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This collective monograph offers the description and analysis of the formation and development of civil society institutions at various levels of government in the field of politics, economics, education and culture. The authors of individual chapters have chosen such point of view for the topic which they considered as the most important and specific for their field of study. Theoretical and applied problems and the existing legal base of practical activities of civil society institutions in the context of growing interdependence of economic, cultural, demographic, political, environmental processes are investigated. The prospects for the further development of civil society and its institutions, their relations with the state, as well as the promotion of the participation of civil society organizations in socio-economic development.

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COMPLEX OF SYSTEM-DYNAMIC SIMULATION MODELS OF MANAGEMENT AND CONTROL OF STOCKS OF PHARMACEUTICAL PRODUCTS

Abstract. *The structure of the complex system-dynamic models of inventory management of pharmaceutical products is the proposed in this paper. Models are based on the synthesis of methods for analyzing inventory management systems and system of dynamics methodologies. Models allow us to solve current problems of inventory management, taking into account the stochastic processes that are inherent in business processes of the functioning of inventory management systems. Reflection of random processes generated by demand in the system-dynamic model of pharmaceuticals inventory management allows to realize the principles of market approaches to management. This contributes to the improvement of the assortment and communication policy of the pharmaceutical enterprise and the creation of a basis for increasing its competitiveness. The structure of the complex of system-dynamic models of management and control of pharmaceutical products is a holistic, multifunctional accounting and analytical system of management of a pharmaceutical company.*

JEL Classification: C 150, P 420

Introduction.

Irrerspective of the area of operation of a business entity, its effectiveness is determined by the level of consistency of goals, objectives, means of converting raw materials into products and services, the structure of functional units and personnel, whose membership depends on the features of a particular operating model that are developed and implemented in the enterprise. The absence of contradictions between these variables of the internal environment of the enterprise allows not only to achieve a positive result of economic activity, but also to ensure the timeliness of the transformation of a certain management of the operating model in the conditions of economic instability. This is particularly true of the pharmaceutical industry as one that is currently not only one of the most dynamic, but also promising and cost-effective, and as a result represents an important segment of the national market of any state. At the present stage of development of the pharmaceutical market of Ukraine, the need for constant initiation of ensuring the efficiency of managing dynamic stocks of pharmaceutical products is becoming increasingly important due to the need to achieve a balance between the decisions on minimizing storage costs by pharmaceutical enterprises and the optimal dynamics of replenishing pharmaceutical stocks while solving the problem of meeting the demand for pharmaceuticals products.

In other words, the management of stocks of pharmaceutical products includes ensuring the demand of the population and health care institutions in pharmaceutical products and preventive actions from excessive marketable mass, which leads to overstocking, exclusion from circulation of financial resources, slowing down their turnover and increasing costs for ensuring the maintenance and storage of pharmaceutical goods.

Performing functions of optimizing stocks of pharmaceutical products contributes to the release of a significant portion of operating cash, reducing the risk of a shortage of pharmaceutical products, and increasing the level of satisfaction of the population's demand. All this leads to an improvement in the quality indicators of customer service, an increase in the efficiency of turnover, cost-effectiveness and image of a pharmaceutical company. That's why , it is necessary to use special methods and models to optimize the level of dynamic stocks of pharmaceutical products, in particular, system-dynamic simulation models of managing pharmaceutical stocks, which take into account random processes generated by demand.

System-dynamic models allow to get information describing the trajectory of development of the system, its behavior in equilibrium states and features of the transition from one state to another when varying the values of parameters or model variables.

The usage of a system-dynamic approach to manage dynamic stocks of pharmaceutical products allows you to combine elements of the information-logical structure of the inventory management system to provide a quantitative basis for the formation of an effective management strategy and a long time interval and is a precondition for making sound management decisions.

1. Computer tools for building and analyzing of system-dynamic models.

Using the methodology of system dynamics in modern practice of decision making under uncertainty is one of the most common and effective approaches to the analysis of complex systems, which are characterized by heterogeneity of elements and connections and a variety of structure. The methodology of system dynamics was first proposed by the American engineer J. Forrester, as an approach to modeling and simulating behavioral aspects in the operation of complex systems, taking into account the time factor [7]. This approach involves statistical modeling of the behavior of probabilistic systems using traditional mathematical methods. As far as the system dynamics uses the tools of object-oriented programming, the analysis of the structural scheme of the system can be carried out by a decision maker without experience in higher mathematics and programming.

