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Agricultural sciences

CHANGES IN THE BIOAVAILABILITY OF POTASSIUM COMPOUNDS IN A SOD-LIVE SOIL DUE TO THE APPLICATION OF SEWAGE SLUDGE SEDIMENTS

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Abstract

*Studies conducted in the Western region of Ukraine with the introduction of sewage sludge as fertilizer for *Silphium perfoliatum* L. showed that the use of 20 - 40 t/ha of fresh SS and composts based on it with grain straw creates a different agrochemical background compared to the application of an equivalent rate of mineral fertilizers and causes a change in the content of potassium compounds in the 0-80 cm soil layer.*

Significant differences were found in the content of potassium compounds in the upper layer of 0-40 cm of silt.

The content of bioavailable potassium compounds also varies depending on the form of fertilizer application to a depth of 60 cm. The highest values were recorded in the variants where 40 t/ha of SS and mineral fertilizers were applied and 30 t/ha of compost (SS and straw) + mineral fertilizers, which was confirmed by the corresponding values of concentration coefficients.

Keywords: *fertilizers, nutrients, potassium, concentration coefficient.*

Introduction

Today, agricultural production faces unprecedented problems related to the growth of the world's population, which led to an increase in the requirements for the quantity and quality of food, an increase in the available amounts of feed and energy resources. The development of reliable environmentally safe and economically feasible sources of energy, including bioenergy, is one of the most important global problems.

Perennial energy crops contribute to the reduction of soil erosion, restoration of carbon stocks and are raw materials for biofuel. In addition to these advantages, the spread of bioenergy crops leads to the modeling of climate change, which is caused by the formation of a stable vegetation cover on the surface of the soil, which leads to a greater reflection of the sun's rays, greater evaporation and a decrease in sensible heat transfer. For example, in the marginal lands of the USA, the spread of bioenergy crops cools the summer in the Middle and Western Heartland by 1°C [1, 4]. According to these scientists, growing perennial crops on marginal lands could be a possible solution to climate change mitigation and adaptation by strengthening food security and providing sustainable alternatives to fossil fuel-based products [2, 6].

Cultivation of non-food energy crops on marginal lands is a potential component of an integrated food-energy policy as part of a general strategy for achieving environmental sustainability [3, 5]

*Among promising energy crops is *Silphium perfoliatum*, which can be successfully used for various purposes, including energy [1, 7, 9]. Scientists note the positive effect of its cultivation on the soil characteristics of cultivation in monoculture, since during long-term germination in one place it annually forms a large amount of biomass, which, among other things, enriches the soil with organic matter [10, 13]. *Silphium perfoliatum* L. responds well to fertilization. In the conditions of a constant increase in their cost and an acute shortage of organic fertilizers, it is necessary to search for non-traditional sources of organic matter entering the soil, in particular sewage sludge SS), the significant fertilizing effect of which has been proven by numerous experimental studies [8, 15].*

*The purpose of our research is to determine the impact of applying mineral fertilizers to energy crops (using the example of *Silphium perfoliatum*), different rates of unprocessed (fresh) SS (20, 30 and 40 t/ha), as well as composts based on SS and straw (20 and 30 t/ha) with a compensatory dose of mineral fertilizers based on the calculation of $N_{90}P_{90}K_{90}$ according to the experimental scheme for changing the main agrochemical parameters of aluvisol, namely the dynamics of the content of bioavailable compounds of nitrogen, phosphorus and potassium.*

The scientific novelty of the performed research consists in the experimental evaluation of the change, establishing the regularities of the change in the bioavailability of potassium compounds in sod-podzolic soil.

Materials and methods

Field experiments were conducted in the Ivano-Frankivsk region of Ukraine on the territory of the village Tsenzliv of the Yamnytsk United Territorial Community as part of an experiment with various energy crops (*Miscanthus giganteus*, Switchgrass), including *Sylphia pronysanolista*, under which various forms of sewage sludge (fresh and composted) were applied with a corrective dose of mineral fertilizers at the rate of $N_{90}P_{90}K_{90}$ [12].

The scheme of field experiments included the following options: 1. Without fertilizers - control; 2. $N_{60}P_{60}K_{60}$; 3. $N_{90}P_{90}K_{90}$; 4. SS – 20 t/ha + $N_{50}P_{52}K_{74}$; 5. SS – 30 t/ha + $N_{30}P_{33}K_{66}$; 6. SS – 40 t/ha + $N_{10}P_{14}K_{58}$; 7. Compost (SS + straw (3:1)) – 20 t/ha + $N_{50}P_{16}K_{67}$; 8. Compost (SS + straw (3:1)) – 30 t/ha + $N_{30}K_{55}$

The area of the experimental plot is 35 m², the placement of plots in three repetitions is systematic. The scheme of sowing *sylphia sylvia* - 0.50 x 0.70 m.

To analyze changes in the indicators of the bioavailable forms of these elements compared to their content before fertilization, calculations of the concentration coefficient (K_c) were performed, which was defined as the ratio of the content of the element in the soil to its content in the soil of the background area [11, 12] according to the formula:

$$K_c = \frac{S_i}{S_{fi}}$$

where S_i is the content of the element in the soil, mg/kg of soil;

S_{fi} is the content of the element in the soil of the background area, mg/kg of soil.

The soil of the experimental field was distinguished by the following agrochemical characteristics of the arable horizon (0-20 cm): saline pH - 4.8; Humus according to Tyurin 2.0; mobile P_2O_5 and K_2O according to Kirsanov, respectively, 64.0 and 41.1 mg/kg of soil; the total nitrogen content is 0.07%.

Statistical processing of the research results was carried out using the methods of mathematical statistics using the STATISTICA 6.0 and EXEL programs.

Research results

Studies have established that the application of fertilizers significantly influenced the formation of the potassium fund of silt (Fig. 1) and, in general, the dynamics of the content of bioavailable forms of the key nutritional elements of cultivated plants. In the subsoil layer (20 – 40 cm) for the experimental variants, the difference in these indicators was also reliable compared to the control, but the content of mobile phosphorus compounds changed to a lesser extent than the indicators of potassium content.

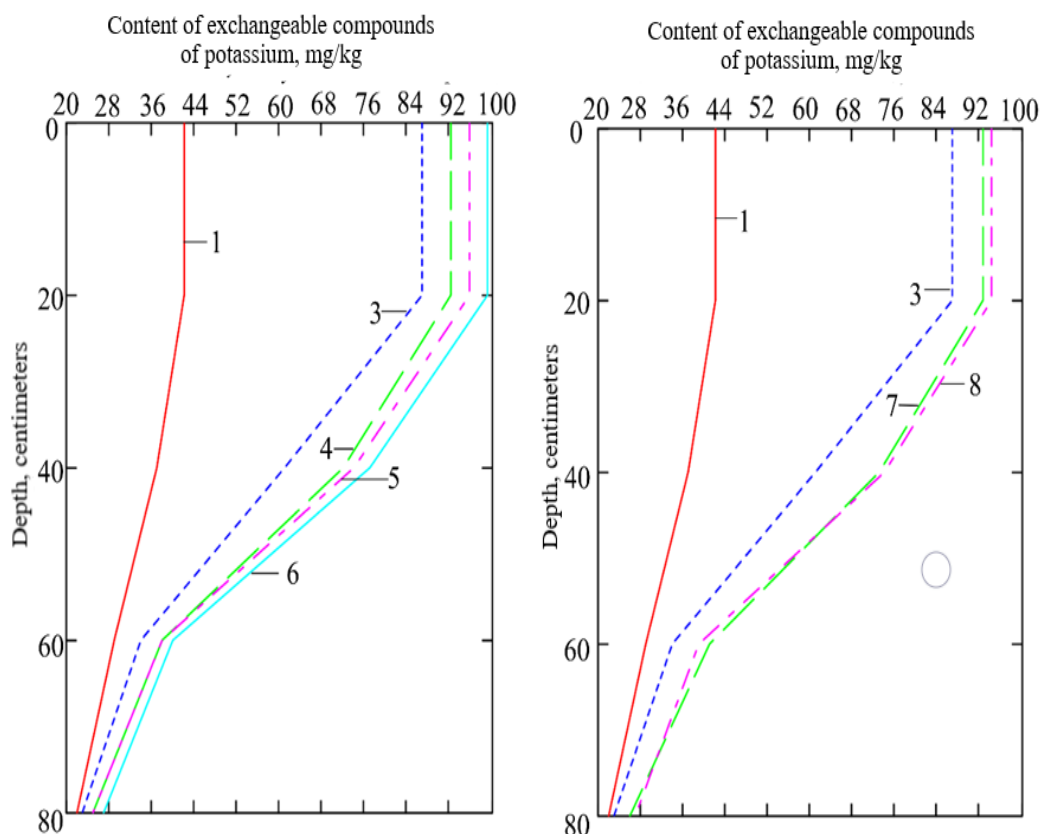


Fig. 1. The effect of applying sewage sludge and composts based on it on the content of exchangeable potassium compounds, for 2016-2022.

Table 1.

Changes in the coefficient of potassium concentration in sod-medium-podzolic soil, average for 2016-2022.

Depth, centimeters	Option						
	2	3	4	5	6	7	8
0 – 20	1,23	2,06	2,18	2,27	2,35	2,21	2,23
20 – 40	1,19	1,65	1,94	2,02	2,08	1,97	2,08
40 – 60	1,07	1,17	1,31	1,31	1,38	1,41	1,35
60 – 80	1,04	1,04	1,14	1,14	1,23	1,35	1,23

In this study, an analysis of the relationship between the content of phosphorus and exchangeable potassium was carried out with an increase in SS norms (options 4, 5 and 6). The results showed that there is a close relationship between these indicators, in particular, the coefficient of determination R^2 was noticeable for phosphorus and high for potassium according to the Chaddock scale (Fig. 2). This can be important information for farmers and agronomists who grow plants and plan to optimize phosphorus and potassium levels in the soil to improve yields.

$$Y_1 = 13.81x + 133.35, r=0.70;$$

$$y_2 = 21.57x + 82.72, r = 0.84;$$

where, y_1 is the content of bioavailable phosphorus in silvisol, y_2 is the content of bioavailable potassium in silvisol, x is the rate of application of fresh SS, t/ha; r is the Pearson correlation coefficient.

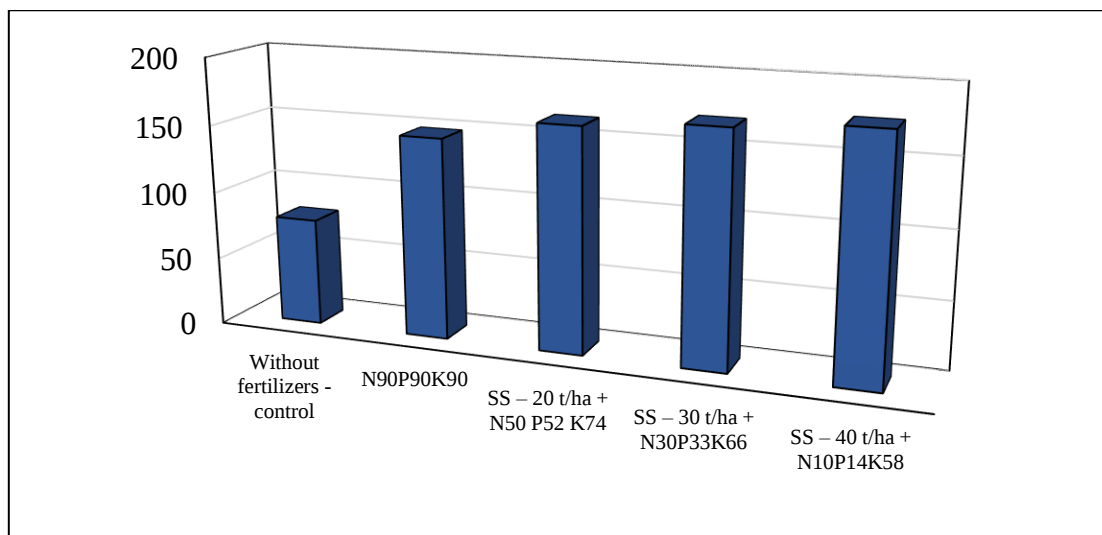


Fig. 2. Correlational dependence of the change in the content of bioavailable compounds of potassium from the increase in the dose of application of SS under *Silphium pronsyanolist*.

Conclusions

The application of different norms of SS and its composts with organic materials under *Silphium perfoliatum* forms a heterogeneous agrochemical background of sod-podzolic soil for plant nutrition with potassium compounds.

The content of bioavailable compounds and potassium also varies depending on the form of fertilizer application. The highest indicators of the content of these macroelements were recorded in the variants where 40 t/ha of SS and mineral fertilizers and 30 t/ha of compost (SS and straw) + mineral fertilizers were applied, which was confirmed by the corresponding values of the concentration coefficients.

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Biological sciences

TREATMENT OF CANCER WITH ONCOLYTIC VIRUSES

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Abstract

The battle against cancer continues to evolve, with oncolytic viruses emerging as a groundbreaking and promising avenue for innovative treatment. This paper provides a comprehensive overview of oncolytic viruses, a unique class engineered to selectively infect and destroy cancer cells, eliciting an immune response against tumors. Beginning with a historical perspective, the narrative explores the mechanisms of action, types of oncolytic viruses, and notable clinical successes, including the FDA approval of a melanoma therapy.

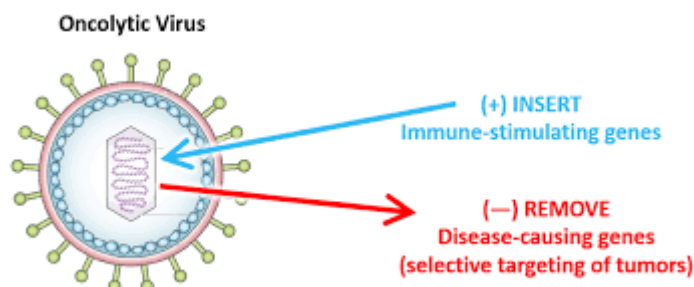
Keywords: Oncolytic viruses, Cancer treatment, Innovative therapy, Targeted therapy, Genetic engineering, Immune response, Selectivity Tumor-specific antigens, Mechanism of action Clinical trials

The article delves into the challenges faced in the utilization of oncolytic viruses, such as immune system interference and the need for improved specificity and safety. Despite these hurdles, the potential of oncolytic viruses to revolutionize cancer therapy is evident, given their ability to target specific genetic alterations in cancerous cells, minimizing damage to healthy tissues.

Looking forward, the discussion extends to the future prospects of oncolytic virotherapy. The exploration of personalized virotherapies tailored to individual genetic and cancer profiles, coupled with the synergies with immunotherapies, underscores the ongoing advancements in this field. As research progresses and technology evolves, oncolytic viruses are poised to become integral components in the oncologist's toolkit, offering hope for a world where effective cancer control and even cures are within reach.

