – кала. Более убедительно, что первое название Кизлар – кала в более позднее время переименовалась как Карасув и т.д. В книге А.Ибрагимова «Тарихи Кизляр – Кала» Карасувкент (или Абсияхкент) назван столицей «Вилаята Татархана» [13, с. 167] (Рисунок 2).

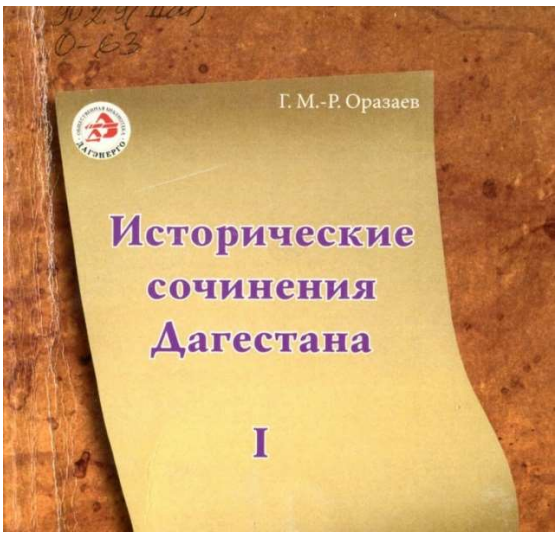

Рисунок 2. Оразаев Г.М.-Р. Исторические сочинения Дагестана на тюркских языках (тексты, комментарии). Кн.1. Махачкала: 2003

Основной состав населения составляли тезики, которые к концу XIX века идентифицировали себя с кумыками. Карасувкент явился ядром будущего Кизляра, который, по сведениям Ю.Шидловского, возник на месте кумыкской деревни [9] (Рисунок 3).

Рисунок 3. Кумыкский энциклопедический словарь. Махачкала: 2012

В последующие периоды она получила различные названия (Абсияхкент, Карасубкент и т.д.), в том числе она называлась Девичьей башней.

Рисунок 4. Кизлярская крепость на карте Астраханской губернии. 1745 год

В официальных источниках датой основания Кизляра считается 1735 год, когда было начато строительство Кизлярской крепости [8] (Рисунок 4). Однако постоянное поселение здесь существовало за 150 – 200 лет до этого. Эта крепость неразрывно связана с предшественниками Кизлярской крепости – с Терским городком (крепость Терки) и Сулакской крепостью (Крепость Святого Креста). Некоторые поздние авторы окрестили Терскую крепость «Старым Кизляром».

Несмотря на широкое распространение Кыз каласы (Девичьих башен) на Кавказе, в Средней Азии, Иране и Турции и отображение в различных источниках, ни в одном из указанных регионов нет отдельных исторических произведений о данном памятнике. Из исследуемых регионов только в Дагестане можно встретить произведение «Тарихи Кызларкала», посвященный истории Кизляркала. В начале XX века, кизлярей Абдулгусейн Ибрагимов изложил историю башни на кумыкском языке. Автор указал, что наряду с другими источниками, он пользовался произведением Али Керим – оглы под названием «Тарихи – Кызлар». Это говорит о положении Девичьей башни в регионе и об отношении местного населения к своей истории. Несмотря на наличие некоторых топонимов в связи с этой территорией, именно после распрожения Петра I другие названия были отменены, название крепости было оформлено как Кизляркала.

Кызлар кала встречается и на территории Азербайджана. Одной из них является Габалинская Кызлар кала, расположенная на севере страны. Некоторые из Девичьих башен великолепно сохранились, однако ряд башен можно распознать только по останкам. Кызлар кала, расположенная в селе Залам Габалинского района (Азербайджан) относится именно к последним памятникам (Рисунок 5). Эта башня, потерпевшая серьезные разрущения, расположена в трех километрах восточнее от селе Залам, в очень благоприятной местности – на вершине горы.

Рисунок 5. Габала

В результате археологических раскопок были обнаружены стены, башни и ворота. Кызлар кала села Залам имела четырехугольную форму, длиной 16,5 и шириной 15,7 метров, в некоторых местах высота стен достигла 1,5 метров [15, с. 90]. Каждый угол обладает монолитной окружной башней, а на каждой стене есть полукруговой контрфорст. Диаметры башней и контрфорсов составляет 3,5 и 1, 5 метров соответственно. Ворота расположены в юго – западной части башни. Уцелевшие части Кызлар кала (с.Залам) построены из камня с гипсового раствора, в окрестности были обнаружены образцы кирпича размером 33х33х8 см. На основании этих образцов можно предположить, что верхняя часть укрепления была построена из этого материала. В результате проведенных раскопок в Кызлар кала был обнаружен культурный слой толщиной 20 см. [17, с. 88 - 91]. Кызлар кала (с.Залам), используемая до начала XI века, была построена в IX веке.