So, the formalization of the task of managing dynamic stocks of pharmaceutical products and controlling certain processes in terms of system dynamics has practical significance. According to the system of dynamics methodology, economic, behavioral, structural, and balance relations, which describe the processes of managing dynamic stocks of pharmaceutical products, are formalized by a simulation model using the following structural elements:

- Level - a drive that accumulates changes in the flows of all subsystems of the warehouse system by taking into account incoming and outgoing values in integrating links, and describes its state at any time *t*.
- Pace - a flow that changes the values of the levels of the warehouse system by implementing the movement of material and financial resources between the corresponding model variables and is controlled by one or several system levels.
- The function of decisions - mathematical relationships that determine the intensity of the pace in the inventory management system and characterize the functional dependencies between the auxiliary quantities and parameters, describing the business processes of inventory management of pharmaceutical products.
- Auxiliary variable - variable system-dynamic model of inventory management of pharmaceutical products, is used to determine the characteristics of the inventory management system.
- Parameter - value that remains its value over a period of time and is used in determining the auxiliary variables, rates and levels of the system-dynamic model of inventory management of pharmaceutical products.

The procedure for constructing a system-dynamic models of pharmaceutical products inventory management and control of these processes includes the following steps [7]:

1. Statement of the problems of managing of dynamic stocks of pharmaceutical products and formulating the corresponding research goal.

2. Filtering and distribution of current information in accordance with the peculiarities of the functioning of a pharmaceutical enterprise.

3. Formation of a conceptual model for managing dynamic stocks of pharmaceutical products.

4. Building a computer model for managing of dynamic stocks of pharmaceutical products using visual simulation tools.

5. Planning of simulation experiments (strategic planning) and determining the method of conducting a series of tests (tactical planning), which is provided for in the plan of research of the behavior of a pharmaceutical enterprise as a dynamic inventory management system.

6. Imitation of the behavior of the model of management of dynamic stocks of pharmaceutical products, which was built during the implementation of the previous stages, and testing its resistance to the effects of random factors with the subsequent processing of the research results.

7. Based on the simulation experiments that have been carried out and the analysis of their results in providing recommendations for improving the structure of the simulation model for managing dynamic stocks of pharmaceutical products.

Among the mentioned above stages of building system-dynamic models for managing dynamic stocks of pharmaceutical products, one of the most important and, at the

same time, the most difficult is the stage of determining qualitative dependencies between the best effect criteria, constraints and many parameters and variables that characterize the activities of a pharmaceutical company as a warehouse system . The result of this process is the formation of the structure of the conceptual model, which is the “ideological” basis of the computer simulator model.

The conceptual model is a sign oriented graph [8]. The display of dynamic hypotheses regarding the interaction of elements of a complex system should be carried out according to the following rules, determining the nature of the relationship between the parameters and variables of the system-dynamic model:

- the nature of the influence between the variables of the conceptual model is positive (negative) in the case when other things being equal, an increase (decrease) in the variable causes an increase (decrease) in the variable B;
- a feedback loop is formed between the variables of the conceptual model, if from variable A to variable B you can explore a closed chain of interconnections (regardless of the number of variables included in the loop) ;
- feedback circuits have a sign, the definition of which depends on the nature of the relationship between all the conceptual model variables included in the contour;
- feedback loop is positive if a change in any variable that forms it stimulates a change in other variables along a given path in the original direction;
- feedback loop is negative if a change in any variable that forms it stimulates a change in other variables in a given loop against the initial perturbation.

The presence in the structure of the conceptual model of a positive feedback loop, as a rule, leads to imbalance of the system, and a negative feedback loop contributes to maintaining a stable state of the system regardless of external influences. That means that using the concept of feedback loops in order to build a conceptual model of pharmaceutical inventory management will allow to combine initial actions on their results, which, in turn, will contribute to changing the characteristics of the operating conditions of a pharmaceutical company and, therefore, is a lot of information that can further contribute to the change of the elements of the model.

It is proposed to implement the realization of a set of simulation models, in particular, a system-dynamic model for managing stocks of pharmaceutical products and a system-dynamic model for controlling stock management processes for pharmaceutical products through the use of a visual diagram-oriented language for simulation Powersim.

The Powersim application package is nowadays most widely used by economists and analysts in various areas of activity in solving problems of determining the structure of complex dynamic systems and making assumptions about the trajectories of their behavior both in real time and in the long term [3, 4] .

First of all it is due to the fact that the Powersim software tool is a powerful tool for building and analyzing system-dynamic models, which makes it possible to implement

various scenarios of simulation experiments and in an accessible form to demonstrate the simulation results to the decision maker in order to develop the most effective management decisions.

The Powersim application software package interface provides for designing diagrams describing the business processes of a complex system in terms of the system dynamics methodology of J. Forrester, which makes visual programming simple and convenient from the point of view of the available structural elements.

The list of commands and the syntax of the built-in functions of the Powersim application package depend on the chosen layout according to the professional skills and personal wishes of the user, namely: demo, standard or professional versions of the software product [4].