Oncolytic Viruses: A Revolutionary Approach in Cancer Treatment In the fight against cancer, researchers and scientists are constantly searching for innovative therapies that can effectively eradicate the disease. One such groundbreaking advancement is the use of oncolytic viruses – a unique class of viruses that show promising potential in cancer treatment. By leveraging the properties of these viruses, scientists aim to develop targeted therapies that specifically attack cancer cells while leaving healthy cells unharmed. Oncolytic viruses are engineered to selectively infect and destroy cancer cells, inducing the immune system to mount a response against the tumor. The concept of utilizing viruses as a weapon against cancer dates back to the early 20th century, when anecdotal evidence of cancer remission after viral infections began to emerge. Decades of research have since paved the way for the development of sophisticated oncolytic viruses that can effectively target a wide range of cancer types. One major advantage of oncolytic viruses is their ability to specifically recognize and enter cancer cells. Unlike traditional cancer treatments like chemotherapy or radiation, which can harm healthy tissues, oncolytic viruses can be designed to selectively infect tumor cells based on specific genetic alterations commonly found in cancerous cells. This specificity allows for targeted therapy, minimizing damage to healthy tissues and reducing side effects. Moreover, oncolytic viruses have the ability to replicate within cancer cells, leading to the destruction of tumor tissue. These viruses can be engineered to release factors that directly kill cancer cells or trigger an immune response, enabling the immune system to recognize and eliminate cancer cells throughout the body. By stimulating the immune system, oncolytic viruses have the potential to generate a systemic anti-tumor response, preventing the recurrence of cancer and improving long-term outcomes. One example of an oncolytic virus that has shown remarkable promise is the genetically modified herpes simplex virus type-1 (HSV-1). In a clinical trial conducted on patients with metastatic melanoma, the HSV-1 oncolytic virus demonstrated impressive tumor regression rates, with durable responses observed in a subset of patients. The success of this trial has fueled further research and development of oncolytic viruses across various cancer types. However, challenges still remain in the utilization of oncolytic viruses for cancer treatment. One obstacle is the body's natural defense mechanisms, which may neutralize or limit the effectiveness of the virus. Researchers are actively

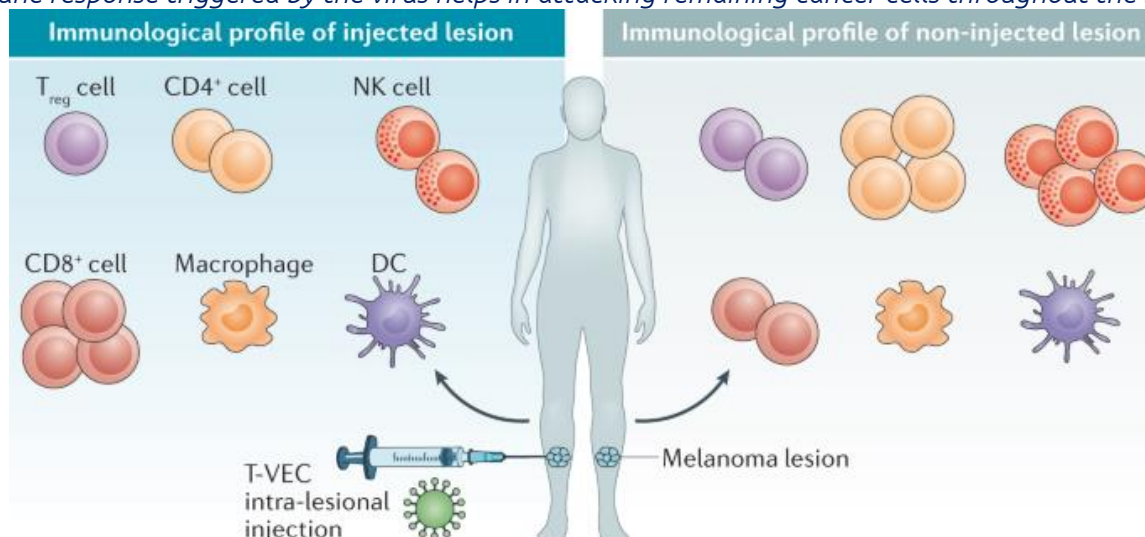
pursuing strategies to enhance viral delivery and replication within tumors, as well as identify ways to overcome the immune system's response to the virus. Another aspect that requires attention is the optimization of viral engineering to improve safety profiles. While oncolytic viruses are designed to target cancer cells, there is always a risk of unintended side effects or off-target effects. Scientists must ensure that the viruses possess sufficient selectivity towards cancer cells to avoid harming healthy tissues. In conclusion, oncolytic viruses represent a groundbreaking approach in cancer treatment, offering the potential for targeted therapy and durable responses. As research on these viruses continues to advance, we can anticipate further advancements in treatment options for patients battling various types of cancer. While challenges remain, the immense potential of oncolytic viruses to revolutionize cancer therapy makes them an exciting area of scientific exploration with the power to transform the lives of countless individuals.



Cancer, one of the leading causes of death worldwide, continues to pose a significant challenge to modern medicine. Traditional treatments like chemotherapy and radiation therapy, while effective to some extent, often cause severe side effects and may not provide a cure for certain types of cancer. In recent years, a promising and innovative approach to cancer therapy has emerged – oncolytic viruses. These viruses, which selectively target and destroy cancer cells while sparing healthy ones, are paving the way for a new era in cancer treatment.

Understanding Oncolytic Viruses

Oncolytic viruses are a diverse group of viruses that have been genetically modified or naturally evolved to specifically infect and kill cancer cells. Unlike normal cells, cancer cells often have weakened antiviral defenses, making them susceptible to viral infections. Oncolytic viruses exploit these vulnerabilities to selectively replicate within cancer cells, causing their destruction. Furthermore, the immune response triggered by the virus helps in attacking remaining cancer cells throughout the body.



Mechanism of Action

Upon infection of cancer cells, oncolytic viruses undergo replication and assembly, ultimately leading to the lysis (breaking down) of the cancer cell. This process releases new viral particles, which can infect neighboring cancer cells, amplifying the therapeutic effect. Additionally, the destruction of cancer cells releases tumor-specific antigens, stimulating the immune system to recognize and attack other cancer cells, including those that are distant from the original site.

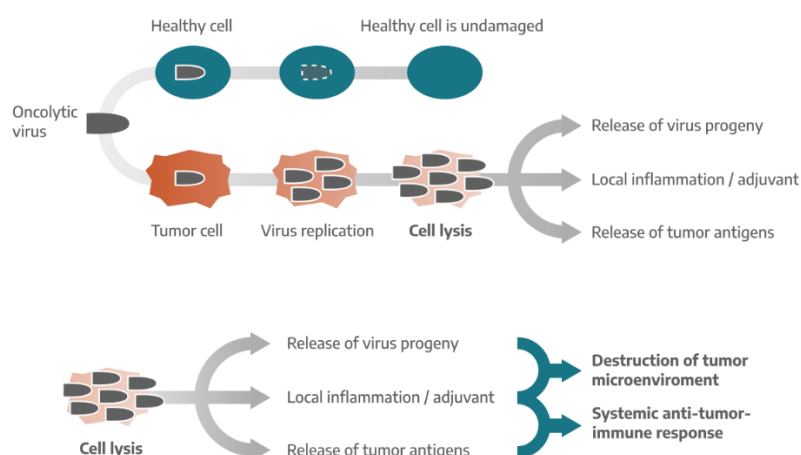
Types of Oncolytic Viruses

Several types of viruses have shown promise as oncolytic agents. Examples include adenoviruses, herpes simplex viruses, reoviruses, and vesicular stomatitis viruses. Each of these viruses has unique properties that make them suitable candidates for specific types of cancer.

Clinical Success and Challenges

Oncolytic viruses have demonstrated remarkable success in preclinical studies and early-phase clinical trials. In 2015, the U.S. Food and Drug Administration (FDA) approved the first oncolytic virus therapy for melanoma. Since then, ongoing research and clinical trials are exploring the potential of these viruses in treating various cancer types, including brain tumors, pancreatic cancer, and breast cancer.

However, challenges remain. The immune system can neutralize the virus before it reaches the tumor site. Moreover, not all cancer types are equally susceptible to oncolytic viruses. Researchers are continuously working to enhance the specificity, efficacy, and safety of oncolytic viruses through genetic engineering and combination therapies with other cancer treatments.



Future Prospects

The field of oncolytic virotherapy holds immense promise. As researchers delve deeper into understanding the complex interactions between viruses, cancer cells, and the immune system, novel oncolytic viruses are being developed. Personalized virotherapies tailored to individual patients based on their genetic makeup and specific cancer profiles are on the horizon.

Furthermore, the synergy between oncolytic viruses and immunotherapies, such as immune checkpoint inhibitors, is being explored. Combining these therapies can potentially enhance the immune response against cancer, leading to more durable and widespread responses.

Conclusion

Oncolytic viruses represent a groundbreaking approach to cancer therapy, offering a targeted and potentially curative treatment for various types of cancer. As research advances and technology evolves, oncolytic virotherapy is likely to become an integral part of the oncologist's toolkit, offering hope to millions of cancer patients worldwide. Through continued innovation and collaboration, the vision of a world where cancer is effectively controlled and even cured is gradually becoming a reality.

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Economic sciences

IMPORTANT ASPECTS OF INNOVATION AND FINANCIAL PROVISION OF INDUSTRIES IN AZERBAIJAN

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ВАЖНЫЕ АСПЕКТЫ ИННОВАЦИОННОГО И ФИНАНСОВОГО ОБЕСПЕЧЕНИЯ ПРОМЫШЛЕННЫХ ОТРАСЛЕЙ АЗЕРБАЙДЖАНА

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Abstract

The article discusses important aspects of innovative and financial support for industrial sectors of Azerbaijan. The essence of the formation and development of innovative processes in the country is revealed. Existing financial mechanisms and tools for ensuring financing of innovative projects and products are analyzed. The problems slowing down the development of innovation processes in Azerbaijan are considered and ways to solve them are proposed. The need to intensify the development of innovation activities through the creation of innovation centers and enterprises is substantiated. A number of recommendations have been prepared and proposals have been made to accelerate innovation processes and optimize the financial mechanisms of the industrial sector of Azerbaijan in the near future, taking into account new realities.

Аннотация

В статье рассматриваются важные аспекты инновационного и финансового обеспечения промышленных отраслей Азербайджана. Раскрыта сущность формирования и развития инновационных процессов в стране. Анализированы существующие финансовые механизмы и инструментарии по обеспечению финансирования инновационных проектов и продукции. Рассмотрены проблемы замедляющие развитие инновационных процессов Азербайджана и предложены пути по их решению. Обоснована необходимость интенсификации развития инновационной деятельности путём создания инновационных центров и предприятий. Подготовлен ряд рекомендаций и даны предложения по ускорению инновационных процессов и оптимизации финансовых механизмов промышленной сферы Азербайджана в ближайшей перспективе с учётом новых реалий.

Keywords: Azerbaijan, innovation, finance, innovative development, innovative processes, financial mechanisms, financial problems.

Ключевые слова: Азербайджан, инновация, финансы, инновационное развитие, инновационные процессы, финансовые механизмы, финансовые проблемы.

Giriş

В современное время освоение новых производств, реконструкция и техническое перевооружение, выпуск новых видов продукции являются основными задачами ненефтегазовой отрасли. Эти задачи решаются в результате подготовки и реализации инвестиционных проектов ненефтяных промышленных предприятий, которые во многом определяют эффективность и финансовое состояние этих предприятий. Существуют различные участники инвестиционных проектов, основной целью которых является получение прибыли в более короткие сроки. По этой причине все участники регулярно анализируют эффективность инвестиционного проекта на протяжении всего периода до стадии добычи-эксплуатации. Производственно-эксплуатационный этап является завершающим этапом инвестиционного

проектирования и характеризует передачу производственных мощностей и приёмку заказчику. Желание получить долгосрочную прибыль в обмен на использование различных ресурсов представляет собой большой риск для участников инвестиционного проекта [1, С. 434].

Такие инструменты, как регуляторные рычаги и правовая поддержка, способствуют совершенствованию экономико-организационных и финансовых механизмов инновационного развития ненефтяных отраслей Азербайджана. В целях реализации промышленной политики в стране готовятся законодательная база и соответствующие программы по приватизации государственного имущества, правовые документы, регулирующие антимонопольную деятельность и защищающие права потребителей. В сфере финансов и инвестиций подготовлены важные законодательные акты, в том числе национальные законы. В целом решающее значение имеет ряд законов и соответствующих государственных программ, связанных с развитием ненефтяных отраслей промышленности и их регулированием. Все это в совокупности оказывает синергетический эффект на развитие этих отраслей и способствует созданию благоприятной бизнес-среды в стране [2, С.7].

Успех инновационной деятельности во многом определяется ее организационными формами и методами финансового обеспечения. Под финансированием инноваций понимается обеспечение инновационной деятельности различными ресурсами, которые могут включать не только денежные средства, но и другие капитальные вложения, а также основной и оборотный капитал, имущественные права и нематериальные активы, кредиты, долг и залог. Система финансирования инновационной деятельности очень широка, а источниками финансирования являются предприятия, финансово-промышленные группы, малый инновационный бизнес, инвестиционные и инновационные фонды, органы местного самоуправления, частные лица и т.д. возможно. Все они, так или иначе участвуют в экономическом процессе или способствуют развитию инновационной деятельности. Финансирование инноваций некоторых отраслей осуществляется недостаточно из-за высоких затрат на внедрение и внедрение инноваций, а также долгосрочного характера инвестиций. Некоторые из них не имеют собственных средств для финансирования разработок, а их возможности по привлечению финансовых ресурсов из внешних источников ограничены. [3, С.821]. Поэтому укрепление экономико-организационных и правовых основ обеспечения инновационного развития страны и регулирование финансовых проблем индустриальных инноваций являются одними из главных приоритетов. Принимая во внимание преимущества инноваций, мы видим, насколько важно укреплять организационную, экономическую и правовую основу процессов инновационной деятельности отраслей и финансирования в этой сфере. Финансовая безопасность является предпосылкой инновационности отраслей и фактором, играющим важную роль в повышении инновационной активности этих отраслей.

Ключевые вопросы инноватизации промышленной сферы Азербайджана и их финансовые проблемы

Учитывая значение венчурного капитала в механизме финансового гарантирования промышленных инноваций, важно обратить внимание на его основные функции: сбор средств инвесторов; передача опыта управления бизнесом инновационным предприятиям; посреднические: перераспределение средств путём инвестирования в инновационные предприятия; стимулирование инновационной деятельности; интеграция науки, образования и производства; трансформационная функция – существующие рынки трансформируются и возникают новые формы конкуренции; социальная функция [4, С.382]. При этом, как правило, участниками процесса венчурного финансирования являются инвесторы, венчурный фонд, управляющая компания фонда и венчурное предприятие. Основными инвесторами венчурного рынка являются венчурные фонды. Это коммерчески ориентированные финансовые организации, целью которых является сбор и последующее использование средств в инновационных проектах с целью получения прибыли. Венчурное финансирование реализуется в несколько этапов, количество и продолжительность которых зависит от стадии жизненного цикла инновации, для которой осуществляется финансирование.

В условиях усиления глобального экономического влияния особое внимание уделяется широкому применению инноваций и разработке эффективного механизма поэтапной оценки инвестиционных проектов, соответствия расчётов инвестиционных проектов международным стандартам, а также применение инноваций. В этих процессах привлекательность ценных бумаг, таких как механизм государственно-частного сотрудничества и активное инвестирование, может использоваться в качестве финансовых

механизмов [5, С.15]. Экономическая эффективность разработки и внедрения инноваций напрямую связана с вопросами комплексной оценки инвестиций. Инвестиции и инновации служат повышению рентабельности предприятия и расширению производства, а также снижению переменных и постоянных издержек, снижению себестоимости готовой продукции. Такие факторы, как модернизация, диверсификация, дифференциация, широкое применение принципов корпоративного управления, мотивация сотрудников, играют важную роль в повышении эффективности процессов разработки и применения инноваций на предприятиях. Важно также постоянно совершенствовать методы оценки инвестиционных проектов, служащие инновационному развитию предприятия и оптимальному использованию передового зарубежного опыта. В условиях развития инновационной деятельности предприятий целесообразно широко использовать статистические и динамические методы, которые помогают принимать правильные решения в повышении эффективности оценки инвестиционных проектов [6, С.160].

В текущий период важно диверсифицировать структуру национальной экономики и обеспечить развитие направлений с более высоким потенциалом [7, С.35]. Этот вопрос очень актуален для Азербайджана, особенно повышение эффективности за счёт инновационности отраслей экономики и укрепление финансовых механизмов промышленных отраслей требует более осторожных подходов. Кроме того, в последние годы принимаются меры по улучшению инвестиционного климата в нашей стране для инновационной деятельности промышленных территорий и привлечения альтернативных источников финансирования в эти сферы, а также более интенсивного прихода иностранных инвестиций. Инновационно-ориентированные проекты и программы разрабатываются в различных сферах экономики, но в то же время существует необходимость реализации всего этого в более системной и интенсивной форме, на основе продуктивных механизмов [8]. С точки зрения изложенного, принятие гибких мер по максимальному использованию инновационного потенциала используемых в настоящее время финансово-экономических механизмов, в том числе индустриальных парков, технопарков, свободных экономических зон, промышленных районов, агропарков, обеспечения инновационных подходов, повышения производства наукоёмкой и инновационной продукции, финансовые льготы и механизмы финансовой поддержки были разработаны и применяются государством в целях создания конкурентоспособных промышленных предприятий [9, С.32]. Уступки, сделанные в этих индустриально-ориентированных сферах экономической деятельности, рассчитаны на 10 лет, и мы считаем, что за этот период промышленные предприятия, зарегистрированные здесь в качестве резидентов, получают достаточную поддержку, чтобы укрепиться в конкурентной среде, увеличить свой капитал и развиваться из стратегической точки зрения. В настоящее время эти вопросы очень актуальны на территориях, освобождённых от оккупации. Так, в Агдаме началось создание индустриального парка, аналогичные процессы распространяются и на «Экономическую зону Аразской долины», организованную в Джебраиле. Полагаем, что будут созданы благоприятные условия для укрепления финансовых механизмов созданных на таких предприятиях промышленных предприятий, что, в свою очередь, сможет позволить производить инновационную продукцию.