В Шекинском районе Азербайджана находятся разные памятники. На вершине горы Каратепе сохранилась средневековая крепость Гелерсен – Гёрерсен. Башня и храм в селе Орта-Зейзит, мавзолей в селе Бабаратма, башня в селе Айдын-булаг, дом Шекихановых, средневековые бани – вот далеко не полный список исторических и культурных памятников Шеки и его окрестностей [1, с. 43].

Среди азербайджанских памятников особое место занимали башни (кулле), контролирующие северный и северо – западный проходы. Одной из этих башен является Башня Айдын – булаг (Рисунок 6), расположенная в Шекинском районе.

Рисунок 6. Башня Айдын – булаг

В народе эту башню называют по – разному (Торпаггала, Майдангала, Агджагала). Одним из ее названий является Кыз кала. Башня имела четырехугольную форму, углы укреплены монолитными полукружными башнями. Одна из конструкций башни, южная и западная стены разрушены. В отличий от них, северная и восточная стены башни, высота которых достигает 10,5 метров, находятся в относительно хорошем состоянии. Стены и башни сужаются по восходящей линии. Здесь имеется три слоя. На первом слое есть дверной проем, а на втором и третьем, окна. Длина и ширина дверного проема составляет 1 и 0,8 метров соответственно. Окно на втором этаже с высотой 1 метр и с шириной 0,4 метров. Башня относится с IX – XII векам [5, с. 102].

Таким образом, многие башни, в том числе Кыз кала, расположенные на севере Азербайджана, построены не случайно. Кыз кала (Кызлар каласы), берущие свои истоки с древних изображений, были построены в Баку, Шемахе, Гяндже, Шамкире, Исмаиллы, Шеки, Кяльбаджаре, Гядабеке и т.д. Девичьи башни, построенные в данных регионах, являются единым историческим памятником, а также отображают этапы развития и уровень архитектурного искусства Азербайджана. При исследование этих памятников, наряду с местными архитектурными особенностями, были обнаружены особенности, присущие соседним регионам. Так как, Кызлар кала, построенные на севере Азербайджана, имеет схожесть с башнями Дагестана и Северного Кавказа вообще, и играют значимую роль в сохранении этих традиций.

Кыз калалары несущие религиозно – ритуальный характер с момента своего появления, впоследствии, особенно в Средние века превратились в оборонительные сооружения, потеряли религиозное значение, адаптировалист к системе оборонительных сооружений региона. В Средневековье на Северном Кавказе в основном строились башни и крепости для проживания, а также в военных целях. Азербайджанские Кыз калалары (Кызлар каласы) тоже несут оборонительный характер.

Башни, построенные на Северном Кавказе и на севере Азербайджана а также Кыз кала (Кыз калалари), в основном имели четырехугольную форму. Окружные башни в основном можно встретить в Дагестане, тесно связанным с Южным Кавказом и контактирующем с Передней Азией. В Азербайджане не встречаются башни с наконечником в форме пирамиды, тогда как на Северном Кавказе они занимают особое место [11, с. 82 - 84].

Каждый памятник несет более точный характер, когда его история утверждается письменными документами. Несмотря на широкое распространение Кыз кала (Кыз каласы), исторические истоники, непосредственно связанные с историей этих памятников имеет эпизодический характер. Такие сведения берутся из исторических источников, посвященных различным происшествиям. Произведения путешественников расцениваются как первоисточники. Нужные результаты получаются при использовании карт, отчетов и др. материалов, относящихся к различным периодам. Среди исследуемых исторических источников мы столкнулись с произведениями Али Керим – оглы «Тарихи Кызлар» и А.Гусейнова «Тарихи Кызларкала», которые посвящены Кызляркала, расположенным на территории Дагестана. Наличие таких источников имеют существенное значение в изучении и исследовании Кыз кала и становится причиной актуальности данных исследований.

Литература:

1. Ахмедов С. Шеки – архитектурный заповедник Азербайджана // Открывая Азербайджан. – 2019. – № 5 (101). – С. 40 – 45.
2. Ахундов Д.А. Архитектура древнего и раннесредневекового Азербайджана / Д.А. Ахундов. Баку: Азернешр, 1986. – 311 с.
3. Ахундов Д.А. Палеоархитектоническая основа генезиса древних жилых и ритуальных сооружений // Ученые записки АзПИ. Серия Х. – 1973. – № 1 (18). – С.27 – 30.
4. Ашурбейли С.Б. История города Баку. Период средневековья / С.Б.Ашурбейли. Баку: Азернешр, 1992. – 408 с.
5. Гадиров Ф.В., Мамедзаде К.М. Айдын – булагская башня // Доклады АН Азербайджанской ССР. – 1969. – Т.25., № 7. – С.101 – 103.
6. Джафарзаде И.М. Гобустан / И.М.Джафарзаде. Баку: Элм, 1973. – 340 с.
7. Карпов Ю.Ю. Кизляр как зеркало российской истории Кавказа // https://www.kunst-kamera.ru/files/lib/978-5-88431-230-2/978-5-88431-230-2_02.pdf.
8. Кизляр. https:// ru.wikipedia.org/wiki/Кизляр (Дата обращения: 11 июля 2024)
9. Кумыкский энциклопедический словарь. Махачкала: Дельта Пресс, 2012. – 400 с.
10. Мартынов А.И. Археология /А.И.Мартынов. М.: Изд. – во Юрайт, 2012. – 460 с.
11. Мехтиева А.А. Горные крепости Северного Кавказа // Труды Истории НАН Азербайджана. Материалы международной научной конференции «Кавказские войны и их последствия в начале XIX века». – 2013. – № 44 – 47. – С. 82 – 89.
12. Новейшие археологические и этнографические исследования Кавказа. Махачкала: Изд.-во Дом «Эпоха», 2007. – 414 с.
13. Оразаев Г.М.-Р. Исторические сочинения Дагестана на тюркских языках (тексты, комментарии) / Г.М.-Р.Оразаев. Кн.1. Махачкала: «Эпоха», 2003. – 332 с.
14. Azerbaijan. Fortress. Castles. M.: Внешторгиздат, 1994. – 263 с.
15. Azərbaycan arxeologiyası. VI c. Bakı: Qərb – Şərq, 2008. – 632 s.
16. Azərbaycan onomastikası problemləri. Bakı: APİ nəşr., 1993. – 243 s.
17. Qədirov F. M. Azərbaycanın şimal müdafiə istehkamları / F. M. Qədirov. Bakı: Elm, 1984. – 150 s.

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Xülasə

Məchul növ ilkin olaraq semantik-sintaktik mövqedən müəyyən edilir. Belə ki, məntiqi və qrammatik kateqoriyalar bir-birilərilə təzadlıq təşkil edir. Yəni məchul növ məlum növün ixtisar olunan forması kimi təzahür edir. Məchul növ müxtəlif şəkildə adlandırılır. İlkin olaraq M.Kaşğari bu növü məchul adlandırmış, daha sonra dilçilikdə bu addan geniş şəkildə istifadə olunmuşdur. Azərbaycan dilçiliyində də ərəb mənşəli olan "məchul" terminindən istifadə olunur. Bununla paralel olaraq "passiv" terminindən də istifadə edilməsi müşahidə olunur. Belə ki, M.Hüseynzadə və A.Şərifov feili növlər üzrə təsnif edərkən məchul sözünün qarşısında "passiv" sözünü yazırlar. Həqiqətən də feilin növ kateqoriyası hər zaman təsirlik və təsirsizlik kateqoriyasına görə sabit qalmışdır. Məhz elə bunun nəticəsidir ki, feilin növ kateqoriyasının müəyyənləşdiriliməsində təsirlik və təsirsizlik kateqoriyasını əsas meyar kimi götürmək olmaz. Hər şeydən əvvəl, şəxssiz mənanın varlığı cümlənin xüsusi sintaktik strukturundan asılıdır və özünün ifadə etdiyi məna ilə digər növlərdən fərqlənməkdədir.

Açar sözlər: məlum növ, məchul növ, icraçı tamamlıq, keçmiş zaman feili sifət,sözönü

Feilin qrammatik məna növləri danışan şəxsin (iş görənin - subyektin) üzərində iş görülən əşya ilə (obyektlə) qarşılıqlı münasibətini bildirir. Fransız dilində feilin iki növü var:

1. La voix active - Məlum növ
2. La voix passive - Məchul növ

La voix active: - Məlum növdə iş görən məlum olur və onun hərəkəti fəaldır.

Nous lisons un livre. - Biz kitab oxuyuruq.

Le malade souffre. - Xəstə əzab çəkir.

La voix passive: - Məchul növdə iş görənin kim olduğu və onun hərəkəti fəal deyil.

La lettre est écrite. - Məktub yazılır. La lettre est écrite par nous. - Məktub bizim tərəfimizdən yazılır.