As the benefits of using the Powersim structural modeling package for the practical implementation of the system-dynamic model of managing pharmaceutical goods stocks, the following features can be noted [4, 6, 9]:

- the construction of a simulation model in the Powersim simulation environment is carried out by busing a special diagram editor, whose graphical objects are used to describe the variables and relations between them, are intuitively understandable to the user, and the means of interpreting the simulation results are generally accepted for solving problems of studying the behavior of complex dynamic systems;
- the structural organization of the Powersim application package allows you to describe individual business processes for managing a pharmaceutical enterprise by building appropriate problem-oriented submodels that are connected to the main model of the marketing-oriented management system, but at the same time can be duplicated and implemented in the activities of individual departments of the same type to optimize their activities;
- the functionality of the Powersim structural modeling package allows not only to investigate the origin of the development of the inventory management system and business process control systems of marketing-oriented management at a certain time interval, but also to exchange information with other business applications using the Dynamic Data Exchange and Objects Links Embedding mechanisms, which are used by the pharmaceutical company in their daily activities;
- the planning period of simulation experiments in the Powersim simulation environment can be adjusted depending on the wishes of the user and characterize the operational, tactical and strategic management levels, which contributes to the effectiveness of the risk management system by improving communication between the heads of key departments of the pharmaceutical company and, therefore, improving the impact methods on the risks of the organization;
- the usage of the Powersim application software package does not require the user to train in the field of mathematical programming and modeling, due to the peculiarities of the

technique of building simulation models in this software environment, the list of embedded mathematical, analytical, statistical, financial and logical functions, and, as a result, the possibility of implementing a large number of numerical methods of mathematics;

- the computational power of the Powersim application software package allows you to implement various development scenarios for a specific list of possible risk situations in a pharmaceutical company and carry out such computational experiments that require established control points that are necessary for the current adjustment of multiple management influences by managers at any level of the management hierarchy;
- the technical characteristics of the Powersim simulation environment tools allow to minimize the time spent on analyzing and planning the activities of a pharmaceutical enterprise by optimizing the procedures for evaluating the effectiveness of key business processes of marketing-oriented management when conditions change in the external and internal environments of the organization.

Thus, taking into account the mentioned above, it can be concluded that Powersim structural modeling package is the most appropriate software for implementing a system-dynamic model of managing pharmaceutical stocks and a system-dynamic model of controlling business processes of marketing-oriented management of a pharmaceutical enterprise among other technical development environments, simulation models, among which are Simulink, GPSS, Arena, AnyLogic, etc. [4].

2. The system-dynamic model of inventory management of pharmaceutical goods.

As an effectiveness criterion, reflecting the performance of the process of managing the sale of pharmaceutical products, is the marginal income, which is represented in the simulation model of inventory management of pharmaceutical products using the Marginal_Revenue level.

We will define a list of variables that will be used in the process of building the structure of a simulation model of managing pharmaceutical goods in the software for system-dynamic modeling Powersim.

The value of the Marginal_Revenue level changes due to cash flow in the organization, which generates positive and negative cash flows, which are reflected in the simulation model in the form of the corresponding flows with the rate Sales_Proceeds - billings from product sales and Total_Costs_Adjusted - adjusted total expenses of the pharmaceutical company.

Also flows with rates is Insurance_supply - Insurance Fund of the i-th cluster of pharmaceutical products at time T, Performed_orders - the number of orders for the purchase of the i-th cluster of pharmaceutical goods, rather when entering the inventory management system at time T, Change_demand_on_goods - change in demand for i-th cluster of pharmaceutical products for the delivery time v1 at time T.

Let us introduce the notation for auxiliary variables related to the implementation of the operating activities of a pharmaceutical company and that's which are necessary to define flows with the pace Sales_Proceeds and Total_Costs_Adjusted:

- Range_of_Goods - a variety of dynamic pharmaceutical assortment over a period of time T;
- Price_of_Goods - the market price for the i-th cluster of pharmaceutical products at time T;
- Volume_of_Goods - batch volume of the i-th cluster of pharmaceutical products at a time T ;
- Fixed Charges - fixed costs for placing an order for the i-th cluster of pharmaceutical products at a time T ;
- Execution_Costs - variable costs for the execution of orders for the purchase of the i-th cluster of pharmaceutical products at a time T ;
- Purchase_intensity - the intensity of the receipt of requirements for the purchase of the i-th cluster of pharmaceutical products at a time T .
- Purchase_Variable_Costs - variable costs of acquiring the i-th cluster of pharmaceutical products at a time T ;
- Maintenance_Costs — variable costs of maintaining the i-th cluster of pharmaceutical products at the point in time T ;
- Sales_Variable_Costs - variable costs of implementing the i-th cluster of pharmaceutical products at a point in time T ;
- No_Supply_Costs - variable costs due to the lack of stocks of the i-th cluster of pharmaceutical products at the time T when the order received in the warehouse system cannot be executed;
- Current_supply - available stock of the i-th cluster of pharmaceutical products;
- Delivery_time - delivery time for a batch of pharmaceutical items;
- Time_between_orders - time between successive orders of the i-th cluster of pharmaceutical products;
- Time_change_expect - time of transition of the value of expected demand to real.

One of the most important aspects of computer simulation of the pharmaceutical company's inventory management process is modeling the dynamics of consumer demand for pharmaceutical products in order to automate the gradation of the safety stock of each pharmaceutical product cluster, the number of orders for their purchase and to determine the critical value of available stocks at a time T .