Роль отраслей в структуре экономики Азербайджана, особенно повышение экспортного потенциала ненефтегазовых отраслей промышленности, является приоритетной, и инновационные меры в этих процессах могут быть высокоэффективными [10, С.48]. Таким образом, за счёт моделирования и более интенсивного инновационного развития территорий ненефтегазового сектора, обладающих экспортным потенциалом, можно повысить интенсивность и объём притока валютных средств в страну, укрепить финансовую стабильность, создать дополнительные возможности для увеличения экспортного потенциала [11, С. 179]. В то же время надёжная разрешающая способность финансовых механизмов этих отраслей создаст благоприятные условия для укрепления предприятий на аналогичных товарных рынках и ускорения инновационного развития со стратегической точки зрения. Создание и реализация инновационно-ориентированной стратегии развития требует наличия стабильных финансовых ресурсов и привлечения инвестиций [12, С. 27]. Поэтому, если посмотреть на международный опыт стимулирования инноваций, ведущие страны мира выделяют достаточные финансовые ресурсы и инвестируют в целях ускорения развития в этой сфере. В последние годы концептуальные подходы в этом отношении в нашей стране вступают в фазу более глубокого осмысления [13, С. 14]. Тем не менее, следует отметить, что инновационные процессы отраслей промышленности в нашей стране достаточно слабы и

необходимо признать, что на большинстве промышленных предприятий интерес к инновациям незначителен. Из проведённых наблюдений и анализа можно сделать вывод, что одной из основных причин отсутствия интереса к инновациям в промышленных сферах в Азербайджане является недостаток финансовых ресурсов или трудности с привлечением инвестиций в инновационные проекты. Неслучайно такое мнение сложилось в международных финансовых институтах, например, по отчётам экспертов Европейского банка реконструкции и развития, только 5% промышленных предприятий в Азербайджане имеют инновационно-ориентированное развитие. Конечно, смириться с такой ситуацией невозможно, и мы считаем, что необходимо предпринять более важные шаги в этом направлении, разработать стимулирующие механизмы государственной поддержки, применить специальные подходы для повышения мотивации инновационной деятельности. Таким образом, процессы разработки, внедрения и применения инноваций требуют длительных усилий и достаточно больших финансовых ресурсов, а с другой стороны, не обещают высоких прибылей и доходов в короткий период времени. То есть от инвестиций необходимо ожидать долгосрочной отдачи, а большинство инвесторов в этом вопросе уж точно не заинтересованы. Поэтому приоритет фактора финансового механизма следует серьёзно рассматривать и оценивать в подходах к инновационной деятельности, в частности к инновационной деятельности промышленных отраслей нашей страны [14, С. 363].

Перспективы развития инновационных процессов и применение оптимальных финансовых механизмов в промышленных отраслях Азербайджана

Следует отметить, что особенности процесса разработки и применения инноваций можно разделить на две категории: 1) контролируемые (в частности, техническое оснащение лабораторий, подбор квалифицированных кадров) и 2) неуправляемые (творческий характер исследовательской деятельности, возможность достижения запланированного результата исследовательской деятельности). Соответственно, при определении методов управления процессом разработки и применения инноваций необходимо учитывать риски, связанные с возможностью влияния на отдельные стороны исследовательской деятельности. При выборе инструментов управления и контроля эффективности инноваций необходимо учитывать характеристики самой инновации (внутренние факторы) и характеристики среды, в которой она будет работать (внешние факторы). Процесс разработки и внедрения любой инновации принято разбивать на определённые этапы, каждый из которых сопровождается определённой деятельностью. Первый этап – этап подготовки изменений. Основная цель – сформировать «стартовую площадку» для запланированных преобразований. Подготовительный этап начинается с анализа внутренней среды предприятия. Цель этапа – определить разницу между фактическим и желаемым положением дел в организации. Важнейшим мероприятием на этапе подготовки к разработке и внедрению инноваций является анализ внешней среды предприятия, в которую входят потребители, конкуренты, государственные органы, поставщики, финансовые организации, источники трудовых ресурсов и т. д. включает в себя. Разработка и внедрение любой инновации направлены на устранение противоречий между внутренней средой предприятия и внешними условиями. Стратегия изменений служит указанием, какие основные направления следует выбрать предприятию, чтобы обеспечить устойчивое развитие, основанное на инновациях. Другими словами, разработанная стратегия позволяет определить цель разработки и применения инноваций. Второй этап разработки и внедрения инноваций – реализация изменений. Основная задача – последовательная реализация мер по развитию и внедрению инноваций. Следующий этап – получение результатов изменений. На этом этапе, завершающем процесс разработки и внедрения инноваций, оцениваются ранее выбранные характеристики для определения эффективности полученных показателей и инновации. Завершающим этапом разработки и внедрения инноваций является мониторинг результатов. Необходимо контролировать этап определения результатов изменений. В результате первым этапом мониторинга является анализ ошибок при внедрении изменений. Ошибки могут быть допущены уже на первом этапе из-за разработки эффективной стратегии изменений, неудачного подбора управленческой команды или отсутствия средств, выделенных на реализацию инновационного процесса. Ошибки могут быть допущены при совершении конкретных действий, связанных с разработкой и внедрением инноваций. Обеспечение устойчивости развития ненефтегазовой отрасли во многом зависит от уровня реализации инновационных проектов в процессе разработки и применения инноваций. [15, С.135]. В

процессах подготовки и реализации инновационного проекта можно выделить группу этапов: 1) Определение потребности проекта в финансовых ресурсах. 2) Подготовка необходимой проектно-сметной документации. 3) Поиск источников финансирования и определение стоимости привлечённого капитала. 4) Оценка эффективности и результативности инновационного проекта [16, С.30].

Считаем, что в развитии ненефтегазовой отрасли на современной основе большее значение следует придавать развитию инноваций, их применению в производственных процессах, расширению географии инновационного развития и использованию эффективных механизмов в этих целях, а также реализацию стимулирующих мер в этом направлении. Также в центре внимания в качестве основных задач находятся более гибкое и продуктивное использование инновационного потенциала этих промышленных предприятий, совершенствование механизмов государственной поддержки в целях эффективного регулирования и финансирования этих процессов. Кроме того, в условиях экономических преобразований необходимо обеспечить оптимальность системы разработки и применения инноваций. Основной задачей следует считать систематическое изучение проблем, связанных с теми или иными вопросами, и разработку эффективных механизмов управления [17, С.137]. С другой стороны, по нашему мнению, в рамках корпоративного управления необходимо учитывать исходные основы и определённые факторы развития и применения инноваций. Исследования, рассуждения и принятие решений, связанных с разработкой и применением инноваций в этой отрасли, являются важнейшей областью корпоративного управления. Для эффективного управления инновационной деятельностью важна разработка долгосрочной (не менее 5-10 лет) инновационной стратегии и инновационной политики, за что отвечает совет директоров и корпоративное управление соответственно. Управление корпоративными инновациями является важнейшим параметром долгосрочного устойчивого развития предприятий, основой которого является управление инновационной деятельностью и инновационное развитие самого корпоративного управления [18, С.114].

Инновации, выступающие одним из основных факторов, влияющих на обновление деятельности отраслей, повышение их конкурентоспособности, а также реализацию их социально-экономических функций, положительно влияют на улучшение результатов финансово-экономической деятельности. деятельности этих направлений и повышению их рентабельности. Основная цель активного применения инноваций больше связана с созданием, внедрением и эффективным использованием новой продукции и высоких технологий. Инновации играют важную роль в повышении эффективности воспроизводственных процессов и получении предпринимательской прибыли. «Инновация отличается свойством активного вмешательства в процессы повышения эффективности производства и качества продукции и осуществления существенных изменений» [19, С.29]. Одной из важных тенденций современной экономики является возрастающее значение инноваций. Инновации являются движущей силой экономического развития и деятельности отраслей [20, С.156]. Основная идея инновации – это не какая-либо инновация, а инновация, повышающая эффективность системы и прибыль, но не увеличивающая издержки производства. Одним из условий успеха инновации является её инвестиционная привлекательность.

Мы считаем, что роль государства в развитии ненефтегазовой отрасли должна проявляться в финансировании инвестиционных проектов и других формах поддержки [21, С.12]. Одной из таких форм поддержки должно быть направление повышения экспортного потенциала этих отраслей. С этой точки зрения, в ближайшем будущем у Азербайджана есть возможность добиться значительного увеличения производственного и экспортного потенциала в ненефтегазовой отрасли. В результате продуманной политики, смелых шагов и политической воли Президента страны в направлении диверсификации национальной экономики в соответствии с требованиями современной глобальной эпохи достигается прогресс в непрерывном развитии этой отрасли [22, С.68]. Неслучайно в последние годы ведётся целенаправленная работа в плане повышения экспортного потенциала нефтехимического комплекса, который считается одним из секторов ненефтегазовой промышленности Азербайджана, обладающих значительным экспортным потенциалом. Например, одной из таких работ является ввод в эксплуатацию в 2019 году имеющего большое значение экспортно-ориентированного производства полиэтилена высокой плотности, которое оказало существенное влияние на увеличение ненефтяного экспорта Азербайджана [23, С.110]. . Как мы уже упоминали ранее, создание ряда индустриальных парков и технопарков положило начало

новой эпохе индустриализации страны. Ряд утверждённых государственных программ по развитию ненефтегазовых отраслей промышленности обеспечил ускоренное развитие этих отраслей и создал благоприятные условия для удовлетворения спроса населения на основные виды продукции за счёт внутреннего производства и чтобы Азербайджан стал одним из экспортёров этой продукции. Стратегические дорожные карты подготовлены в целях реализации стратегических целей развития ненефтегазовой отрасли в Азербайджане, совершенствования национальной модели экономического развития нашей страны, а также обеспечения конкурентного и устойчивого развития в этих отраслях [24, С.834]. В число основных поставленных приоритетов входят ускорение сбалансированного развития непродовольственных сфер и регионов в целом, эффективное использование стратегических валютных резервов, усиление государственной поддержки предпринимательства, формирование благоприятной деловой и инвестиционной среды, повышение социального благосостояния населения. в этих стратегических дорожных картах.

На наш взгляд, в ближайшем будущем предполагается, что будут определены новые стандарты международной торговли, конкуренции, интеллектуальной собственности и окружающей среды, а роль международных организаций в этом направлении возрастет. Ожидается также повышение глобального и регионального уровня конкурентоспособности стран, которые отдают приоритет специализации, развитию технологий производства и инновационного потенциала на международных рынках и тем самым стимулируют сферы, создающие высокую добавленную стоимость. Инновационное развитие отрасли станет возможным за счёт укрепления научно-технического потенциала и расширения образовательных возможностей [25, С.75]. С учётом этих факторов, если принять во внимание, что СЭЗ, являющиеся одним из многофункциональных благоприятных экономических механизмов, могут реализовать любой комплексный экономический приоритет, то можно сказать, что использование таких зон как различного и эффективного экономического инструмента для обеспечения экономической безопасности страны является необходимостью в условиях глобализации мировой экономики в современную эпоху. В тех или иных процессах вопросы, связанные с повышением потенциала территорий, действующих в ненефтегазовой отрасли Азербайджана, и усилением темпов их экономического развития, должны быть сосредоточены на углубленном изучении приоритетных направлений использования СЭЗ и определении стратегические цели этих зон [26, С. 293].

В Азербайджане производятся ненефтяная промышленная продукция, электрические машины и оборудование, запасные части, строительные материалы, продукция химической промышленности, готовая текстильная продукция и т.д. экспортировались в разные страны [27, С.176]. Согласно соответствующим указам и решениям главой государства были приняты различные программы в целях реализации мер по диверсификации экономики и эти программы были успешно реализованы. Нефтяная экономика Азербайджана продолжает поддерживать высокие темпы роста, и экономический прогноз на ближайшую перспективу в целом позитивный. Тенденция непрерывного развития, наблюдаемая в последние годы в ненефтегазовой отрасли Азербайджана, рассматривается наиболее рейтинговыми международными агентствами как основа улучшения имиджа страны. В целом, реформы, проводимые в Азербайджане многими авторитетными международными организациями, и усиленная политика развития ненефтегазовой отрасли высоко оцениваются. Например, в результате независимого исследования, проведённого Всемирным банком, Азербайджан продвинулся на 6 мест в отчёте «Doing Business 2020», и вновь, как и в отчёте 2019 года, наша страна вошла в «10 самых реформируемых стран». в мире. Этот отчёт считается самым важным в мире рейтинговым индикатором для оценки лёгкости деловой среды.

Одним из основных факторов, влияющих на изменения, наблюдаемые в современной экономике Азербайджана, является непрерывное развитие ненефтегазовой отрасли [28, С.34]. Азербайджан успешно использует свои богатые месторождения нефти и газа для достижения такого развития. Стратегия превращения «чёрного золота» в ведущую силу развития ненефтяной отрасли нашей страны – человеческого капитала – продолжает приносить свои плоды, продолжается построение конкурентоспособной экономики за счёт нефтегазовых доходов. Приняты меры по обеспечению устойчивости развития ненефтегазовой отрасли, открытию промышленных предприятий с современными и инновационными технологиями, созданию благоприятных условий для развития конкурентоспособного производства,

основанного на инновациях, поддержке предпринимательства и расширению занятости. на производственных участках [29, С.138].

Заключение.

В целом, в условиях новых вызовов, одновременно учитывая постпандемические и послевоенные приоритеты, мы постарались определить направления решения финансовых проблем индустриальных инноваций:

- максимальное использование возможностей отраслей, повышение уровня современного развития ненефтегазовых отраслей, повышение конкурентоспособности отраслей и выпускаемой продукции, а приоритет в этих процессах должны быть отданы инновационным подходам;

- В целях расширения структуры и номенклатуры производства наукоёмкой, инновационной продукции должны быть разработаны и реализованы целевые программы и стратегии действий в инновационном направлении отраслей промышленности страны;

- В нашей стране должны быть глубоко изучены причины, тормозящие инновационное развитие ненефтегазовых отраслей промышленности, имеющих мощный потенциал экспортно-ориентированного и инновационного применения, должны быть приняты адекватные меры и, в первую очередь, эффективность механизмы финансовых гарантий должны быть расширены;

- В нашей стране многие механизмы, стимулирующие развитие инноваций, до сих пор функционируют не в полной мере, например, более характерна слаборазвитая кредитно-финансовая система, известно, что фондовые рынки развиты недостаточно, отсутствуют необходимые механизмы. за перераспределение финансовых потоков из сырьевых отраслей в высокотехнологичные отрасли, либо эффективность в этой сфере пока не заметна;

- Потенциал химической и нефтехимической промышленности и ее предприятий можно отметить как промышленную сферу с достаточно высокой инновационной активностью в Азербайджане, и мы считаем, что в этой промышленной сфере можно реализовать крупные инновационные-инвестиционные проекты;

- В нашей стране малые масштабы инновационной деятельности по-прежнему характерны для отраслей, ориентированных на удовлетворение потребностей внутреннего рынка, с точки зрения этих факторов следует обратить внимание на проблемы инновационной деятельности малых и средних промышленных предприятий в Помимо крупных промышленных предприятий, необходимо разработать доступные механизмы финансовых гарантий для их доступа к финансовым ресурсам;

- В период инновационного развития важно расширять инновационную деятельность, совершенствовать механизмы её управления, ставить цели в направлении вывода инновационной продукции на рынок финансовоёмких технологий, и в этом направлении важно расширять объем механизмов государственной поддержки процессов, связанных с инновационной деятельностью, и повышение их эффективности в целях поддержания конкурентной среды предприятий.

- В целом в целях повышения инновационной активности различных отраслей промышленности страны необходимо принять меры по совершенствованию законодательной базы, повышению уровня обеспеченности различными ресурсами, защите внутреннего рынка, обеспечению применения оптимальные механизмы финансирования инноваций отраслей промышленности для подготовки и реализации привлекательных и перспективных инновационных проектов и т.д.

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Geographical sciences

SCIENCE AND EDUCATION: THE PROBLEM OF GEOGRAPHY

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Abstract

Geography plays a significant role in our lives. It is crucial in researching and understanding the cultural, political, economic, and social issues of the world. Geographic research and education are critical resources in addressing global problems. However, one of the contemporary challenges of geography is its further integration with other scientific fields and the need for increased integration.

Keywords: science, education, geography, integration, contemporary issues.

The integration of geography

Geography is of course an independent science and has its own unique rules, concepts and areas of research. However, it is important to link other fields of science and education to understand modern problems and to help solve world issues. It calls for geography, the economy, culture, political operations and for it to be more closely connected to issues in many other areas and to be more closely connected to those issues. Stronger intelligence in the fields of science provides a multidisciplinary analysis of world problems and helps us to look at existing problems in a multilateral way. This integration calls for both a change in the modern education system and a more significant role for geography in modern societies.

The importance of science and education intelligence

The intelligence of science and education is an effective tool for solving modern problems in many ways. This process encourages the development of new theories and practices and leads to more interesting and effective research. In addition, this intelligence helps researchers and students have a broader world perspective. The importance of science and education is essential. Geography plays an important role in understanding and addressing the world's economic, social, and political issues. Economic uncertainties have shifted some of the world's latest developments, such as economic development, climate change, migration, and social processes.

The intelligence of science and education enhances the possibility of linking research fields and exploring modern issues. The integration of geography in a stronger way in economics, political science, sociology, and other fields helps to make multidisciplinary research more effective. The intelligence of science and education provides access to a larger field of research for researchers and students and helps them explore more. It helps both improve the quality of the study and help students have a broader perspective.