Məchul növü düzəltmək üçün "être" feilini lazım olan zamanda təsrif edib üzərinə əsas feilin "participe passé" formasını əlavə etmək lazımdır. Bu vaxt ``participe passé`` mübtəda ilə cinsə və kəmiyyətə görə uzlaşır. [2.s151]

Məlum növ -> Marion mange une pêche. (indiki zamanda təsrif olunmuş feil)
Məchul növ -> Une pêche est mangée par Marion. (indiki zamanda təsrif olunmuş être köməkçi feili)

	voix active	voix passive
Présent :	mange	est mangée
Futur :	mangera	sera mangée
Passé simple :	mangea	fut mangée
Passé composé :	a mangé	a été mangée
Imparfait :	mangeait	était mangée
Plus-que-parfait :	avait mangé	avait été mangée

"Passé immédiat, Futur proche" zamanları və modal feillər məchul növdə işləndikdə "être" feili məsdər formasında işlənir.
Futur proche de l'indicatif
Je vais être aimé - Mən seviləcəyəm
Tu vas être aimé - San seviləcəksən
Nous allons être aimés - Biz seviləcəyik
Vous allez être aimés - Siz seviləcəksiniz
Il (Elle) va être aimé(e) - O seviləcək Ils (Elles) vont être aimé(e)s - Onlar seviləcəklər
Passé immédiat de l'indicatif
Je viens d'être aimé - Mən sevildim
Tu viens d'être aimé - Sən sevildin
Nous venons d'être aimés - Biz sevildik
Vous venez d'être aimés - Siz sevildiniz
Il (Elle) vient d'être aimé(e) - O sevildi
Ils (Elles) viennent d'être aimé(e)s - Onlar sevildilər
Les verbes modaux
Je veux être aimé - Mən sevilmək istəyirəm
Tu veux être aimé - Sən sevilmək istəyirsən
Il (Elle) veut être aimé(e)- O sevilmək istəyir
Nous voulons être aimés - Biz sevilmək istəyirik
Vous voulez être aimés - Siz sevilmək istəyirsiniz
Ils (Elles) veulent être aimé(e)s - Onlar sevilmək istəyirlər
Məchul növün tamamlığına "complément d'agent" deyilir və o, "par" və "de" sözönü ilə işlənir.
Maman a écrit une lettre. - Ana bir məktub yazdı.
La lettre a été écrite par maman. - Məktub ana tərəfindən yazıldı.
La lettre a été écrite. - Məktub yazıldı.
"Aimer (sevmək), détester (xoşlamamaq, zəhləsi getmək), accompagner (müşayiət etmək), estimer (hörmət etmək), hair (nifrət etmək), suivre (əməl etmək, ardınca getmək), respecter (hörmət etmək), connaître (tanımaq), couvrir (örtmək), remplir (doldurmaq), planter (əkmək), entourer (əhatə olunmaq)" feillərindən sonra "de" sözönü işlənir.
La neige couvre la terre. - Qar yeri örtür.
La terre est couverte de neige. - Yer qarla örtülür..
La mère aime son enfant. - Ana uşağını sevir.
L'enfant est aimé de sa mère. - Uşaq anası tərəfindən sevilir.
Cümləni məlum növdən məchul növə keçirmək üçün məlum növün tamamlığı məchul növün mübtədasına, məlum növün mübtədası isə məchul növün tamamlığına çevrilir və ondan əvvəl ya "par" və ya "de" sözönü işlənir.
Aider (indicatif présent – forme passive)
Je suis aidé(e) par quelqu'un.
Tu es aidé(e) par quelqu'un.

Il est aidé par quelqu'un.
Elle est aidé(e) par quelqu'un.
On est aidé(es) par quelqu'un.
Nous sommes aidé(e)s par quelqu'un.
Vous êtes aidé(es) par quelqu'un.
Ils sont aidés par quelqu'un.
Elles sont aidées par quelqu'un

Tout le monde l'aime. - Hamı onu sevir.
Il est aimé de tout le monde. - O, hamı tərəfindən sevilir.
J'écris une lettre à mon amie. -Mən rəfiqəmə bir məktub yazıram.
La lettre est écrite par moi à mon amie. - Məktub mənim tərəfimdən rəfiqəmə yazılır.
On lit un livre. - Kitab oxuyurlar.
Le livre est lu. - Kitab oxunur.
"Passé composé" da "être"-lə təsrif olunan feilləri məchul növ ilə qarışdırmaq olmaz. "Être"-lə təsrif olunan feillər təsirsiz feillərdir, məchul növdə isə ancaq təsirli feillər işlənir.
Je suis sorti de la chambre (la voix active). - Mən otaqdan çıxdım.
La porte de la chambre a été ouverte de ma sœur (la voix passive). - Otağın qapısı bacım tərəfindən açıldı.
Bəzi qeydləri bilmək lazımdır :
Qeyd 1.« Avoir və posséder » feilləri yalnız məlum formada istifadə olunur.
Məsələn :Paul a un livre. -~~ *Un livre est eu par Paul.*~~
Les élèves ont eu le droit de sortir.- ~~*Le droit de sortir a été eu par les élèves.*~~
Qeyd 2.être censé (+ infinitif) və être tenu de (+ infinitif) yalnız məchul formada istifadə olunur.
Məsələn :Cet employé était censé rentrer à 18 heures.
Les étudiants sont tenus de ne pas utiliser leurs portables en classe.
Qeyd 3.Aşağıdakı fellərlə **par** əvəzinə **de** istifadə edirik:
aimer, estimer, apprécier, détester, connaître, savoir*, oublier, précéder, suivre, accompagner, entourer,* accablé de, aimé de, bordé de, connu de, craint de, décoré de, detesté de, entouré de, estimé de, étonné de, frappé de, haï de, ignoré de, oublié de, respecté de, surpris de.
Məsələn : Cette fille est aimée de tous. Cette revue est connue de tous.
Buna baxmayaraq yenə də **par** -dan istifadə edilə bilər.
Məsələn : Cette fille est aimée par tous. Cette revue est connue par tous.
Qeyd 3.Bəzən cümlədə icraçı tamamlıq olmur.