The concept of expected demand is one of the key concepts in managing the activities of any enterprises and organizations involved in product distribution, not only from the point of view of ensuring uninterrupted supply of goods to consumers and establishing effective long-term partnerships, but also to minimize the difference between the desired and actual stock levels in order to avoid additional expenses [5].

Considering that the time factor influences the flexibility of demand, in a simulation model of pharmaceutical goods management the demand for the i-th cluster of pharmaceutical goods during delivery v_i at time T is reasonable to determine using the appropriate level of Demand_on_Goods. On it's part, the value of the Demand_on_Goods level will change due to the intensity of receipt of requirements for the purchase of the i-th cluster of pharmaceutical products at time T, that is, the process of transition of expected demand into real at a certain time interval, in the simulation model is the so-called "shock" for analysis of the behavior of the pharmaceutical company as a result of unexpected changes in operating conditions (flow with the rate Change_Demand_on_Goods).

According to the general experience of the functioning of pharmaceutical enterprises of various activities, an abrupt change in the intensity of claims for the purchase of the i-th cluster of pharmaceutical products at time T is equal to 15%, which is represented in the equation of the corresponding auxiliary variable Purchase_Intensity as an integrated function STEP.

As the dynamic pharmaceutical assortment of a production and trading enterprise has to provide an opportunity to meet the expected demand, and the level of stocks of pharmaceutical products is equal to the desired demand, the Supply_Limit level is introduced into the simulation model, the definition of which will allow to maintain the insurance stock of the i-th cluster of pharmaceutical goods l at a certain declared by leadership non-zero level. As an initial value of the Supply_Limit level, it is reasonable to take the initial surplus of the quantitative turnover balance sheet for the inventory of any of the pharmacies, as well as the product range, which includes prescription and non-prescription ready-made medicines, active chemical compounds and pharmaceutical substances. Systemic variables, the values of which fluctuate as a result of the impact of many destabilizing factors and should be clarified within a certain time interval, are presented in the simulation model of pharmaceuticals inventory management in the form of random variables that are distributed according to the normal law, which describes the features of various aspects of the pharmaceutical enterprise in the best way.

So, the simulation structural-dynamic model of inventory management of pharmaceutical products, which is formalized in the Powersim simulation environment, looks like it is shown in Fig.1.

As can be seen at Figure 1, one of the most important components affecting the value of the adjusted total costs of a pharmaceutical company is the sum of the average costs spent for the controlling the inventory management processes of pharmaceutical products.

The definition of this value is a key element in researching the activities of a pharmaceutical enterprise and, therefore, is a structure-forming element of the corresponding simulation model. It is the next tool for diagnosing and managing both the dynamic assortment and stocks of pharmaceutical goods and the network of wholesale or retail realization.