In general, the intelligence of science and education provides a more oppressive way to solve modern problems in geography and helps us to monitor and understand what is happening in the world.

Potential opportunities for cultural heritage tourism

Cultural heritage tourism is a result of interest in the various cultural heritage that exists in the world. This type of tourism suggests that people are familiar with the oldest cultural heritage, observe historical monuments and dive instead of a country's cultural heritage. In this scientific article, we will explore the potential opportunities for cultural heritage tourism and the impact of this tourism on social, economic and cultural fields.

The economic significance of cultural heritage tourism

Cultural heritage tourism adds value to the economy. This type of tourism creates more work through historical monuments, museums, and community organizations. Visitors to tourists and cultural heritage sites support the development of the local industry and create jobs. Economic Importance of Cultural Irs Tourism

Cultural heritage tourism adds great value to the economy and creates economic characteristics for a country. Here are some examples of this economic significance:

- *Tourists, food and drink.* Cultural heritage creates potential for the development of restaurants, cafes and shops for tourists. These places allow local and foreign tourists to eat and experience quality drinks after visiting cultural heritage sites. Cultural heritage tourism increases orders from restaurant and café owners and creates new jobs.

- *Museums and research.* Historical museums and cultural heritage sites encourage tourists to visit the region. This supports the work of museums and research organizations. It supports the finances of these museums and research organizations with tourists, ticket prices and souvenir purchases.

- *Hotel and hotel.* Cultural heritage tourism supports business areas in the hotel industry. When tourists visit cultural heritage areas, they start staying in local hotels, which supports the development of the tourism sector. New hotels need to be built and expand existing ones.

- *Transportation and tourism.* The arrival of cultural heritage tourists in the region also provides opportunities for military flights, railways and automobile companies. Military flights and rail routes allow tourists to come to the region more, creating jobs in public transport.

- *Souvenir purchase.* Cultural heritage spends money on the purchase of tourists, cultural heritage supplements, souvenirs and memorial tools. This encourages the development of a significant industry.

As illustrated by the examples, cultural heritage tourism creates jobs and opportunities for the economy in a variety of ways. Increasing financial contacts in this area encourages the development of cultural heritage sites and causes tourists visiting the region to add great value to the region's economy.

Social impact of cultural heritage tourism

Cultural heritage tourism has a profound effect on cultural and cultural heritage among people. This helps to understand different cultures and provides detailed cultural operations and comparative research operations for researchers, students and researchers. Cultural heritage tourism demonstrates travel in order to explore and experience local culture, history and traditions by tourists in a country or region. There are many social impacts of this tourism:

- *Protecting cultural heritage.* Cultural heritage helps to preserve and restore tourism, traditions and historical culture. There is a growing interest in tourism and a greater need for preservation of historical and cultural objects.

- *Preaching local culture.* Cultural heritage tourism helps promote recognition of local culture and traditions and is presented to other people. It plays a significant role in preserving and adopting a community culture itself.

- *Job creation.* The arrival of tourists is supportive of the local economy. Cultural heritage creates jobs for tourism, restaurants, hotels, souvenir shops and researchers.

- *Education and research.* Cultural heritage tourism is a favorable area for researchers and educational institutions. Researchers and educators help research and maintenance of cultural heritage sites.

- *Equality and encouragement.* Cultural heritage tourism promotes equality and cultural exchange among people. It helps us get to know and understand different cultures better.

Cultural heritage tourism preserves and promotes the historical and cultural heritage of the local community, supports the local economy, creates opportunities for education and research, and promotes cultural equality. It has an important social impact for a country.

Cultural heritage tourism opportunities for innovation and research

Cultural heritage creates a number of opportunities in the fields of tourism, innovation and research:

- *Search research.* Cultural heritage tourism provides opportunities to explore historical and cultural objects and explore their historical background. This is an important area for archaeologists, historians and anthropologists to collect and explore compulsory sources.

- *Application of innovation.* Modern technologies and innovations are available to explore and preserve cultural heritage objects and traditions. This can be done in areas such as rachelious research used for archaeological excavations, new technologies for the restoration of objects and innovative ways for interactive education.

- *Education and research centers.* Cultural heritage tourism, cultural heritage research, and the creation of centers for educational promotion. It helps to create a technical base where researchers and educational institutions will be drawn to the side to work in research.

- *Cultural heritage technologies.* Cultural heritage tourism also contributes to the development of cultural heritage technologies. It applies to 3D historical modelling, cultural heritage websites, raging cultural heritage museums and many other areas.

- *Research locations.* Cultural heritage tourism is an important resource for the creation of research sites. These locations provide opportunities for researchers and educators to explore objects more closely.

Cultural heritage creates opportunities in the areas of tourism, research and innovation and carries great potential to explore and present local cultural heritage in new ways. Cultural heritage tourism can expand existing opportunities for a variety of research areas. Research in this area helps to deepen the development of culture and the historical understanding.

The future of cultural heritage tourism

The future of cultural heritage tourism is parliament. With more people eager to recognise, learn and explore cultural heritage, more opportunities will be created in this area. Cultural heritage tourism also helps to preserve and enhance world culture. Cultural heritage tourism will still have great potential in the future. Here are some issues and forecasts for the future of cultural heritage tourism:

- *More ingredients in other forms of travel.* Cultural heritage tourism will attract more people's attention and there will be increased interest in this type of tourism. This is possible by combining with different types of tourism, such as visiting cultural objects and traditions when traveling.

- *Increased use of technology.* More of the rachelious research and cultural heritage technologies are expected to be used. It will offer tourists more interactive experiences and allow cultural heritage sites to be explored more closely.

- *More advanced experiments.* Cultural heritage tourism will be able to offer tourists more personal and fresh experiences. This is linked to offering experiences that help tourists choose destinations that suit their interests.

- *Protecting cultural heritage.* The preservation and restoration of cultural heritage sites will be even more significant in the future. This will require greater cooperation between local and international organizations, agencies and institutions.

- *More dignified infrastructure.* Cultural heritage tourism will lead to the development of more decent transport, congestion and restaurant infrastructure to attract a larger number of tourists.

- *Increasing people's interest in cultural heritage.* People will increase their interest in historical and cultural heritage and it will drive the development of cultural heritage tourism.

- *Persian.* In the future, continued life will be even more important. Cultural heritage will be combined with tourism, the preservation of traditions and the maintenance of the environment.

In the future, cultural heritage tourism will become a bigger competitive area, encompassing great potential for countries and regions that want to grow in it.

The result

Cultural heritage offers important opportunities in tourism, history, economics, and culture. Promoting more research and development in this area helps to preserve world culture and shape a broader cultural understanding. This article presents a common theory about the potential opportunities for cultural heritage tourism. A comprehensive scientific paper that will cover more specific topics and fields can be compiled in order to add additional research and samples.

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Pedagogical sciences

INTEGRATION IN MUSIC EDUCATION

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МУЗЫКАЛЫҚ БІЛІМ БЕРУДЕГІ ИНТЕГРАЦИЯ

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Abstract

The main importance of the teacher's activity is to create conditions for each student to succeed in academic and extracurricular activities. It is academic achievements that strongly color the student's life, determine the attitude towards teachers, parents, and oneself. Ultimately, all this affects the moral development of students. Each teacher's creative laboratory is unique in its own way, its activities have their own discoveries, interesting finds, and ideas. The essence of the pedagogical strategy is to strengthen success by emphasizing the importance of the work done so far. To do this, you need to:

- to show an interest in music, a direct relationship;*
- active efforts in search situations;*
- passion and growth of musical abilities;*
- hearing acuity;*
- interest in improvisation, composition, self-education;*
- conscious attitude to the quality of music and its performer;*
- interest in other types of art.*

The combination of traditional and new methods, forms of teaching and control in music lessons allows us to solve the tasks of developing and educating students, creating a special atmosphere of calm, trust, passion and teamwork in the classroom. A student of a passive listener becomes an active participant in the educational process from the object of influence.

The problem of integration (integration) of school education and upbringing is important and modern for both theory and practice. Its relevance is due to new social requirements for the school and due to changes in the field of science and production. Subject fragmentation becomes one of the reasons for the fragmentation of the worldview of a school graduate, and in the modern world the processes of economic, political, cultural, and information integration prevail.

Thus, the independence of things, their weak connection with each other, create serious difficulties for students in the process of forming a holistic picture of the world, and hinder the organic perception of culture.

The introduction of the integration of subjects into the education system will currently allow solving the tasks set for the school and society as a whole. Integrated classes contribute to the formation of a holistic picture of the world in children, understanding the relationship between phenomena in nature, society and the world as a whole. In an integrated lesson, didactic goals are best achieved through cognitive, developmental and educational qualifications.

The integration of music, fine arts and literature provides great opportunities for the disclosure of the spiritual horizons of art, introduces it to the language of relations between peoples, human memory, which stores the thoughts, feelings, and actions of people of past eras and modernity. Thus, the problem of integrating the content of education is very

Аннотация

Мұғалімнің іс-әрекетінің басты мәні - әр оқушыға оқу және сыныптан тыс жұмыстарда сәттілік жағдайын жасау. Бұл оқушының өмірін қатты бояйтын, мұғалімдерге, ата-аналарға, өзіне деген қарым-қатынасты анықтайтын оқу жетістікт-

ері. Сайып келгенде, мұның бәрі оқушылардың моральдық дамуына әсер етеді. Әр мұғалімнің шығармашылық зертханасы өзінше ерекше, іс-әрекетінде өз жаңалықтары, қызықты олжалары, түсініктері бар. Педагогикалық стратегияның мәні - жетістікті осы уақытқа дейін атқарылған жұмыстың маңыздылығымен көрсету арқылы нығайту. Ол үшін қажет:

- музыкаға деген қызығушылықты, тікелей қатынасты көрсету;
- іздеу жағдайлары барысындағы белсенді күш-жігер;
- құмарлық және музыкалық қабілеттердің өсуі;
- есту қабілетінің өткірлігі;
- импровизацияға, композицияға, өзін-өзі тәрбиелеуге қызығушылық;
- музыканың сапасына және оның орындаушысына саналы көзқарас;
- өнердің басқа түрлеріне қызығушылық.

Музыка сабақтарында дәстүрлі және жаңа әдістердің, оқыту формаларының және бақылаудың үйлесімі сыныпта тыныштық, сенім, құмарлық пен бірлесіп жұмыс жасаудың ерекше атмосферасын құра отырып, оқушыларды дамыту және тәрбиелеу міндеттерін шешуге мүмкіндік береді. Пассивті тыңдаушының оқушысы әсер ету объектісінен оқу процесінің белсенді қатысушысы болады.

Мектептегі оқыту мен тәрбиені біріктіру (интеграция) мәселесі теория үшін де, практика үшін де маңызды және заманауи. Оның өзектілігі мектепке қойылатын жаңа әлеуметтік сұраныстардан туындайды және ғылым мен өндіріс саласындағы өзгерістерге байланысты. Пәндік бытыраңқылық мектеп түлегінің дүниетанымының бытыраңқы болуының себептерінің біріне айналуға, ал қазіргі әлемде экономикалық, саяси, мәдени, ақпараттық интеграция үрдістері басым.

Осылайша, заттардың тәуелсіздігі, олардың бір-бірімен әлсіз байланысы оқушыларда әлемнің тұтас бейнесін қалыптастыру барысында елеулі қиындықтар туғызады, мәдениетті органикалы қабылдауға кедергі келтіреді.

Пәндерді білім беру жүйесіне интеграциялауды енгізу қазіргі уақытта мектеп пен жалпы қоғам алдында қойылған міндеттерді шешуге мүмкіндік береді. Интеграцияланған сабақтар балалардағы әлемнің тұтас бейнесін қалыптастыруға, табиғаттағы, қоғамдағы және жалпы әлемдегі құбылыстар арасындағы байланысты түсінуге ықпал етеді. Интеграцияланған сабақта дидактикалық мақсаттарға танымдық, дамытушылық және тәрбиелік біліктілігі арқылы жақсырақ қол жеткізіледі.

Музыканың, бейнелеу өнері мен әдебиеттің интеграциясы өнердің рухани көкжиектерін ашуға үлкен мүмкіндіктер береді, оны халықтар арасындағы қарым-қатынас тілі, өткен дәуірлердегі және қазіргі замандағы адамдардың ойлары, сезімдері, іс-әрекеттері сақталған адамзат жадымен таныстырады. Осылайша, білім беру мазмұнын интеграциялау мәселесі өте өзекті және жан-жақты. Оның кешенді шешімі ұзақ уақыт бойы білім беру жүйесіне байланысты келіспеушіліктердің бүкіл тобын жоюға мүмкіндік береді.

Keywords: music, education, upbringing, unification, integration, improvisation, communication

Кілт сөздер: музыка, оқу, тәрбиелеу, біріктіру, интеграция, импровизация, қарым-қатынас

Білім берудегі интеграциялық процестер-бұл неғұрлым байланысты және кешенді оқыту жүйесін құру мақсатында әртүрлі білім беру пәндерін, әдістері мен тәсілдерін біріктіру. Интеграция идеясы білім мен дағдылардың әртүрлі салалары бір-бірімен өзара әрекеттесе алады, бұл оқушылардың терең және жан-жақты білім алуына ықпал етеді. Бұл сонымен қатар оларды қазіргі әлемнің күрделі сынақтарына жақсы дайындауға көмектеседі.

Интеграциялық процестер мыналарды қамтуы мүмкін:

1. Пәнаралық интеграция - белгілі бір тақырыпты немесе мәселені жан-жақты зерттеу үшін оқу пәндерін біріктіру.

2. Технологияларды интеграциялау - оқытуды жақсарту және әртүрлі ақпараттық ресурстарға қол жеткізуді қамтамасыз ету үшін оқу процесіне заманауи технологияларды енгізу.

3. Әлеуметтік-педагогикалық интеграция - оқушылардың әртүрлі қажеттіліктерін қамтамасыз ету үшін әртүрлі білім беру мекемелерінің, қоғамдық ұйымдардың және басқа институттардың ынтымақтастығы.

Білім берудегі интеграциялық процестер біртұтас білім алуға, барлық оқушылардың қажеттіліктерін қанағаттандыруға және оларды табысты әлеуметтік және кәсіби өмірге дайындауға ықпал етеді.

Музыка сабағын біріктіру - бұл басқа пәндерді немесе тақырыптарды оқыту үшін музыкалық әрекеттерді қолдану. Бұл оқу процесін ынталандыруға және оқушылардың жан-жақты дағдыларын дамытуға көмектесетін күшті және тиімді оқыту әдісі. Мысалы, музыка сабақтары тарихты, әдебиетті, математиканы, физиканы және басқа ғылымдарды зерттеуге біріктірілуі мүмкін. Музыка сабағын біріктіру сонымен қатар олардың эстетикалық дамуына үлес қоса отырып, оқушылардың жалпы түсінігі мен өнерге деген құрметін жақсарта алады.

Осылайша, музыка сабағын біріктіру оқушыларды оқыту мен тәрбиелеу процесін тиімді байытатын маңызды оқыту әдісін білдіреді.

Музыка сабағын біріктіру сонымен қатар шығармашылық ойлауды дамытуға, зейінді, есте сақтауды жақсартуға және оқушылардың әлеуметтік дағдыларын дамытуға ықпал етеді. [2]. Сонымен қатар, бұл әртүрлі пәндер арасындағы байланысты көрсетуге көмектеседі және оқытылған материалдың практикалық қолданылуын көрсетеді.

«Алайда, жоғарыда келтірілген анықтамаларда тұжырымдаманың жалпы сипаттамалары ғана берілген, бізді оның білім беру аспектісі қызықтырады, сондықтан біз тағы бір дәйексөз келтіреміз: «Білім беру жүйесіндегі интеграция - бұл белгілі бір оқу сатысында білім беру жүйесіндегі мазмұнның, әдістер мен формалардың бірдей бөліктері мен элементтерін тәрбиелеу мен оқытудың бірыңғай мақсатына бағыну» [1].

«Интеграциялық оқытудың бірнеше түрлері мен қалыптары бар.

Толық интеграция – қандай да бұзылыс түрі бар баланы қалыпты деңгейде дамып келе жатқан балалармен бірге мектепке дейінгі топтарда, сыныптарда оқыту. Толық интеграция психофизикалық және тілдік дамуы жас ерекшелік деңгейіне сәйкес немесе жақын және де балалардың қалыпты құрбыларымен бірге оқуға психологиялық тұрғыдан дайын жағдайда іске асырылуы мүмкін».

Тұрақты, бірақ толық емес интеграция – мүмкіндігі шектеулі мектеп жасына дейінгі балалар мен оқушыларға да пайдалы бола алады. Ол, психофизикалық дамуы жас ерекшелік деңгейі қалыптыдан сәл төмен, жүйелі және түзету көмегін қажет ететін, бірақ бірқатар пәндер аймағында қалыпты дамыған құрбыларымен бірге оқи алатын, олармен сыныптан тыс уақыттың көп мөлшерін өткізетін балалар үшін нәтижелі болады.