1) icraçı tamamlıq göz qabağındadır.
2) natiq onu demək istəmir.
3) icraçı tamamlıq qeyri-müəyyəndir.

Məsələn : L'Amérique a été découverte en 1492. (1) = Par les Européens, par Christophe Colomb.
Amerika 1492-ci ildə kəşf edilmişdir. (1) = Avropalılar tərəfindən, Kristofer Kolumb tərəfindən.
Une décision sera prise. (2) = Qərar veriləcək. (2) = Kim tərəfindən olduğunu bilmirik. Qərarı kimin verəcəyini demək istəmirik.
Ma voiture a été volée. (3) = Maşınım oğurlanıb. Kimsə mənim maşınımı oğurlayıb.

Qeyd 4. Əgər məlum cümlənin mübtədası «on » qeyri-müəyyən şəxs əvəzliyidirsə, məchul növdə icraçı tamamlıq olmayacaq.
Məsələn : On dit la vérité.-La vérité est dite.

Qeyd 5. Məchul formanı məlum növdə pronominal feillə əvəz etmək mümkündür. Məlum növdə « on » qeyri-müəyyən şəxs əvəzliyini işlətçək olur.

Məsələn : On conduit le blessé à l'hôpital- Yaralı xəstəxanaya çatdırılır.
Le journal racontant les faits se vendra bien- Faktları söyləyən qəzet yaxşı satılacaq.

Qeyd 6. ``Contraindre`` , ``obliger`` ,``forcer``(məcbur etmək) feillərindən sonra məlum növdə, özlərindən sonra məsdər varsa, ``à`` sözönü istifadə olunur.Məs :Son père l`a obligé à faire ses exercices. Bu feillər məchul növdə olduqda, ölərindən sonra məsdər varsa , ``de`` sözönü tələb edirlər. Məs : İl a été obligé de faire ses exercices par son père. [1.s87]

Ədəbiyyat

1.Axundov Y. (2015)Le français Grammaire. -Naxçıvan. - 174 s.
2.Həsənova X., Məmmədova G., İsmiyeva X., Ağayev F. (2019). Le français pour tous. - Bakı: LƏMAN NƏŞRİYYATI. - 300S.
3.HÜSEYNOV S.S. (2012) FRANSIZ DİLİ Azərbaycan Dövlət Bədən Tərbiyəsi və İdman Akademiyasının bakalavr təhsil dərəcəsində I və II kurs tələbələri üçün dərslik "Mütərcim" nəşriyyaz Bakı – 247 s.

STYLISTIC FEATURES OF DIALECT WORDS IN THE LANGUAGE OF ARTISTIC WORKS

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Abstract

A process of constant change and enrichment is occur in the vocabulary of a language. Not all elements of a language that form its vocabulary are used in the same degree. İt is natural, because each lexical unit of a language has its own unique features and stylistic duties. Therefore, a group of words is used in all styles, while the other group is used only in a certain style carrying special stylistic purposes. In this sense, according usage in linguistic literature, words in vocabulary of a language are divided into different groups. Among them dialect and accent words take a special place .

Dialect words are lexical units that have limited scope of usage. Dialect and accent words can mostly be found in art style. Dialects come into written literary language through fiction. Dialects and accents are sources of enrichment of vocabulary in Azerbaijani literary language. Besides written sources in studying of history of the Azerbaijani language live language plays a great importance as well particularly dialect and accent words.

Key words **:** language, dialect, vocabulary, style, lexical units, word, expression, source, feature, themes

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СТИЛИСТИЧЕСКИЕ ОСОБЕННОСТИ ДИАЛЕКТНЫХ СЛОВ В ЯЗЫКЕ ХУДОЖЕСТВЕННЫХ ПРОИЗВЕДЕНИЙ

В словарном составе языка постоянно происходит процесс изменения и обогащения. Не все языковые субъекты в одинаковой степени используют слова, включенные в словарный состав языка. И это естественно, потому что, каждая единица, составляющая лексический состав языка, имеет свои особенности и стилистические задачи. Поэтому одна группа слов используется во всех стилях языка, а другая группа слов используется только в одном стиле с определенной стилистической целью. В этом смысле в лингвистической литературе слова, составляющие словарный состав языка классифицируются на разные группы по их функциональному назначению, среди которых особое место занимают диалектные слова и наречия.