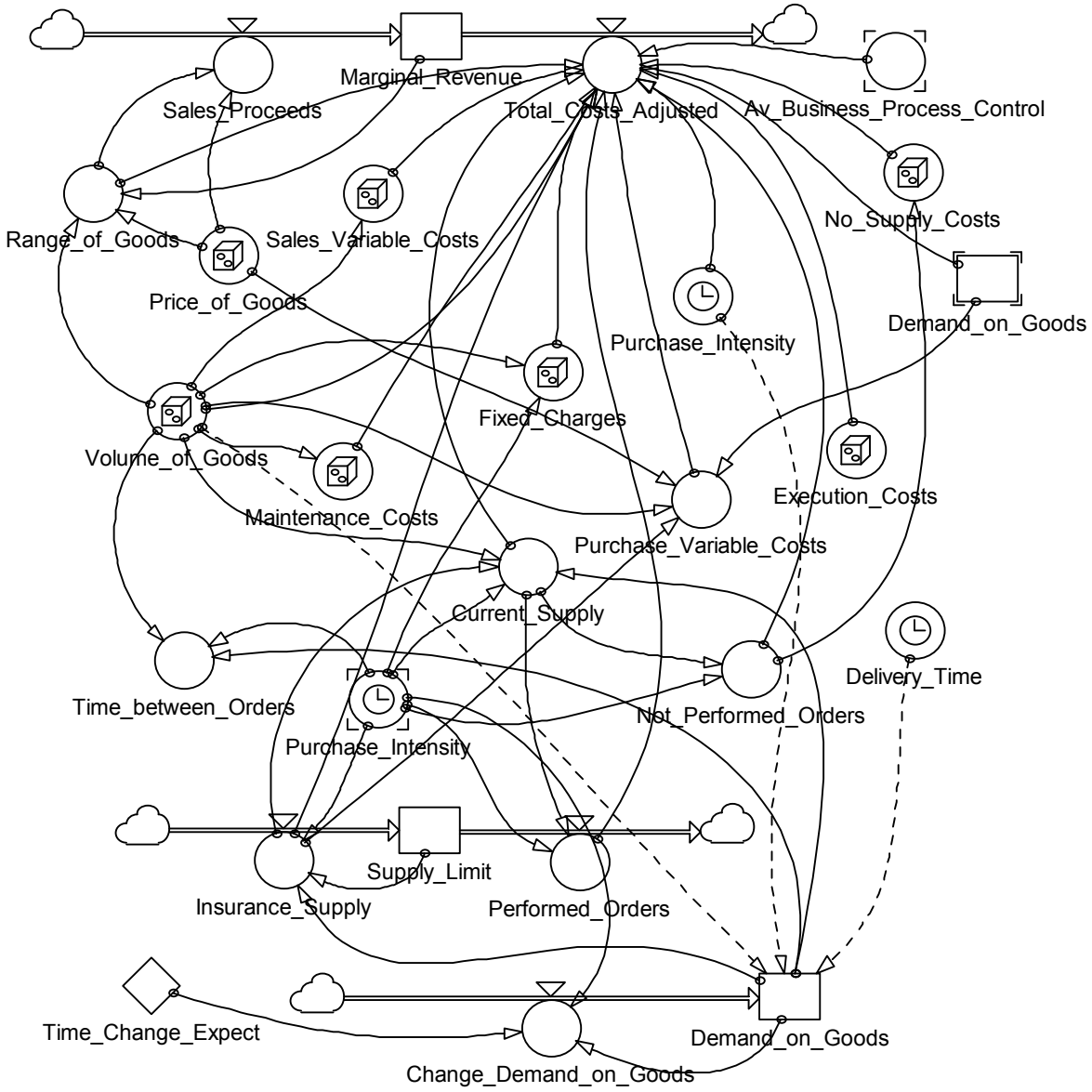

Fig.1. The system-dynamic model of pharmaceuticals inventory management in the Powersim application package

It should be noted that the Marginal_Revenue level, with the help of which the marginal income of a pharmaceutical enterprise is determined, will be used as a central link in a simulation model for controlling the business processes of the marketing-oriented management of a pharmaceutical enterprise, which is due to the peculiarities of the influence of this value on the size of the organization's free money.

This also applies to such structural elements as the flow with the Total_Costs_Adjusted rate and the auxiliary variables Performed_Orders and Not_Performed_Orders, which characterize, accordingly, the number of orders for the purchase of pharmaceutical products, which were or were not, which were resolved by a pharmaceutical company at a certain point of time, without which the determination of the costs of marketing-oriented management of its processes is impossible.

A certain continuity of structural elements in a complex of interrelated system-dynamic models will allow not only to achieve objectivity and accuracy in calculating indicators of economic efficiency of a pharmaceutical company, but also to maintain consistency in the flow of material and information resources, which is a prerequisite for a scientifically based, effective research of the conduct of the organization as a complex dynamic system with feedbacks [1].

3. The system-dynamic model of control of pharmaceuticals stockpile management processes.

In the simulation model of controlling the processes of managing stocks of pharmaceutical products, a lot of random variables are used, which is due to the possibility of the occurrence of various pathways of operations. To program generate random variables in the Powersim structural modeling package, we used a function that corresponds to the normal distribution law and, therefore, is given by a probability density, which coincides with the Gauss function. The choice of this law of distribution of random variables is resulted from the fact that in the practice of managing any production and trade enterprises as complex economic systems, the normal distribution law is the limit to which when all other conditions being equal, all other probabilistic laws of distribution of random variables approach [2]. Also, the normal law of distribution of random variables is used to determine the parameters for estimating the probabilities of deviations of indicators of business processes of marketing-oriented management of a pharmaceutical enterprise set values, including the probability of their detection and the consequences of occurrence, as those elements that characterize the overall risk of disruption to the organization's operating activities.

For formalization the simulation model for controlling the inventory management of pharmaceutical products in the Powersim simulation environment, we introduce the following notation for key structural elements that will be used when calculating the values of the objective function to estimate and optimize the value of the pharmaceutical enterprise costs:

- Spare_capital - amount of free cash flow of a pharmaceutical company;
- Total_Marketing_Management_Costs - total pharmaceutical company costs for marketing-oriented management;
- Av_Business_Process_Control - the average cost of controlling the business processes of marketing-oriented management of a pharmaceutical enterprise;
- Marketing_Strategy_Costs - costs of implementing marketing strategies for managing multiple clusters of pharmaceutical products;
- Marketing_Strategy_G_05 - a marketing strategy for managing clusters of pharmaceutical products, for which the balance in the use of periods of growth and decline in demand is observed;
- Marketing_Strategy_G_0 - marketing strategy for managing clusters of pharmaceutical products for which periods of demand growth were not used;
- Duration_in_State_Si - the duration of the stay of the business process of marketing-oriented management of a pharmaceutical enterprise in the state Si;

− Control_Duration - the duration of the procedure for monitoring the business processes of marketing-oriented management of a pharmaceutical enterprise;

− Removal_Break_Duration - the duration of the elimination of violations in the implementation of the business process of marketing-oriented management of a pharmaceutical company.