Жартылай интеграция – қалыпты дамудағы құрбыларымен қажетті іскерліктер мен дағдылардың аз ғана мөлшерін меңгере алатын, сыныптан тыс уақыттың аз ғана мөлшерін балалармен өткізе алатын балалармен нәтижелі жүргізіледі.

Музыка сабақтарында музыкалық білім туралы түсінікті байыту және тереңдету үшін интеграция бірнеше деңгейде жүзеге асырылуы мүмкін. Интеграция орын алуы мүмкін бірнеше деңгейлер:

Пәнаралық интеграция: музыка әдебиет, тарих, математика және тіл сияқты басқа пәндермен біріктірілуі мүмкін. Мысалы, музыкалық шығармаларды зерттеу кезінде сол кездегі тарихи және мәдени контекстті де зерттеуге болады.

Әр түрлі өнер түрлерін біріктіру: музыканы бейнелеу өнерімен, бимен және театрмен біріктіріп, оқушылардың шығармашылық ойлауын дамытатын интеграцияланған жасанды жобалар жасауға болады.

Технологиямен интеграция: дыбыстық және музыкалық материалдарды жасау және редакциялау, сондай-ақ музыкалық шығармалар мен сабақтарды ұсыну үшін заманауи технологияларды қолдану,

Әлеуметтік ғылымдармен интеграция: музыкалық жанрларды зерттеу және олардың қоғам мен мәдениетке, музыканың әлеуметтік және мәдени аспектілеріне әсері;

Әр түрлі деңгейдегі интеграция оқу процесін байытады, материалды толық түсінуге ықпал етеді және оқушылардың талдау, сыни ойлау және шығармашылық дағдыларын дамытады.

Біріншіден, бұл пәнішілік интеграция, егер бастапқы мәселе оқушылардың көзінен жоғалмаса, онымен байланысты білім шеңбері кеңейіп, тереңдей түседі. Мысалы, бұл музыкалық стильдерді дамытудың тарихи бөлімінде музыкалық тілді тану логикасымен біріктірілген

музыка теориясы мен тарихын игеру арасындағы интеграция. Интеграцияның екінші деңгейі - пәнаралық интеграция. Бұл белгілі бір негізгі тақырып немесе негізгі ұғымдар төңірегінде бірнеше оқу пәндерін біріктіру.

Музыканы білімге біріктіру оқушылардың дамуы үшін үлкен маңызға ие. Музыкалық дағдыларды, шығармашылықты дамытады, есте сақтау қабілетін жақсартады, зейінді дамытады. Ол сондай-ақ математиканы (ырғақ пен қарқын), әдебиетті (ән мәтіндерін құру және талдау), тіпті тарихты (музыкалық дәуірлер мен стильдерді зерттеу) түсінуді жақсарту үшін оқу жоспарларына біріктірілуі мүмкін. Сонымен қатар, музыка ұжымдық музыка арқылы оқушылардың өзін-өзі көрсетуіне және әлеуметтік интеграциясына ықпал етеді.

Қазіргі білім беруді интеграциялаудың теориялық негіздері білім алушылардың әртүрлі қажеттіліктері мен қазіргі әлемнің талаптарын ескеретін неғұрлым теңдестірілген және кешенді оқыту жүйесін құру идеясына негізделген. Бұл негіздерге білім беру жүйесін интегративті, тұтас және тұлғаға бағытталған тәсілге бағыттауын бірқатар ұғымдар, принциптер мен тәсілдер кіреді.

Қазіргі білім беруді интеграциялаудың кейбір теориялық негіздеріне мыналар жатады:

Пәнаралық байланыс. Білім мен дағдыларды тереңірек түсіну үшін әртүрлі пәндер мен пәндер өзара байланысты болған кезде оқыту тиімдірек болады деген;

Тұлғаға бағытталған тәсіл. Білім берудің мақсаты тек білім беру ғана емес, сонымен қатар мәдени, әлеуметтік, эмоционалды және психологиялық аспектілерді қамтитын жан-жақты тұлғаны дамыту болып табылатын негізгі тұжырымдама;

Қазіргі білім беру технологиялары. Неғұрлым серпінді және өзекті білім беру ортасын құру үшін ақпараттық технологияларды, оқытудың интерактивті әдістерін және онлайн-ресурстарды пайдалану;

Инклюзивті білім беру. Білім беру барлық адамдар үшін олардың ерекшеліктері мен қажеттіліктеріне қарамастан қол жетімді болуы керек деген қағида;

Ынтымақтастық және серіктестік. Неғұрлым интеграцияланған және үйлесімді білім беру ортасын құру үшін білім беру мекемелерінің, қоғамдық ұйымдардың, ата-аналар мен оқушылардың күш-жігерін біріктіру.

Сабақтарды біріктіру - бұл әртүрлі оқу пәндерін немесе тақырыптарды бір сабаққа немесе курсқа біріктіру процесі. Мұндай интеграцияның негізгі мақсаты - әртүрлі пәндермен немесе тақырыптармен байланысты білімді кеңірек және тереңірек түсіну және қолдану.

Сабақтарды біріктірудің бірнеше мақсаты бар:

Түсінуді күшейту: интеграция оқушыларға әртүрлі тақырыптар мен тақырыптар арасындағы байланысты көруге мүмкіндік береді, бұл оларға материалды жақсы түсінуге және есте сақтауға көмектеседі. Мысалы, тарихты зерттеу кезінде болып жатқан оқиғалардың мән мәтіні мен мағынасын толық түсіну үшін әдебиетті, өнерді және географияны біріктіруге болады.

Білімді қолдану: сабақтарды біріктіру оқушыларға нақты өмірде әртүрлі пәндерден немесе тақырыптардан білімді қолдануға және біріктіруге мүмкіндік береді. Бұл оларға оқу материалының пайдалылығы мен қолданылуын көруге көмектеседі. Мысалы, физиканы зерттеу кезінде математиканы біріктіріп, олардың білімін нақты есептерді шешуге қолдануға болады;

Кросс-дағдыларды дамыту: сабақтарды біріктіру оқушылардың сыни ойлау, проблемалық шешу, ынтымақтастық және қарым-қатынас дағдыларын дамытуға көмектеседі. Оқушылар әртүрлі көздерден алынған ақпаратты талдауды, шешім қабылдауды және ортақ мақсатқа жету үшін топта жұмыс істеуді үйренеді. Бұл олардың болашақта пайдалы болатын әмбебап дағдыларын дамытады;

Сабақтарды біріктіру сонымен қатар оқуды қызықты, практикалық және шынайы өмірге бағдарлауға көмектеседі. Бұл оқушыларға әртүрлі пәндер мен практикалық жағдайлар арасында байланыс орнатуға көмектеседі, осылайша олардың түсінігін жақсартады және олардың қатысуы мен оқуға деген қызығушылығын арттырады.

Музыкалық білім берудегі интеграция материалды неғұрлым толық және терең түсіну үшін әртүрлі пәндік салалардағы білім мен дағдыларды біріктіруді білдіреді.

Музыка сабақтарында интеграцияны қолдану бірнеше себептерге байланысты пайдалы болуы мүмкін:

Өнерді тұтас түсіну: Интеграция оқушыларға музыканы әдебиет, өнер, тарих және т.б. сияқты басқа өнер мен ғылым контекстінде қарастыруға мүмкіндік береді;

Шығармашылықты дамыту: басқа пәндермен интеграция оқушылардың шығармашылық ойлауын ынталандыруы мүмкін. Мысалы, музыканы әдебиетпен бірге қолдану оқушыларды өз шығармаларын жасауға немесе мәтіндерді музыка арқылы түсіндіруге шабыттандыруы мүмкін;

Шынайы өмірмен байланыс: музыканы басқа пәндермен біріктіруге оқушыларға музыкалық ұғымдардың нақты оқиғалармен, құбылыстармен және мәдениетпен байланысын көруге көмектеседі. Мысалы, әртүрлі мәдениеттердің музыкалық дәстүрлерін зерттеу география мен этнографияны зерттеумен байланысты болуы мүмкін;

Көп салалы дағдыларды дамыту: Интеграция коммуникация, ынтымақтастық, талдау және сыни ойлау сияқты жан-жақты дағдыларды дамытуға ықпал етеді. Бұл дағдылар оқушылардың өмірі мен болашақ мансабының әртүрлі аспектілерінде пайдалы болуы мүмкін.

Интеграцияланған сабақтарды өткізу болып табылатын білім беру мазмұнын интеграциялау мәселесін теориялық және практикалық зерттеуді қорытындылай келе, бұл мәселе өте өзекті және жан - жақты деген қорытынды жасауға болады, оны іс жүзінде зерттеу оқу процесін құруға, оқу мазмұнын құруға жаңаша көзқараспен қарауға мүмкіндік береді [4].

Өнер тұрғысынан музыка адамға тікелей жан-жақты әсер етуінің арқасында ерекше орын алады. Бірақ көбінесе музыканы «тыңдауға және музыкалық мәдениетті тәрбиелеуге үйрету үшін оқушыға музыка мен ән сабақтарында музыканың өзінен тыс жүру керек (байланысты өнер түрлеріне, тарихқа, поэзияға, әдебиетке, өмірлік жағдайлар мен бейнелерге). Сондықтан «музыка» пәні [3] көптеген басқа мектеп пәндерімен: тарих, әдебиет, математика, информатика, дене шынықтыру және басқалар жиі байланыста болады.

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Psychological sciences

THE CHALLENGES OF TEACHERS IN MANAGING THE PROBLEMATIC BEHAVIORS OF ADOLESCENT

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Abstract

Adolescence is a difficult period in the development from children into adults and a period when they withdraw from their responsibilities.

This study is based on a literature review of foreign and local authors about in order to analyze the problematic behaviour of adolescents in general and how to treat those problems in terms of teaching and learning.

Students during this period of development, usually lack motivation and are not clear about their place in the world. Therefore, teacher's role is to make sure that they are developing but also how they are developing. How can they help students go through adolescence so that they can be academically successful? Of course, there strategies which can have a positive impact on students academic life.

This study will try to give a clearer viewpoint of the Albanian learning and teaching environment in terms of adolescence psychology and their hard issues, the role and responsibilities of teachers to treat these issues and trigger motivation in learning as part of the solution to these problems in adolescents.

Keywords: adolescent, problematic behaviour, teacher's techniques, strategies, education.

Introduction

Adolescence is a difficult period in children's development and a period where they withdraw from their responsibilities (Asharaf, 2020). Students at this age usually lack motivation and are unclear about their place in the world. Therefore, teachers are a very important part of this process. Teachers spend more time with a child than their parent.

There are several strategies that can positively affect students. (Richard Beach, Deborah Appleman, Bob Fecho, Rob Simon, 2020). The teacher must be supportive, encourage interaction among peers, create a pleasant atmosphere in the classroom, be interested in the students and must show his/her interest in them, engage the students in the classroom, be efficient in classroom management, be trustworthy to students, and model appropriate behaviors in the classroom.

Teaching with adolescent can be complicated because there are many ways of parental resistance and they depend on different factors. However, what a teacher can do in the classroom is to encourage students and their attention to engagement by accepting them, making them feel safe and challenging.

The purpose of this study was to analyze the problematic behaviors of adolescents in the classroom and to identify the most common, disturbing and unacceptable behaviors from the teacher's perspective. By analyzing and identifying these behaviors, the possibilities of their treatment from the teachers' point of view will be examined.

In order to carry out this study, several objectives have been identified as issues for development.

- a. To identify the challenges and problems of adolescents in everyday life.
- b. To identify the challenges and problems of adolescent in school life.
- c. To analyze the behavior of the teacher in a problematic adolescent with inappropriate behavior.
- d. To analyze the techniques and strategies of the teacher in the classroom towards a problematic adolescent.

This study presents some research questions:

1. What are some challenges teenagers face?
2. What are the biggest problems teenagers have?
3. What are the most problematic behaviors that teenagers have in the classroom?
4. What are some of the behaviors of teachers to deal with problems?
5. What techniques and strategies should a teacher follow in the classroom with teenagers?

According to the general definition, adolescence is known as the period of the beginning of puberty, the transition from child to adult (AGARWAL, 2022). It is also the time when knowledge and skills are developed, how to manage emotions and relationships are learned, and qualities and skills are acquired that will be important for enjoying the teenage years and assuming roles as an adult.

Major changes that occur in adolescence

Biological changes: start with what we call maturity or puberty. These are the changes that occur to release sex hormones that affect emotions. Mood swings can increase and this influences relationships both at home with parents and others, but also in society and school.

Cognitive changes: Learning from success and failure is part of the challenge of the adolescent learning process. They are self-centered, thinking that they are being watched by others, and here they want to act as if they are the center of attention. They live in their own private world where they think they are invincible and cannot be hurt. All this is part of the complex process of becoming a separate and unique individual. As a result, these beliefs of theirs can lead them to think that no one understands them.

Psychological changes: the changes that the adolescent must face in the transition from childhood to adulthood. A new person is appearing among them, where the rules will change, more responsibilities will be assigned to them, therefore a new standard that must be maintained is required. Accountability starts to become an expectation, both from the parental and legal side.

Problems that arise during adolescence

Many of the mental health problems people experience as adults begin in adolescence, because young people may be dealing with anxiety, depression, or other forms of stress that are developmentally appropriate but not necessarily lasting (Psychology Today, 2019).

An important sociological approach to depression, regardless of gender, has to do with how it is interpreted by others. Depression can therefore be stigmatized in social groups when it is seen as a mental illness rather than a health problem, causing depressed young people to isolate themselves from others at a time when they should have the most support (Martin et al., 2007).

In fact, social reactions to adolescent stress can either have long-term effects on other areas of life, including education (Carter, 2020).

As for risky behavior, understanding why teenagers become more careless even though they are developing critical thinking is one of the main researches in this field.

Assessment of teacher-student communication

The main problem in building teacher-student relationships is creating a trusting interactive partnership. Most of the students say that they feel the lack of communication and discussion with the teachers about the issues that concern them. Even in the case of communication, a good part of teachers do not treat students as partners in communication. This happens because our school pedagogy carries strong doses of the authoritarian mentality of the past (Orhani., Z, 2011).

The researchers suggest that the rules should be stated in a positive context, be no more than five, and cover multiple situations. They should be appropriate for the age of the students and their level of development. They should be taught by teachers and implemented first by teachers to set a good example.

Treatment of problematic behaviors

Adolescents perceive the classroom as stressful, impoverished and hostile. For them, school is a relatively safe environment for the explosion of their anger and mistrust. It is recommended to use non-verbal techniques before verbal techniques (Ph.D, 2023). One technique involves stopping speaking immediately because the teacher can draw attention and increase awareness. Changing the character of the activity may be another method. The main goal is to draw students' attention to the topic or activity without interrupting other students and without disrupting the flow of the lesson (Hooper-Hodson).

Behavior modification techniques are based on the assumption that behavior, good or bad, does not occur if it is reinforced or rewarded while ignored and unreinforced behavior can disappear. In the classroom this means that undesirable behaviors occur because they are reinforced by the environment, while desirable behaviors are not reinforced and may not be established (Doula Nicolson, Harry Ayers, 2016). This technique gives the teacher the opportunity to carefully analyze the student's behavior to identify the factors that reinforce the unwanted behavior and to formulate strategies that will push these factors in the desired directions.

Methodology

The study was realized using the qualitative research method. The instrument used was an interview with 13 questions for the teachers of the 12th grades of the "Olsi Lasku" and "Beqir Çela" schools in the city of Durrës, Albania. Out of 30 interviews, only 25 were completed by the teachers. This study expects to find a link between the techniques and strategies currently used by teachers in the classroom, with the techniques and strategies suggested in the literature.

It was explained to the interviewees that their answers will be for study purposes only and everything will remain confidential.

Instrument

The research instrument used is the interview, which contains several sections:

The first section obtains demographic information, gender, age and experience of the teachers.

The second section provides information on the basic problems students have in the classroom.

The third section collects data on teaching philosophy for managing these disciplinary issues.

Results

The teachers included in the study were aged 25-35 years (15%), 35-45 years (40%) and over 45 years (45%), of which 80% were women and 20% were men.

An important aspect was experience in the profession as a teacher.