Диалектизмы - это локально ограниченный тип активных слов. Это слова, используемые в разных диалектах и наречиях [1]. Такие слова могут войти в литературный язык и обогатить его словарный состав. В этом смысле диалектная лексика является одним из источников обогащения литературного языка [2]. Такие лексические единицы иногда включаются в язык художественного произведения как средство выразительной речи. По лексико-семантическим, фонетическим, грамматическим признакам, отличным от литературного языка, выделяют три типа диалектных слов: фонетические, лексические,

грамматические диалектизмы [3]. В языке литературных произведений, как правило, встречаются лексические диалектизмы (иногда и фонетические диалектизмы).

В азербайджанском языкознании проведен ряд интересных исследований относительно стилистических возможностей диалектизмов, их роли и места в художественных произведениях и высказаны определенные мнения.

Известно, что «диалектная лексика» - это разговорные и бытовые слова, принадлежащие местному//локальному языку населения определенной местности, находящиеся за пределами норм литературного языка.

Исследователи высказали разные мнения о диалектизмах как в функциональных стилях, составляющих литературный язык, так и в самом художественном стиле. По мнению Т.Эфендиевой, единственным стилем употребления диалектизмов в современном языке является художественный стиль [4]. В этом смысле мнение Т.Эфендиевой совпадает с мнением А.Демирчизаде. Он пишет: «Основной областью применения таких выражений (диалектизмов) является художественный стиль» [5].

Связь литературного языка с диалектами создается главным образом через художественный стиль и художественные произведения. Основным методом перехода диалектных слов в письменный язык является художественная литература. Влияние диалектов на литературный язык имело особое значение на всех этапах его развития и этот продолжается постоянно. Функция лексических единиц литературного языка и диалектных слов в художественной литературе неодинакова. Диалектные слова часто могут использоваться в новом значении, функции и составе в контексте литературных слов.

Художественная литература дает богатый материал для прослеживания взаимодействия диалектных слов и слов литературного языка, обогащает терминологический фонд словарного состава за счет внутренних возможностей, раскрывает процесс словотворчества. В то же время эта литература очень полезна для обогащения диалектологических словарей. В изучении истории азербайджанского языка, помимо письменных источников, большое значение имеют факты, предоставленные живым языком, особенно диалектами и наречиями. Особое значение имеет изучение вопроса взаимодействия диалектов и литературного языка. Потому что проблема языка и диалекта связана с рядом важных вопросов языкознания. Поэтому изучение диалектных фактов, собранных из художественной литературы, необходимо в определении основных источников развития лексико-семантических групп слов, особенно в плане отношения к синонимам, словотворчества, изменения значений и, наконец, в плане выяснения взаимодействие языка и социальных фактов, влияющее на обогащение литературного языка за счет диалектных слов.

Лексически богатые диалекты и наречия азербайджанского языка практически во все периоды привлекали внимание писателей и поэтов. Выдающиеся мастера слова умело использовали народный язык и тонкости живой разговорной речи, чтобы обогатить язык произведений художественными оттенками разговорной речи. Среди них особое место занимает роман Ю.В.Чеменземинли «В крови».

В этом произведении много интересных подробностей, связанных с нашим историческим прошлым, обычаями и традициями нашего народа, в том числе и диалектными словами. Интересен тот факт, что использовались диалектные и жаргонные слова, характерные для местности, где происходили события, описанные в этом произведении.

Среди диалектных слов, использованных в романе «В крови», важное место занимают по структуре - простые слова. Исследования показывают, что некоторые из этих слов, хотя исторически сложны и производны, сейчас предстают как лексические единицы с простой

структурой [6]. Можно привести следующие примеры диалектных слов, из языка произведения:

Lığa/лыга/слизь - твердое состояние жидкости. *Qamış qələm davatın lığasına dəyib mavi kağızların üzərinə çəpəki misralar tökürdü// Тростниковое перо коснулось слизи чернила и вылило на синие листы красивые строки.*

Boyana/бойана/фенхель – трава. *Hər adama bir məcməi verildi və hər məcməidə bir boşqab boyanalı plov, üstündə quzu soyutması, yanında da sarımsaqlı qatıq və bağır-beyin vardı // Каждому подали поднос, и на каждом подносе была тарелка плова с фенхелем, сверху тушеная баранина, рядом катык с чесноком и внутренности.*

Dit vermək/дит вермек/вырастать – зеленеть. *Bizlərdə boyana hələ indi dit verir // У нас фенхеть только начал зеленеть.*