At the same time, the flow with the Total_Marketing_Management_Costs pace is an indicator of the total increase in expenses of a pharmaceutical company due to changes (positive or negative) in the course of business processes of marketing-oriented management of its activities, which, in turn, determines the financial condition of the organization and its level of stability in the long-term perspective.

− Level_Aim_Achievement - the degree to which the pharmaceutical company achieves the point target of functioning;

− KPI_1 - the ratio of the number of orders for the purchase of the i-th cluster of pharmaceutical products, which is implemented when it enters the inventory management system, to the total number of requirements for the purchase of the i-th cluster of pharmaceutical products;

− KPI_2 - the ratio of the number of orders for the purchase of the i-th cluster of pharmaceutical products, which is sufficient when entering the inventory management system, the number of working days in the period during which the business processes of marketing-oriented management of a pharmaceutical enterprise are analyzed;

− Duration_In_State_Si - the duration of the stay of the business process of marketing-oriented management of the pharmaceutical company in the state of Si;

− Risk_Priority_Number - the number of priority of the risk of the process of managing stocks of pharmaceutical products;

− Operation_Duration - the duration of the k-th operation of the business process of marketing-oriented management of a pharmaceutical enterprise;

− T_opt - optimistic duration of the k-th operation of the business process of marketing-oriented management of a pharmaceutical enterprise;

− T_reg - the most probable (expected) duration of the k-th operation of the business process of marketing-oriented management of a pharmaceutical enterprise;

− T_pes - pessimistic duration of the k-th operation of the business process of marketing-oriented management of a pharmaceutical enterprise;

− Operation_Duration_Deviation - the deviation of the duration of the k-th operation of the business process of marketing-oriented management of the pharmaceutical enterprise from the expected value;

− Activity_Purpose - the point target of the functioning of a pharmaceutical enterprise;

− Bb1 - assessment of the probability of detecting deviations in the indicators of the business process of marketing-oriented management of a pharmaceutical enterprise of established values;

− Bb2 - assessment of the probability of deviations of indicators of the business process of marketing-oriented management of a pharmaceutical enterprise of established values.

Taking into account mentioned above, the structure of the imitation of system-dynamic model of control of the processes of managing stocks of pharmaceutical products is presented in Fig.2.

As an information base for the necessary calculations, it is advisable to use not only financial statements, it is compulsory drawn up at a pharmaceutical company with an aim to transfer it to the supervisory authority, but also quantitative turnover and balance sheets, registers of manufacturers and suppliers of substances, as well as corresponding price lists that determine the pricing and assortment policy of a pharmaceutical company.