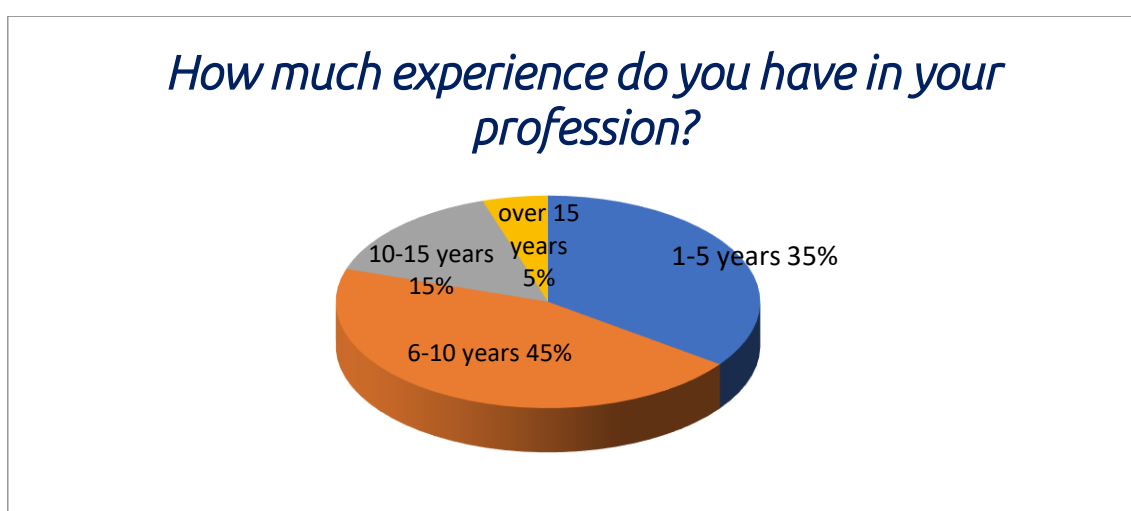


Figure 1. Experience of teachers

Figure 1 shows the experience of the teachers in their respective classes, namely the dominant percentage were teachers with 6-10 years of experience, i.e. 45%.

All participants affirm that there are problematic students in their classes, namely 100%.

Regarding the disturbing behaviors that arise during adolescence, most of the respondents were of the opinion that:

"Mental health is delicate, students feel depressed and anxious. They are grouped based on discrimination or class characteristics. Some feel discriminated against and excluded from socializing with their peers. They have very low self-confidence and self-esteem, which prevents even the most intelligent student from making progress in learning."

The biggest challenges teachers face with teenagers in the classroom are:

"Balancing different learning needs is a big challenge. Every student is different, some need extra help, some learn immediately others solve learning issues on their own."

"Most of my students do not understand the value of education because they have never seen the benefits that education gives them. I talk to them about their future and the goals they may have, guiding them in their educational path if they want for example to follow a certain profession, such as a doctor, or teachers, etc. As a result, they do not pay attention to what we teachers instruct because in adolescence it is known that what adults say they perceive as backwardness from the elders, and they know everything according to them."

Most of the participants regarding the students' self-evaluation answered as follows:

"Self-esteem is very important not only for teenagers but from early childhood. Having a sound mind, with sufficient self-confidence, a child grows up with self-love and the stages of adolescence can be easier. Because if you have a high enough self-esteem, at least in terms of academics, no matter how

difficult the stages of adolescence are, this feeling would help them to successfully pass any challenge in academic environments."

Question 8: Can you list for us some types of problem behaviors that prevail in your classrooms?

"Externalizing. Teachers rated externalizing behaviors as the most common in the areas of distractibility, hyperactivity, and immature behavior."

"A good part of the students are not interested in learning or lack concentration. Some others do not understand the instructions we give them and thus create problems in learning."

Question 9: How do you approach discipline in your classroom?

The majority of teachers think that:

"Discipline plays an important role in maintaining an effective environment for learning and it depends a lot on the teaching style, the age of the students and the school's policies, let's not leave them unmentioned. I make it very clear from the beginning what is expected in my class and what the limits are. From my experience, students do not react well if they are forced to be disciplined."

"Students want a picture where they agree to the rules, are respected as individuals in their own right, and are held accountable for what they do and say."

"I try to make the lesson interesting and engaging, but in serious cases of infractions, I follow the school's policies for those students, but that rarely happens in my classroom."

Question 10: How important is teacher-student communication as a good discipline technique?

The majority of teachers think that:

"Teenagers, 11th and especially 12th graders, have a lot of fun pushing you out of your limits and making us react negatively. But in these moments, the more nervous you become, the more the student thinks he has power over you and that he has managed to overcome your limits. So we should keep calm first, or ignore their behavior on other occasions."

"Since teenagers want a lot of independence, some of them tend to push the limits and put you to the test to prove their power. In such cases it is very important to set clear and specific boundaries to maintain a constructive relationship."

Question 11: What are some effective techniques and strategies for modifying problem behavior in your classroom?

Most of the respondents state that:

"The best strategy is to prevent behaviors before they happen. But in the case when it happens, the teacher has his own style of discipline. In my opinion, students should be constantly observed in their behavior, to see the signs of negative behaviors and prevent them."

"What I use in my classroom is that I try to create an academically friendly environment that can promote learning. I try to get them motivated by cooperating with each other."

"I set clear boundaries of dos and don'ts in the classroom. And also uses the technique of punishment and reward of achievements in lessons."

Question 12: What qualities should a teacher have to be successful in the classroom?

Regarding what makes a successful teacher in the classroom, most participants state that:

"Every teacher wants to be good, regardless of what qualities they should have as a standard. Teaching can be a passion to do well. Being a teacher, I know this well, not because I think I am the best teacher, but because I get along very well with the students and I believe it happens because of the teaching style and because teaching is my passion."

"Although every good teacher has a unique style, he must be very communicative, listen to students when they speak and build relationships with them."

"A good teacher must enjoy the subject he teaches, and know it well, so be prepared. Also be friendly with students while having a strong work ethic."

Question 13: What do you suggest teachers should do to manage adolescent problem behaviors in their classrooms?

Most of the participants state that:

"Not only teachers, but also parents should play an important role in the lives of teenagers. Both sides should try to find the best in these children and increase their self-confidence and make them feel unique in the character they are forming."

"Even though it is difficult in our schools, because bureaucracies do not allow you time to plan the right behavior with teenagers, especially with those who have disturbing behavior, I think that we as teachers should do a lot to guide them towards values, towards reading good and educational books."

"The reprimand for them should not be harsh and not in the eyes of others, because that way we encourage them to do worse. Let's not exaggerate even the smallest details that they present as

problems. In fact, we should encourage them to work hard and achieve academic success through positive reinforcement."

Recommendations

Recommendations for teachers and students:

The desired degree of control of the classroom by the teacher varies from teacher to teacher because some teachers consider discipline as the main goal of their teaching, seeing their primary role in the classroom to control and maintain discipline and the secondary role of teacher.

Therefore, these teachers take more action to prevent disruptive behavior in the classroom than to achieve certain educational objectives. But disciplined students who sit quietly in class does not mean they are learning but that they may be afraid of the teacher. If the students are obliged to be disciplined, the teacher also has the obligation to be disciplined. This situation has a positive effect on the atmosphere in the classroom and improves the conditions for the students to be filled with the knowledge of the teachers. The main goal of the teacher who represents this attitude is to develop the lesson and achieve the educational objectives in order not to terrorize his students.

Teenagers learn differently than young children. Some teachers expect these students to behave like children, while others want them to behave like adults. Teachers should remember that the main issue in adolescence is the search for individual identity. Friendship is more important to the teenager than the attention of the teacher.

In addition to the need for peer approval, there are a number of reasons why teenage students can be disruptive in the classroom. Reasons may be factors such as boredom, problems brought into the classroom from outside school, previous learning experiences or attitudes towards subjects and learning in general. The teacher's job during teaching adolescence is to encourage student engagement with material that is relevant and inclusive, but at the same time he or she must always be aware of the student's need for identity. There is no student more creative and responsible than the teenage student, but when things go wrong in the classroom, there is no student more disturbing and damaging to teachers' self-esteem than such a student.

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TRENDS OF FORMATION OF THE FATHER'S POTENTIAL IN THE FAMILY SYSTEM

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Historically, there has been a trend of close attention of society to the family and parenthood, and changes in society have led to a «crisis of family development». The redistribution of the role of father and mother created conditions for strengthening the authority of the man. Positive changes in the role and functional responsibilities of parents, value and personal manifestations, recorded by the researchers, actualized the significance of the study of the phenomenon of parenthood [1; 2].

The development of the family is influenced by various laws, among which the influence of a number of humanitarian disciplines of family formation is highlighted: psychotherapy, sociology, pedagogy, and jurisprudence. The attention of these disciplines confirms the importance of parenthood in the processes of forming a harmoniously developed personality. Modern science supports the «interdisciplinary nature of research in the field of family psychology», which, accordingly, is the second trend. The changing world has always been and will be under the watchful eye of ideologues and researchers whose views differ radically. The inclusion of worldview positions, accordingly, is the third trend. And, as a result, changes are taking place in the development of society, which lead to the appearance of the fourth trend – «the emergence of «forbidden topics» in research activities». These are the topics of same-sex marriage and children without parental care. Transformations in society lead to the emergence of the fifth trend: «the emergence of new subjects of research, within the framework of family psychology», in particular, as a result of the resistance to defeminization, an increase in the number of studies on the psychology of parenthood. The sixth trend confirms the high status of family psychology as a field of psychological science: «a number of fundamental scientific problems are solved in the subject field of family psychology», where the family is the basis of stability and full-fledged development of society. The listed trends highlight the relevance and necessity of studying the problem of family and parenthood, in particular, the relevance of a systematic study of the father's contribution to the child's mental development [2; 3].

In the structure of gender roles, there have been changes in recent years related to the manifestation of parental activity. Thus, as a result of revision and detailing by society of the function of parenthood, gender roles are divided and a new gender system is formed. Parenthood is a social and status role within the framework of gender psychology and personality psychology, where a combination of historical and social attitudes, accumulated experience related to family planning, affects the attitude towards children and towards oneself as a father [1; 3].

Among the causes of the crisis of parenthood, it is necessary to allocate the destruction of the traditions of the patriarchal family, which led to the secondary role of the father. Such an egalitarian system of the family led to a violation of the relationship between the older and younger generations and the transfer of upbringing experience [1; 2].

The identity of parenthood, as a micro- and macro-social phenomenon, is determined by the principles of the attitude of adults towards children and civic self-awareness. This is an emotionally and evaluatively colored complex of knowledge, ideas, beliefs about oneself as a father. Parental love is not innate, but is formed in the first years of a child's life as a response to certain social requirements and expectations of achievements. Thus, the emergence of parenthood as a phenomenon became possible when polygamy changed to monogamy in family relationships [2; 3].

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Sociological sciences

THE CONTENT OF PERSONAL INFORMATION SECURITY IN THE CONDITIONS OF WAR

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ЗМІСТ ІНФОРМАЦІЙНОЇ БЕЗПЕКИ ОСОБИСТОСТІ В УМОВАХ ВІЙНИ

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Постановка проблеми. У сучасному світі інформаційна безпека особистості стає однією з найважливіших проблем, оскільки з розвитком і поширенням інформаційних технологій, збільшенням об'ємів цифрової інформації, зростають можливості використання неповної, несвоєчасної та недостовірної інформації; випадки протиправного застосування інформаційних технологій, здійснення негативного інформаційного впливу, несанкціонованого поширення й використання інформації, порушення її цілісності, конфіденційності та доступності. Протягом багатьох десятиліть розвинені країни відпрацьовують тактику і стратегію ведення інформаційних війн, концепції яких передбачають створення засобів небезпечного впливу на інформаційні сфери інших країн, порушення нормального функціонування інформаційних систем, одержання несанкціонованого доступу до інформаційних ресурсів. Значну небезпеку при цьому представляє протиправне застосування спеціальних засобів впливу на індивідуальну, групову і суспільну свідомість, що спричинює девальвацію духовних цінностей і пропаганду зразків масової культури, заснованих на культі насильства та новостворених цінностях, що суперечать духовним і моральним цінностям, традиційно прийнятим у демократичному суспільстві [1].

Особливої актуальності проблема інформаційної безпеки особистості набула з початком повномасштабного вторгнення росії в Україну. Інформаційна безпека держави, яка зазнає збройної агресії, є уразливою і потребує комплексних дій щодо її захисту. Розуміння соціальних аспектів інформаційної безпеки є важливим для розробки ефективних стратегій захисту особистості від деструктивних впливів інформаційних потоків та формування її інформаційної культури і грамотності – умінні людини використовувати у повсякденному житті та професійній діяльності сучасні інформаційні технології, здатності сприймати і критично оцінювати інформацію, контролювати й розподіляти інформаційні потоки, визначати надійність джерел інформації, виявляти упередженість повідомлень, неясні або двозначні аргументи, логічні помилки в ланцюжку міркувань тощо [2].

Мета роботи – обґрунтувати зміст інформаційної безпеки особистості в умовах війни та схарактеризувати її соціальні аспекти.

Виклад основного матеріалу. Інформаційна безпека – це стратегічна категорія, яка є складовою значно ширших, багатокомпонентних понять, а саме: «національна безпека», «міжнародна безпека» тощо. В умовах війни інформаційна безпека може розглядатися в різних

аспектах: і як фактор соціально-економічного розвитку держави, і як відстеження та класифікація комп'ютерних й мережових загроз, і як збереження та захист технічної і мовної інформації, і як новий вид озброєння чи запобігання інформаційній війні. Значна частина сучасних дослідників визначають інформаційну безпеку як стан захищеності інформаційного середовища, що відповідає інтересам держави, за якого забезпечується формування, використання і можливості розвитку незалежно від дії внутрішніх і зовнішніх інформаційних загроз [3].

Основні аспекти інформаційної безпеки держави та особистості відображено в Конституції України. Окрім того, Указом Президента України від 25.02.2017 р. була затверджена «Доктрина інформаційної безпеки України», якою передбачено захист інформаційних прав і свобод громадян. З початком повномасштабного вторгнення росії в Україну Радою національної безпеки і оборони України (далі – РНБО) прийнято рішення «Щодо реалізації єдиної інформаційної політики в умовах воєнного стану» (від 18.03.2022 р.), в якому визначено, що «в умовах воєнного стану реалізація єдиної інформаційної політики є пріоритетним питанням національної безпеки» [4]. Наразі в Україні функціонує також Центр протидії дезінформації при РНБО України, на сайті якого можна ознайомитись з актуальною інформацією та подіями в цій сфері.

Зазначимо, що проблема інформаційної безпеки перебуває у постійному полі зацікавлення науковців. Права людини в умовах інформаційного суспільства вивчали І. Браун, В. Дрейк, Р. Йоргенсен, Д. Лайон, Л. Лессіг, К. Расерока. Проблеми забезпечення інформаційної безпеки держави, групи і окремої людини покладені в основу досліджень В. Гурковського, В. Копилова, Б. Кормича, В. Настюка, М. Швеця, А. Селіванова. Сучасні особливості інформаційного суверенітету та доктрини інформаційної безпеки України досліджують В. Бондаренко, Ю. Горбань, М. Дмитренко, Ф. Медвідь, Я. Михальський, А. Пишна, О. Черевко та ін. Незважаючи на значний науковий інтерес до проблеми інформаційної безпеки, багато аспектів її залишаються малодослідженими. Так, практично невивченими є зміст, фактори впливу, умови забезпечення та шляхи підтримки/оптимізації інформаційної безпеки особистості у цілому та в умовах війни зокрема.

Інформаційну безпеку особистості визначаємо як стан її захищеності від різноманітних впливів, здатних проти її волі та бажання змінювати психічний стан та психологічні характеристики, модифікувати поведінку та обмежувати свободу вибору. Вважаємо, що на стан інформаційної безпеки особистості в умовах війни діють інформаційно-пропагандистські та інформаційно-психологічні впливи, процеси життєдіяльності світового співтовариства та українського суспільства, рівень сформованості свідомості і сталість функціонування психіки особистості, здатність особистості існувати в сучасному інформаційному просторі. У структурі інформаційної безпеки автори виділяють: світоглядно-ментальну складову (знання, переконання, цінності й ціннісні орієнтації, життєві позиції та ідеали); когнітивну складову (уміння аналізувати й оцінювати інформацію, процеси суспільної життєдіяльності); культурологічну складову (знання технологій інформаційних та інформаційно-психологічних впливів, культура користування сучасними технічними засобами інформації та комунікації) [2; 5].

Інформаційна безпека особистості відображає значимі соціальні аспекти: рівень інформаційної культури, тобто теоретичної та практичної підготовки особистості, за якого досягається захищеність і реалізація її життєво важливих інтересів, гармонійний розвиток й задоволення потреб особи в інформації в умовах інформаційного суспільства незалежно від наявності інформаційних загроз; формування та використання інформаційного середовища в інтересах особистості; захищеність особистості від різного роду інформаційних загроз [3].