Quzulamaq//гузуламаг//окот - выращивание, размножение, окот земли - размягчение почвы. *Bir tərəfi quzulayıb, ot saçaqları sallanan bir təpədə iri, qol-qanadı qurumuş bir ağac vardı // На холме с одной стороны которого свисала выращенная траваы, стояло большое дерево с иссохшими ветвями,.*

Xaşmaş//хашмаш – шорох. *Görünür, dünəndən bu ziyarətə hazırlanırmış. Çünki xaşmaş şalvar bütün gecəni quyuya sallanmış olmasaydı, bu qədər xışıldamazdı // Видимо, он готовился к этому визиту еще со вчерашнего дня. Потому что, если бы шуршавые штаны не провисели всю ночь в колодце, они бы так не шуршали.*

Qarpışdırmaq//гарпышдырмаг – отнять и убежать. *Həyətdəkilər bir-birini əzişdirərək pulu qarpışdırdılar // Люди во дворе давили друг друга и отнимали деньги.*

Lığırsa//лыгырса – плохо пропеченный хлеб. *Bismillah çəkib yeməyə başladılar. Lığırsa çörəyi iştahasız çeynəyərək arabir danışır, qırıq- qırıq fikirlər və mülahizələr yürüdürdülər // Они сказав «Бисмиллях» начали есть. Они жевали плохо пропеченный хлеб без аппетита, время от времени разговаривали, у них были разбиты мысли и мнения.*

Pəlmə//пельма - сумерки, тьма. *Toran yavaş –yavaş qovuşur, qürubun sumağı boyaları tutqun pəlmələrə bürünürdü //Медленно приближались сумерки, и бардовые краски заката покрылись тусклыми оттенками тьмы.*

Qapladı//гаплады - покрыл, раскинулся, распространился. *Sükut ətrafı qapladı. Hamının diqqəti oraya cəlb olundu. Тишина покрыла окрестности. Туда было обращено всеобщее внимание.*

Cürlər//джурлер – компаньон, друг, приятель. В этом же смысле **curlar//джурлар** используется в Бакинском диалекте. *Qızxanım cürlərilə duvaqqapamada şirin söhbətə məşğulikən, Vaqif də Mədinənin vüsalına qovuşurdu. Vaqifin oğlu Qasım ağa Məmməd bəyin cürlərindən idi // Пока Гызханум занималась милой беседой в дувагапма, Вагиф встретился с Мединой. Сын Вагифа Гасым-ага был приятелем, приближенным Мамед-бея.*

Tulumbaşı//тулумбаши - тамада. *Gürcü zadəganlarından biri tulumbaşı seçildi, dəbdəbəli ziyafət başladı // Тулумбаши/тамадой выбрали одного из грузинских дворян, и началось роскошное застолье.*

Höyüş//хоюш - влажное место. *Gəncəli olduğu üçün danışığında Qarabağda anlaşılmayan bəzi sözlər işlədir və Tutubəyimin rişxəndinə səbəb olurdu. Tutubəyim billə-billə -ana, yer höyüşdü –deyə qəhqəhə çəkdi // Поскольку он был родом из Гянджи, он использовал некоторые слова, которые были непонятны в Карабахе и вызвали презрение Тутубайим. «Мама, земля влажная» - хихикнула Тутубайим.*

Qəlbi // гелби – высокий. *Anası da istehza üçün: - dağ qəlbidir, - dedi, qarabağlı qızına sataşdı //* А мать насмешливо дразнила карабахскую дочь сказав: гора высокая.

Küz // кюз - пастбище, осеннее пастбище. **Ban//бан** – крыша, чердак. **Tuğra, tuğ//Тугра, туг** - флаг. **Yovuq//Йовуг** – близко. **Şətəl//шетел -** шерстяные носки. **Yağır//ягыр** - сыпь. **Yassar/yasar//Яссар//йасар** – бессмысленный. **Unamadı //**unamax//Унамады/унамах –

понимать. Он не мог забыть //ты не можешь понять. **Çillə//Чилла** - Şahnisə xanım çilləsini kəsdirirdi // Шахниса ханум подняла чиллу. **Cirə//чире -** пай, повсеместно.

Диалектные слова приходят в письменный литературный язык через художественную литературу. Известно, что одним из источников обогащения словарного запаса литературного языка Азербайджана являются словообразование за счет диалектов и диалектов. Проф. С. Джафаров пишет, что диалекты и наречия являются неисчерпаемым источником, обогащающим словарный запас нашего литературного языка. В нашем современном литературном языке имеется немало слов, употребляющихся сегодня в составе литературного языка, хотя эти слова не выходили в свое время из лексики различных диалектов. М.В.Видади, М.П.Вагиф, Г.Б.Зардаби, С.А. Ширвани, М.А. Сабир, Дж. Джаббарлы, С. Вургун и другие поэты и писатели возродили их, используя в своих произведениях, придали им народный окрас и включили в словарь литературного языка [7].