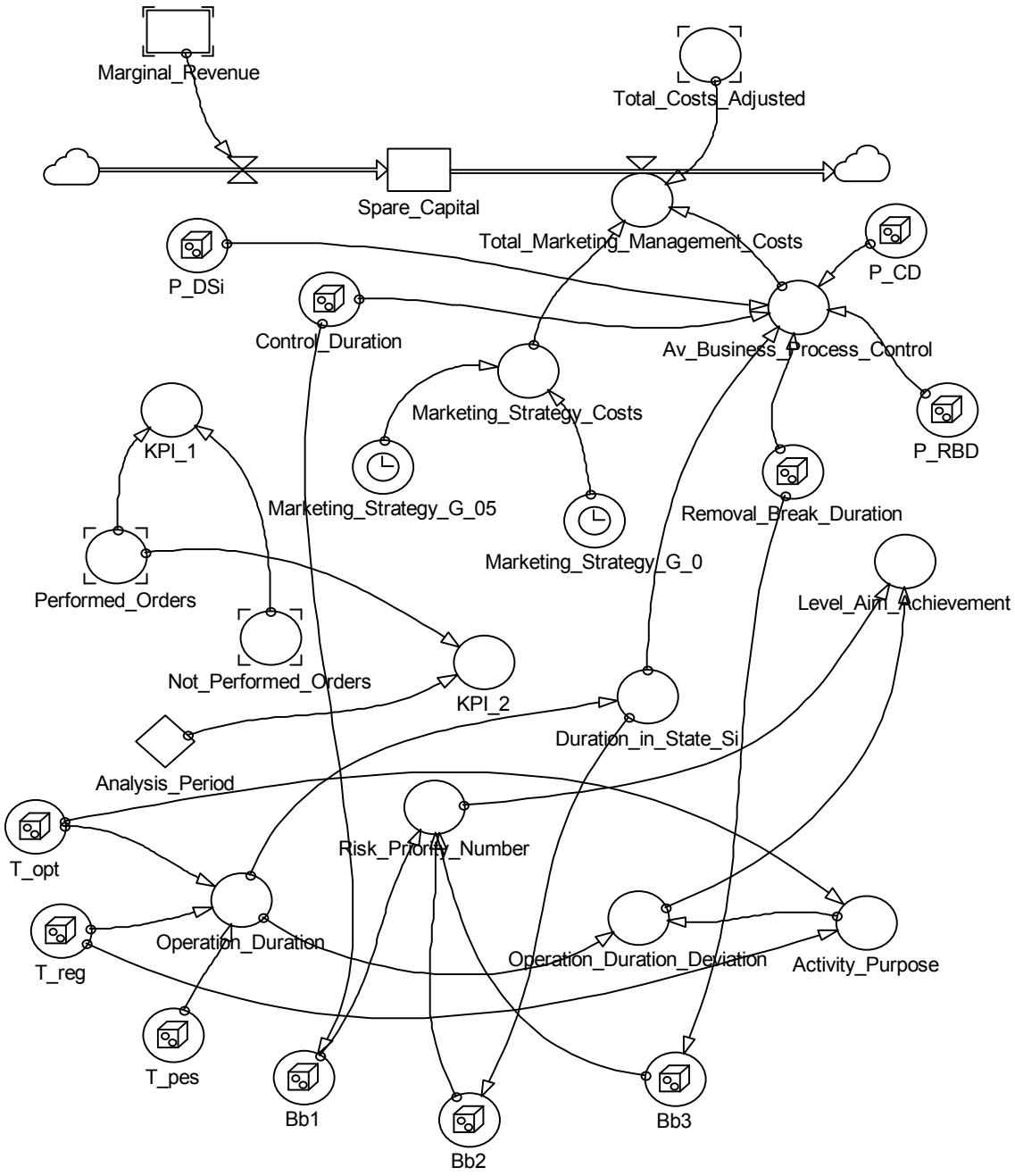

Fig.2. A system-dynamic model of controlling pharmaceuticals inventory management processes in the Powersim application package

Conclusions.

Therefore, the proposed structure of the system-dynamic model of inventory management of pharmaceutical products, is based on the synthesis of methods for analyzing inventory management systems and system dynamics methodology and which allows to solve current problems of inventory management, taking into account the stochastic processes inherent in the business processes of inventory management systems. Reflection of random processes generated by demand in the system-dynamic model of inventory management of pharmaceutical products allows to implement the principles of market approaches to management, contributes to the improvement of the assortment and communication policies of a pharmaceutical company and create a basis for increasing its competitiveness. The structure of the complex of system-dynamic models of management and control of pharmaceutical products is a holistic, multifunctional accounting and analytical system of pharmaceutical enterprise management tools, which allows: to carry out calculations of a set of estimated parameters of the target orientation, which characterize the features of the flow of operations within the divisions of a pharmaceutical enterprise; to generate a basis for the development of management decisions adequate to the current situation for their further implementation in the practice of a pharmaceutical enterprise in order to adjust the level of economic efficiency of its activities; to coordinate information flows between the divisions of a pharmaceutical enterprise, ensuring the continuity of its activities in the long term; to determine the quantitative and qualitative results of the process of managing the achievement of the objectives of the functioning of a pharmaceutical enterprise.

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THE UKRAINIAN CRISIS: A TEST FOR THE RULE OF LAW

Abstract*. The article focuses on the recent challenges which Ukraine faced after Revolution of Dignity that caused the violation of rule of law and territorial integrity of the country. Ukraine made the choice in 2014 toward European democratic principles, the rule of law developed by the Western constitutionalism, the principle of separation of powers, political pluralism, guarantees of human rights and freedoms based on human dignity and independence of the judiciary. Within the four years Ukraine faced a set of challenges with Russia: annexation of Crimea, subsequent intervention in the Donbass and Luhansk region, violation of UN Charter, the Helsinki Final Act (1975), the Budapest Memorandum (1994), UNCLOS (1982) and main principles of international law. The author describes examples of violation of rule of law such as annexation of the Crimea peninsula, Ukraine-Russia sea clash on November 25th, 2018 and external aggression which became the biggest challenge Ukraine faces since the restoration of state sovereignty in 1991. Russia's behaviour poses a challenge to the world security system as they undermine the general democratic values and rule of law. In order to describe this problem, the violation of rule of law, the author analysed international treaties, documents of international organizations and internal law as well as the practice of their implementations, judicial decisions, diplomatic documents, statements, speeches by state figures, materials of mass media, scientific works in the field of international, constitutional and other branches of law.*

Jel Classifacation: H12, K10

Abbreviations

NATO The North Atlantic Treaty Organization
NS the Nord Stream 2
CP Crimea Peninsula
ICJ the International Court of Justice
UN the United Nations
UNC the United Nations Charter
UN PO the UN Peacekeeping Operations
UNCLOS the United Nations Convention on the Law of the Sea 1982
DCU the Defence Council of Ukraine

Introduction.

Among international organizations, the UN due to the powers vested in its Charter and its unique international character has undertaken a leading role on the rule of law in order to support the development, promotion and implementation of international norms and standards in most fields of international law, particularly the maintenance of peace and security. The Security Council takes the lead in determining the existence of a threat to the peace or an act of aggression. Under Chapter VII, the Security Council can take enforcement measures to maintain or restore international peace and security. Such measures range from economic sanctions to international military action. The Council also establishes UN Peacekeeping Operations and Special Political Missions. Among the tools the Organization uses to bring peace are peacekeeping, peacebuilding, countering terrorism, disarmament [39].