Небезпечним чинником в умовах війни, яка, безперечно, ведеться ворогом в повній мірі і в інформаційній площині, є інформаційні маніпуляції. Поняття «інформаційна війна», «інформаційна зброя» та «інформаційний тероризм» давно набули поширення, але в умовах воєнного часу вони набувають специфічного значення. Адже внаслідок дії інформаційних маніпуляцій серед населення можуть виникати панічні настрої, поширюватися загарбницькі наративи про необхідність припинення Збройними Силами визвольних бойових дій, уступок ворогу захоплених ним територій, відмови України від вступу до Європейського союзу, закріплення в державному та міжнародному правовому полі її позаблокового статусу та ін. Перелічені інформаційні маніпуляції є елементами інформаційної війни, її зброєю. Саме тому інформаційні маніпуляції вважаємо зовнішніми загрозами інформаційній безпеці як державі, так і особистості [2; 3].

Виокремлюємо такі групи загроз інформаційній безпеці особистості: технологічні (випливають із постійного вдосконалення технологій та відставання правового забезпечення їх функціонування, реалізують, здебільшого, як загрози безпеці інформації); соціально-правові

(пов'язані зі становищем людини у суспільстві і державі, а також можливістю реалізовувати свої соціальні, культурні, політичні та економічні права і свободи); особистісні (пов'язані безпосередньо з фізичною і психічною безпекою людини, що є необхідною умовою її якісної життєдіяльності, найважливішими абсолютними правами і свободами людини – на життя, здоров'я, тілесну недоторканість, недоторканість приватного життя, повагу людської гідності тощо) [1; 5].

В умовах повномасштабної військової агресії росії в Україні, коли цілий комплекс ворожої інформації розрахований на маніпуляцію суспільною думкою, свідомістю людини та подається з використанням фізіологічних та психологічних методів та засобів її сприйняття, важливого значення набуває питання такої складової інформаційної безпеки особистості, як її інформаційна культура. Вважаємо, що інформаційна культура особистості пов'язана з її спроможністю критично сприймати, аналізувати та оцінювати отриману інформацію.

У даному контексті важливо відзначити важливість освітньої складової інформаційної безпеки особистості, яка полягає в систематичному навчанні основ інформаційної безпеки та формуванню інформаційної культури у закладах середньої, передвищої та вищої освіти, в системі підвищення кваліфікації працівників органів державної влади та місцевого самоврядування, які працюють з інформацією [3].

Висновок. Таким чином, в системі національної безпеки інформаційна безпека є одним з пріоритетних видів безпеки та здійснює на інші види великий вплив. Захист інформаційної безпеки особистості є пріоритетним державним завданням, оскільки від нього залежить не лише безпека окремої людини, а й безпека суспільства та країни у цілому. Дотримання фундаментальних засад інформаційної безпеки особистості оберігає від руйнування систему загальних принципів організації її життєдіяльності. Формування інформаційної безпеки особистості є комплексною діяльністю уповноважених органів, спрямованою на захист людини. Пріоритетним завданням держави із забезпечення інформаційної безпеки особистості в умовах війни є вивчення основ інформаційної безпеки сприяння формуванню її інформаційної культури.

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Technical sciences

CAUSES OF FRACTURE IN INDUSTRIAL ACCIDENTS OF ELEMENTS AND ASSEMBLIES IN SERVICE. ASSESSMENT OF DEFECTS UNDER UNACCEPTABLE LOADS.

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Abstract

Non-destructive methods for examination and control of parts and assemblies of structures allow determining the probable causes of boils and fractures after unacceptable loads. Some of the evaluations made in the Laboratory of "Destructive Control" at the Institute of metal science, equipment and technologies with hydroaerodynamic center.

Keywords: non-destructive testing, visual examination methods, radiographic test method, capillary method.

1. Introduction

State authorities in the country such as Regional Departments of the Ministry of Interior and Investigation Department at the relevant departments provide us with material evidence from materials and assemblies that have led to industrial accidents or accidents after improper use of metal equipment.

The tests were performed at the Laboratory of non-destructive testing in IMSETHAC-BAS- License I-1193 registration number 04328 for using of ionizing ray sources for scientific and economic purp

2. Test methods

Visual control – tests are according to standards [1]. Rent-rate and penetrating liquid testing according to standards [4],[5],[6],[7].

Non-destructive control with radiation methods and with roentgen defectoscope of type 200/5 model MXR-200. Technical parameters: spot focus 2,45x2,80 mm; anode current 5 mA; tension 180 kV at measured equivalent dose 0,210 mSv with tapping $\pm 0,8$ %. Work conditions and reading of the roentgenograms are conformity with Standards BDS EN ISO [1, 3].

Calibration and certification -in accordance with - Industrial X-ray system MXR 200 (No 201017) Certificate of calibration №553-Ro/22.05.2020; Negatiscopes KL-1500 (No 151) Certificate of calibration №462-HC/21.06.2018; Radiographic technology B; film system C4, film D7.

Capillary control was performed according to standards [4], [5], [6], [7].

Equipment used: Caliper № 187, Certificate of calibration № 187-ID/03.12.21;

Lux meter MS6610: № MBFG077505, Certificate of calibration № 35-OI/11.03.2022z;

Set penetrants: DIFFU-TERM 890, 871, 860, Certificate of 07.11.2022.

3.1 Product: Metal materials and forging. Test to clarify the reasons for breaking a hydraulic hammer workpiece plunger with No FUKOKAWA.

Details of a geological exploration company – piston fig.1a and fig b position №8 on structural documentation – from broken hydraulic hammer FUKOKAWA.

The specimen is of steel type 40Ch2N2MA. DIN analogue 1.6565 40NiCrMo 6; Analogue: Japanese brand JAPAN JIS No G 4103 steel grade SNCM8 type.



Fig.1 a

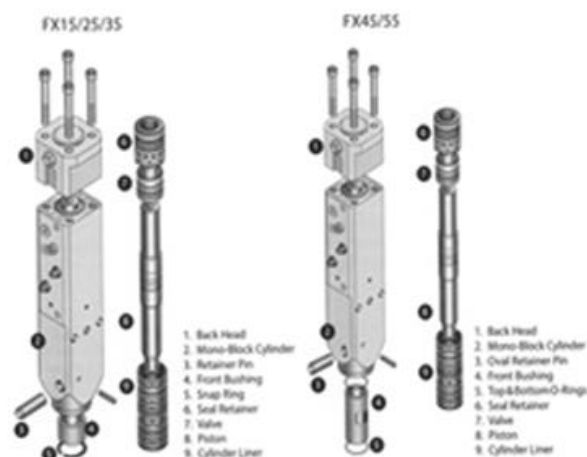


Fig.1 b

The rolled steel of the above-mentioned material is 160mm and within the limit of 100÷400 mm is with subsequent heat treatment of the forgings – tempering 850 °C in oil and annealing at 610 °C, which allows a workpiece made with additional machining to be loaded to an impact of 5120 J energy according to the BDS EN 10002-1:2000 documentation.



Fig.2

X-ray photo

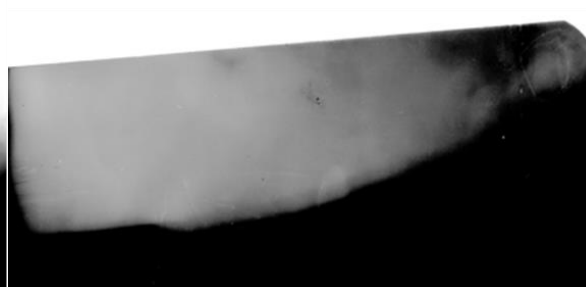


Fig.3 X-ray photo

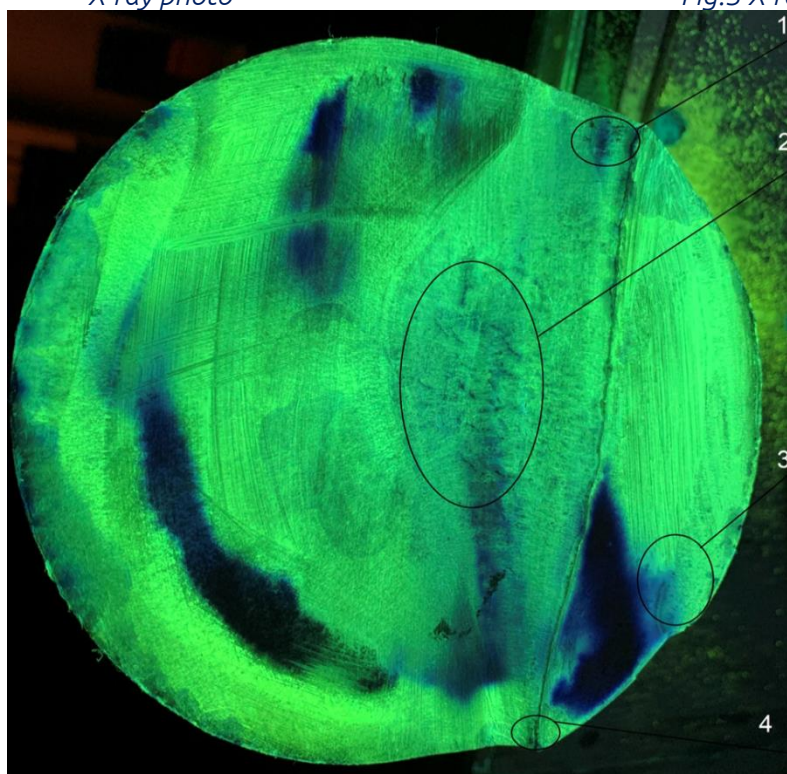


Fig.4 Analysis with penetrating fluids of workpiece 1.a

1-cluster of pores in the fracture region and an incipient crack about 35 mm long

2-cracks min 15 pieces with lengths between 1.5 and 12 mm

3-single pores between 0.5 and 2 mm

4-pores and a crack measuring about 9 mm

After the radiographic control according to the current standards BDS EN ISO [1] and [3] Figs.2 and 3 show the found inadmissible gaps $A > 10\%$.

3.2 Product -Metal elliptical element part of screw and plastic part to clarify the cause of its breakage-Fig.5.



Fig.5.

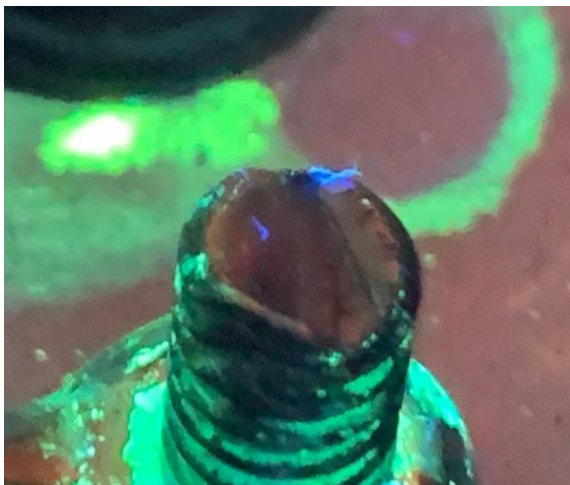


Fig.6

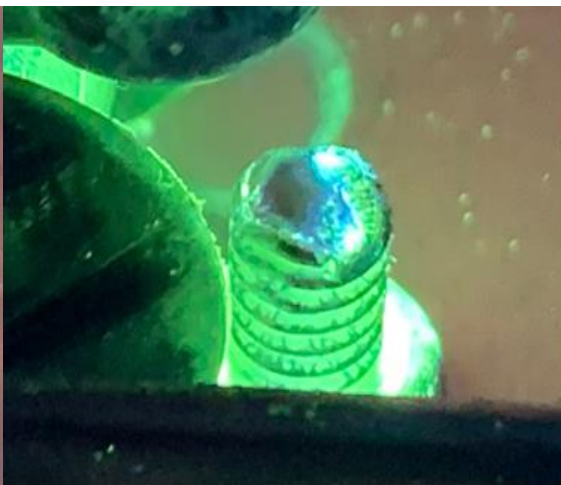


Fig.7

- Capillary NDT. It was found in compliance with standards [3],[4],[5] and [6]. Pores /Fig.7 / with a length of more than 0.5 mm and cracks /Fig.6/ with a length of 2.2 mm, 3 mm and a main crack with a length of 4÷5 mm were found.

4. Conclusion

The detail of the FUROKAWA FXJ 275 hydraulic hammer was broken due to the large number of cracks inside the forging, as well as pores and cracks at two diametrically opposite ends that led to a highway crack.

Established defect $A > 10\%$

Non-linear indication $\Phi > 0.5\text{mm}$ - CP3, LP7

Linear indication $L \geq 12\text{ mm}$ -CP8,AP8

In the second detail – part of an elliptical element with screw M6 clearly distinguish two zones: brittle and plastic. The area occupied as a result of the brittle destruction of the element is twice as large as the plastic zone. The registered cracks inside the forging, as well as pores (in blue) at the two

diametrically opposite ends, clearly show the dividing line of destruction. The demolition area clearly indicates that the load is above the allowable. Unfortunately, the element was part of the equipment for climbers and shearing the stem of the bolt could have caused the climber to slight.

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ISSUES INCREASING THE QUALITY OF ELECTRIC POWER 0.4 KV HOUSEHOLD APPLIANCES DUE TO VOLTAGE REGULATION**Karimov Rakhmatillo Chorievich***Doctor of Philosophy in Technical Sciences (PhD), assistant professor,
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Republic Uzbekistan, Tashkent***Abstract**

The article discusses a way to improve the quality of electricity up to 0.4 kV of household appliances through voltage regulation. A booster transformer with two secondary windings connected in accordance with the primary winding is used as an actuator. High-speed non-contact voltage relays are used as a sensitive device to changes in input voltage, as well as a device that switches the secondary windings of a booster transformer.

Keywords: *power quality indicators, voltage deviation, contactless switching device, non-contact voltage relay, thyristor, optothyristor, capacitor, booster transformer.*

Introduction

In Uzbekistan, the quality indicators of electrical energy in the power supply system are characterized by eleven indicators approved by the State Standard of Uzbekistan O'zDSt-1044:2003 and the Interstate Standard GOST-32144-2013 [1-2].

The quality of electricity must be considered as two views connected with each other: electricity as a product, the quality of which must meet well-defined market requirements and electricity capable of performing work in the process of its production, transmission, distribution and consumption [3-4].

According to the requirements of a market economy, when providing consumers with high-quality electricity, legal norms and requirements apply to all participants involved from electricity production to its consumption.

For normal operation, each electrical receiver requires certain network parameters, such as: rated frequency, voltage, etc., i.e. high-quality electrical energy [5-6].

The reason for the deterioration in the quality of electricity generated by power plants may be the poor technical condition of lines and transformer substations, as well as the distance of consumers from the power source [7-9].

For all of the above types of operating modes of the electrical system, power quality indicators or their permissible values in magnitude and duration are standardized separately.

Review and discussion

Electricity, as a special type of product, has certain characteristics that make it possible to judge its suitability for various production processes.

The set of characteristics under which power receivers are able to perform the functions inherent in them are united by the general concept of power quality, along with reliability and safety, which is one of the mandatory requirements for power supply systems. The quality of electricity is characterized by a set of properties and indicators. Ensuring the required quality of electrical energy is a problem that is solved during its generation, transmission, distribution and consumption. The main parameter and indicator of the quality of electrical energy is considered to be voltage and its quality. The task of managing the quality of electrical energy is to ensure technical acceptable values of quality indicators at the terminals of electrical receivers of electrical energy. Deviation of these indicators from the permissible values leads to disruption of the normal operation of electrical receivers, a reduction in their service life, the occurrence of defective products, and a decrease in productivity in industry, i.e. to various damages [10-13].

In the field of electrical energy quality management, significant results have been obtained that correspond to the achieved level of means for measuring electrical energy quality indicators. It was the means of measuring voltage quality indicators that made it possible to take the next step in solving the problem of improving the quality of electrical energy [14-17].

To quantitatively assess the quality of electricity, a system of single or generalized (integrated) indicators is needed so that the quality is measurable, comparable and accessible for monitoring and management.

Power plants produce electricity of sufficiently high quality, and deterioration in the quality of electricity occurs during its transmission and consumption as a result of the influence of electrical receivers. The characteristic properties of electricity necessary to determine the requirements for a system of electricity quality indicators are as follows [18-20]:

- with symmetry and sinusoidality of the three-phase voltage system and voltage and frequency values equal to or close to the nominal values for electrical equipment, the requirements formulated above are almost completely satisfied. The greatest economic efficiency can be achieved with some deviations from the specified conditions;

- the adverse impact on consumers can manifest itself either constantly, through the accumulation of irreversible changes (defects or under-supply of products, aging of insulation, etc.), or abruptly (failures or malfunctions of automatic devices, explosions of capacitor banks, etc.). This circumstance indicates the need to limit the permissible values by reducing the quality of electricity that determine these negative impacts;

- electromagnetic and other characteristics of electrical systems and consumer power supply systems change over time, as a rule, according to probabilistic laws, therefore changes in the quality of electricity are random variables.

One of the reasons for the deterioration in power quality is the so-called voltage dips, which are observed when switching powerful loads: semiconductor converters, etc. Voltage dips lead not only to a deterioration in the performance of electrical receivers at such enterprises, but also to a complete stop of the entire technological process. For example, up to 0.4 kV of household appliances causes great damage [21].