Определенное место в словарном составе сатир Мирзы Алекпера Сабира занимают диалектные слова. Некоторые из них состоят из общеупотребительных слов и словосочетаний, используемых в широком кругу. Употребление в языке стихов М.А.Сабира разных диалектных слов связано с темой и целью стихотворений. Используемые здесь диалектные слова характеризуют индивидуальный лексикон поэта. Диалектизмы в языке стихов, как правило, относятся к восточной группе диалектов и наречий Азербайджанского языка - Шемахинскому диалекту. Поэтому в таких диалектных словах более ярко выражены фонетические и грамматические особенности Шемахинского диалекта.

В словарный состав сатир М.А.Сабира входят следующие диалектные слова:

Nay//най – означает «гармонь». *Çal nayı, qavalı//Играй на гармони, бубне*. Такое значение слова используется в Шемахинском диалекте. Бардинский, Газахский, Гянджинский и Шамкирский диалекты имеют значение «*gülməli, məzəli // весёлый, комический*», в Шарурском диалекте есть значение «*key adam//тупой человек*». *İbrahim çox nay adamdır//Ибрагим очень тупой.*

Qanqımaq//гангымаг – ныть. *Çox qanqıma, durram, elə vurram ki, batarsan // Прекрати нытье, обозлюсь, встану, так дам, что провалишься*. В Шемахинском диалекте это слово употребляется в значении *«нытье// zarıldamaq», «стонать//inildəmək».*

Yava//явa – неприятный, плохой. *Çünki nə sünni, nə qızılbaşdılar, Bir yava şeydir bu başı daşdılar // Поскольку они не были ни суннитами, ни кызылбашами, они очень неприятны, камень им на голову*. В Шахбузе, Кельбаджаре, Сальяне, Лачине, Сабирабаде слово **явa** широко употребляется в значениях «*sərt суровый*» и «*pis//плохой*». *O yava danışır// Он сквернословит.* Лексическая единица может быть родственна слову ***yabız// ябыз*** (в более позднем процессе развития ***yavuz//явуз***) в значении *«pis// плохой, yaxşı olmayan//не хороший»*, употребляемом в языке Орхоно-Енисейских памятников. В письменных памятниках азербайджанского языка также имеет значение «*qorxulu//страшный*» или *«vəhşi//дикий»*. В «Книге моего Деда Коркута»: *Ol bir yauz canvərdir// Он словно дикий волк*.

Yavıq//явыг – близкий. *Şiə mollası yazan türkicə Quransa əgər, Mən onun yazdığı Qurana yavıq durmayıram // Если это Коран на тюркском, написанный шиитским муллой, то я близко не подойду к Корану, написанным им.* В Бакинском и Имишлинском диалектах оно употребляется как *yavığ//явыг*.

Osarlamaq//овсарламаг – обуздать. Овсар – означает уздечка для верблюда. *Lap bizi osarladılar, mindilər // Они обуздали нас.* В том же смысле оно используется в Шемахинском диалекте.

В стихотворениях наблюдаются и грамматические особенности, характерные для Шемахинского диалекта. Таким образом, когда существительное с относительным суффиксом, принадлежащим ко второму лицу единственного числа, употребляется в родительном, дательном и винительном падежах, происходит замена **n-v//н-в**. Например:

Yazmaq, oxumaq **başuvə** əngəl kələf oldı. *Qari **nənövün** sözlərini sanma çərəndir // Писать, читать стало трудно. Не принимайте слова старушки как пустословие.* Эта характерная черта диалектов восточной группы азербайджанского языка.

В некоторых случаях проявляется грамматическая особенность, связанная с диалектами и наречиями Южной группы: в конце суффикса множественного числа **-lar,-lər//-лар,-лер** опускается согласная **r/р**. Например: *Rusi oxumuşlar bə neçin etdilə nifrət. Çığmığ edib axır başıma saldıla bir daş // Почему ненавидят те, кто изучал русский язык? Мне на голову бросили камень.*

ЛИТЕРАТУРА

1. Гурбанов, А. Современный Азербайджанский литратурный язык. Баку: 1985
2. Гаджиев, Т. История Азербайджанского литературного языка. Часть 2, Баку: 1982
3.Вердиева, З., Агаева, Ф., Адилов, М. Семасиология Азербайджанского языка. Баку: 1979
4. Эфендиева, Т. Лексическая стилистика Азербайджанского языка. Баку: 1980
5. Демирчизаде, А. Стилистика Азербайджанского языка. Баку: 1962
6. Чеменземинли, Ю.В. В крови. Баку: 1968
7. Джафаров, С. Современный Азербайджанский язык (Лексика). Баку: 1970

Proceedings of the 7th International Scientific Conference
«Theoretical Hypotheses and Empirical results» (July 11-12, 2024). Oslo, Norway, 2024. 203p

editor@publisher.agency

https://publisher.agency

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