There is a large number of works devoted to voltage regulation using transformers and autotransformers by changing the transformation ratio. However, switching of branches of transformer windings occurs due to electromechanical contacts, which reduces their speed [3, 21].

Devices that could compensate for voltage dips in the supply network must meet the following requirements: speed and sensitivity to changes in the voltage at the input of the device [22].

Research of contactless devices

This article discusses the main indicators of power quality - voltage deviation and, in order to ensure stability, we will consider an analysis and overview of the work [1-2, 7, 23].

Such devices include booster transformers with contactless switching of secondary windings. The executive body that switches the secondary windings of booster transformers, which meets the above requirements, is a non-contact voltage relay developed at the Electrical Engineering Department of Tashkent State Technical University, the diagram of which is shown in Fig. 1.

It is known that by controlling the triggering moment of the thyristor, you can influence the shape of the load current curve. If the phase shift φ between the beginning of the "positive" half-cycle of the anode voltage and the beginning of the forward current flow is zero, the shape of the load current curve will be sinusoidal. The article examines the circuit of a thyristor voltage relay with a non-sinusoidal voltage curve across the load. For many electrical installations this is not the nominal operating mode. To ensure the sinusoidal shape of the current and voltage curves at the load, it is necessary to achieve the opening of the thyristor when the current passes through zero. Figure 1 shows a schematic diagram of a non-contact voltage relay with a sinusoidal voltage across the load [20-24].

A non-contact voltage relay works as follows. When a certain input voltage value is reached, the unlocking signal on the control electrode of thyristor VT2 will be sufficient to open at an angle of 90° . After opening the thyristor VT2, the thyristor VT1 opens and the capacitor C is charged to the voltage of the secondary winding.

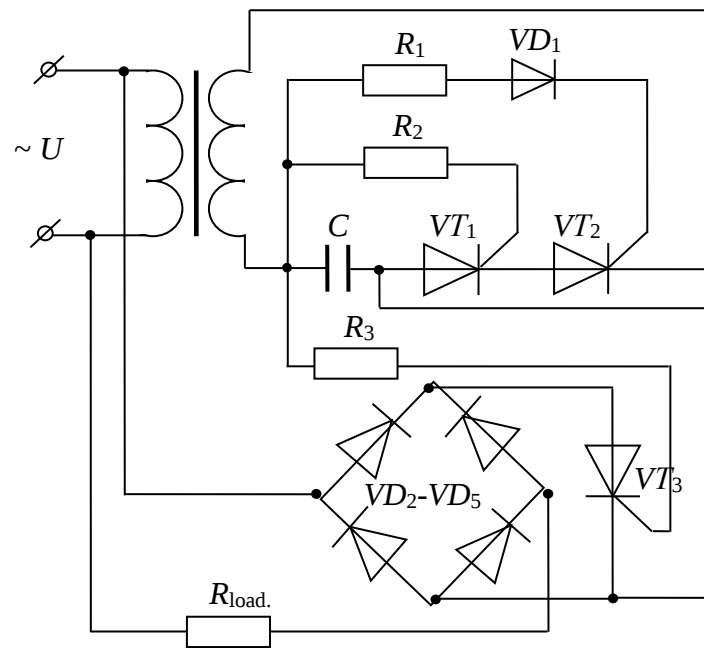


Fig.1. Schematic diagram of a contactless thyristor relay voltage

At the same moment, a control signal pulse is supplied from the plates of capacitor C to the power thyristor VT_3 , which has the shape shown in Fig.2. Since a direct current signal is supplied to the control electrodes of thyristor VT_2 , it remains constantly open, and a sinusoidal current will flow through the load R_4 . The triggering moment of thyristors VT_2 is regulated by selecting the parameter of resistor R_1 . During testing, thyristors of the type KU202I, KU202I, KU202R were used as thyristors, VT_1 , VT_2 , VT_3 , respectively, as a diode bridge KT402B, as active resistances R_1 , R_2 , R_3 , R_4 , respectively 5.6 kOhm, 160 Ohm, 390 Ohm, 2.4 kOhm, capacitor C is a capacitor with a capacity of 30 μF , a single-phase transformer with a voltage of 220/20 V is used as a transformer. Experimental studies showed that the load $R_4=2.4$ kOhm was connected to the network at a voltage of 200 V [21-26].

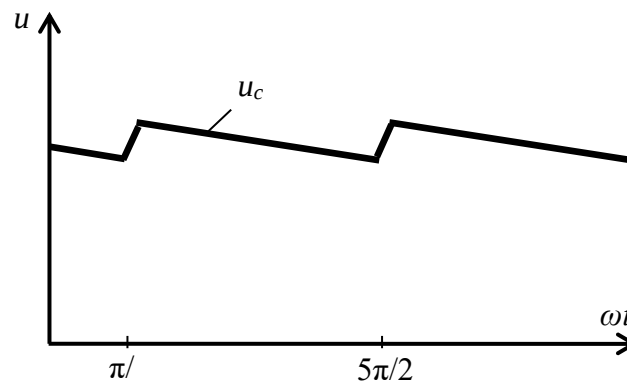


Fig.2. The shape of the voltage curve across the capacitance

We know the contact circuit for turning on and off the windings of a voltage booster transformer. The disadvantages of such devices are the use of a ferromagnetic element and an electromechanical key in the control unit, an increase in weight and dimensions, and also relatively low operational reliability. A non-contact device that is built using a voltage boost circuit has its own advantage - the switching process is carried out without interrupting the current through the load during switching of power switches [10].

By using contactless voltage relays, a control system for a booster transformer has been assembled, providing the rated voltage at the load when the voltage in the supply network decreases (Fig.3).

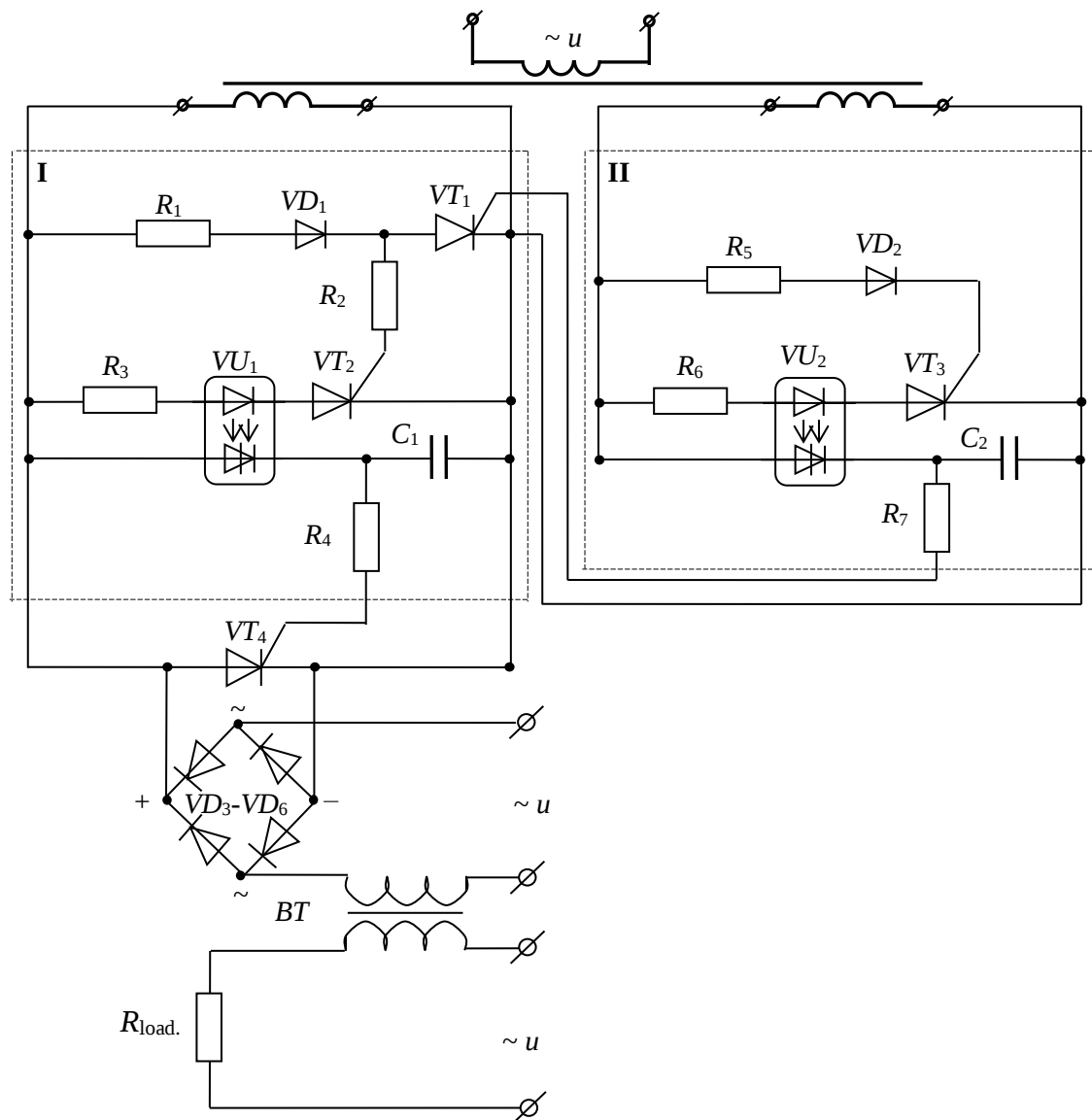


Fig.3. Schematic diagram of a non-contact device for turning on/off the windings of a voltage booster transformer

In Fig.3. shows a schematic electrical diagram based on a non-contact voltage relay for switching on and off the winding of a voltage booster transformer. The device consists of two contactless relays based on optocouplers. When a certain value of the input voltage is reached, the I-relay is activated and a control signal is sent to open the power thyristor VT4, which turns on the winding of the voltage booster transformer into the network. With a further increase in the input voltage, the II voltage relay is triggered, shunting the diode circuit VU1 of the optocoupler I-relay with its thyristor optocoupler circuit. Thus, stopping the access of the control signal to the power thyristor, i.e. The power thyristor is turned off as soon as the load current passes through zero [22-26].

Let's consider the circuit of a contactless switching device (Fig.3) based on a contactless voltage relay. The winding of the voltage booster transformer is connected to the network via a diode bridge VD3-VD5; a controlled power thyristor VT4 is included in the diagonal of the diode bridge. Control signals are supplied to the control electrode of the power thyristor through resistor R4 from the plates of capacitor C1 (I-relay), which in turn is connected to the secondary winding of a low-power transformer through two low-power controlled thyristors VT1, VT2. The control signal for thyristor VT1 is supplied from the secondary winding of a low-power transformer through R3 connected in series. The control signal for thyristor VT2 is supplied from the secondary winding of a low-power transformer through series-connected R1, R2 and diode VD2, as well as through resistor R5, since thyristor VT3 is closed. The winding of the voltage booster transformer is disconnected from the network due to the action of the second voltage relay (II), containing a limiting resistor R4 through which a signal is supplied to the control electrode of the thyristor VT3. Opening thyristor VT3 will turn off the control signal of thyristor VT2 (I-

relay), thereby closing VT2 and this will turn off the control signal of power thyristor VT4. The rest of the relay (II) circuit is carried out in the same way as for relay (I). Variable resistors R2 in both relays serve to regulate the relay operation setting [1-2, 12, 22-26].

The developed circuit of a non-contact device for turning on and off a booster transformer has improved weight and dimensions and ensures high reliability [22].

This contactless thyristor device was tested in the laboratory of the Department of Electrical Engineering. In this case, thyristors of the following types were used as thyristors VT1, VT2, VT3, VT4: KU202ZH, KU201K, KU202N, KU202E; as diodes VD1, VD2 - D226B, as active resistances R1, R2, R3, R4, R5, R6, R7, Ryuk, respectively, resistors of 820 Ohm, 5.1 kOhm, 1.3 kOhm, 6.8 kOhm, 22 kOhm, 24 kOhm, 6.8 kOhm, 20 kOhm, capacitors C1 and C2 are 500 V AC capacitors with a capacity of 2 μ F, MOS thyristor optocouplers are used as optocouplers VU1 and VU2, diode bridge VD3-VD6 - KTs402V. Experimental studies showed that the voltage booster winding of transformer 3 was connected to the network at a voltage of 190 V and turned off at a voltage of 220 V [8, 12-16].

Figure 4 shows the input-output voltage characteristic of this device.

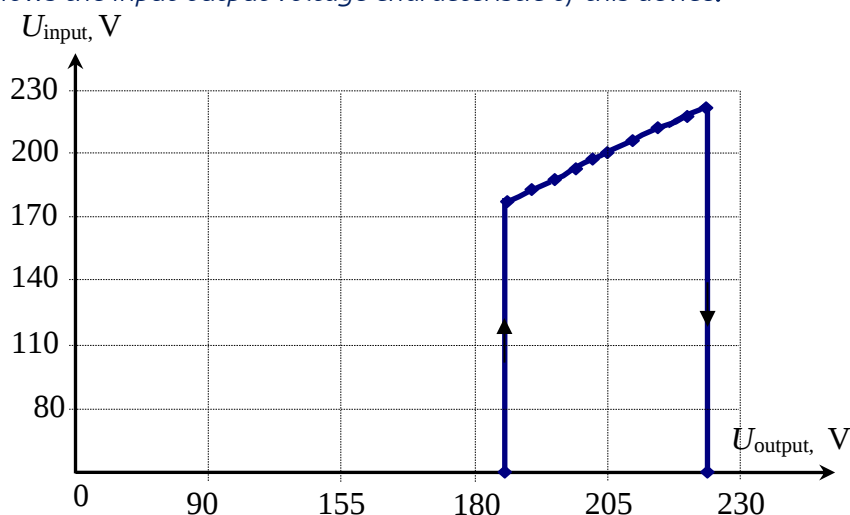


Fig.4. Input-output voltage characteristic

Experimental analysis of contactless voltage relay

In the research laboratory of the Department of Electrical Engineering of the Tashkent State Technical University, using an oscilloscope of the LeCroy WaveRunner 64 Xi-A type, experience was given and experimental data were obtained for the amplitude value of the voltage. Oscilloscope type WaveRunner 64 Xi-A 64 MXi-A was developed by the leading company LeCroy USA in the production of digital oscilloscopes (<https://www.rlocman.ru/op/tovar.html?di=59773&/WR-64MXi-A>).

Figure 5 shows an experimentally obtained oscillogram of the change in voltage for an active load using a non-contact voltage relay in the control system for switching the windings of a booster transformer.

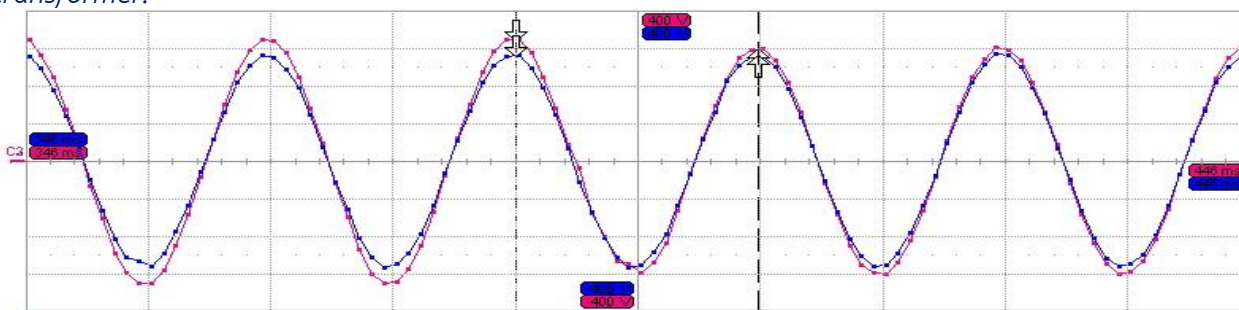


Fig.5. Oscillogram of the voltage change "input-output" of the voltage relay

Conclusions

The results of the experiment show that a non-contact voltage relay in the control system produces switching of the windings of a voltage booster transformer with a control voltage of 18 V in 0.32 seconds.

Thus, the purpose and objectives of the article are to obtain the results of the study:

- developed a non-contact voltage relay;

- using a control system for switching the windings of a voltage booster transformer, a non-contact device circuit is proposed;

- the use of the device led to energy-saving technology, reducing energy consumption.

Testing a prototype voltage relay ensures that the voltage deviation is within acceptable limits of $\pm 5\%$, which leads to improved power quality.

Based on the analysis of the developed voltage relay, a device circuit for contactless switching of the windings of a voltage booster transformer was proposed in the control system.

The energy characteristics obtained from the control of the windings of the voltage booster transformer, contactless switching, show a high degree of reliability.

Thus, using this device, you can maintain the load voltage stable.

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