The Secretary General has made very important statement that "every nation that proclaims the rule of law at home must respect it abroad and that every nation that insists on it abroad must enforce it at home" [40]. He has submitted various reports on the rule of law to the UN organs. The General Assembly has considered the rule of law as an agenda item since 1992, and with renewed interest since the 2001 Millennium Declaration [46]. The UN has adopted several resolutions in this regard calling for compliance with the decisions of the International Court of Justice, for non-discrimination, and for an inventory of activities on the rule of law by the UN organs. The UN Security Council has held several thematic debates on the rule of law and justice, post-conflict national reconciliation, Haiti, humanitarian crises, and the maintenance of international peace and security [35]. Important reports on the rule of law have been submitted within the context of conflict prevention and peace-keeping operations, which have led to the adoption of resolutions and to important statements of the President of the Security Council [36].

In particular, the rule of law has been strongly promoted by the UN Security Council in its work in the field of peace and security. Of course, Article 84 of the UN Charter refers to the domestic law of the states in the context of trust territories (the last of which became independent in 1994), but Article 2(7) of the Charter specifically excludes matters "essentially within the domestic jurisdiction" from interference by the UN, except when the UN SC acts in its enforcement capacity for the purpose of preserving international peace and security under Chapter VII. Consequently, the UN SC has incorporated the concept of rule of law in many of its peace-keeping operations, and in some of them the components of the rule of law play a fundamental role. In both Kosovo since 1993 and in East Timor/Timor Leste from 1999-2002 the UN has had and still has direct responsibility for the administration of justice (the so-called "executive powers,") including the control of the police and prison services. In Kosovo, before its declaration of independence, the High Representative could exercise "all legislative and executive authority, including the administration of the judiciary".

Additionally, the officials working for the Kosovo High Representative enjoyed personal or functional immunity from legal process while being unaccountable to the local population. Similar executive powers were conferred on the Office of the High Representative in Bosnia and Herzegovina. Ever since then, UN SC resolutions have continuously expanded the scope of the rule of law to include gender issues, the protection of children in armed conflict, the protection of civilians, and due process in the fight against terrorism [33].

The United Nations also works to support a rule of law framework at national levels. In this regard, the UN Secretary General has indicated that the rule of law is a concept at the very heart of the Organizations mission and "for the purpose of the United Nations: The rule of law refers to a principle of governance in which all persons, institutions and entities, public and private, including the state itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated, and which are consistent with international human rights norms and standards. It requires, as well, measures to ensure adherence to the principles of supremacy of law, equality before the law, accountability to the law, fairness in the application of the law, separation of powers, participation in decision-making, legal certainty, avoidance of arbitrariness and procedural and legal transparency".

Thus, in its different programs and actions, the UN supports the establishment of national legal systems that incorporate a constitution (or its equivalent) as the highest law of the land. The constitution should include a clear and consistent legal framework, and implementation thereof; strong institutions of justice, governance, security, and human rights that are well structured, financed, trained and equipped; transitional justice processes and mechanisms; and a public and civil society that contributes to strengthening the rule of law and holding public officials and institutions accountable. These are the norms, policies, institutions, and processes that form the core of a society in which individuals feel safe and secure, where disputes are settled peacefully, where effective redress is available for harm suffered, and where all who violate the law, including the State itself, are held accountable [41].

1. Violation of international law due the annexation of Crimea peninsula and sea clash in the Sea of Azov.

In late February, pro-Russian separatists seized key buildings in the Crimean capital, Simferopol, and unidentified gunmen in combat uniforms appeared outside Crimea's main airports. On 16 March, Crimea voted to secede in a disputed referendum, and the next day the Crimean parliament declared independence and formally applied to join the Russian Federation. On 18 March, President Putin signed a bill to absorb the peninsula into the Federation [12].

This events the whole civilized world called as annexation of Crimea with violation some international agreements, namely:

1. non-intervention provisions in the United Nations Charter [8];
2. the Helsinki Final Act of 1975 [16];
3. the 1990 Paris Charter (the tenets of which are that borders of countries are not rewritten by force and all states enjoy equal security and equal rights to choose their own alliances) [43];
4. the Budapest Memorandum of 1994 [20];
5. the 1997 Treaty of Friendship, Cooperation and Partnership between Russia and Ukraine (which requires Russia to respect Ukraine's territorial integrity) [45].

On November 25, 2018, another act of armed aggression by the Russian Federation in the Kerch Strait against the ships of the Naval Forces of the Armed Forces of Ukraine took place. At 00:00 on November 26 the Military Cabinet a meeting of the National Security and Defence Council of Ukraine took place. The decision "Regarding extraordinary measures on ensuring the state sovereignty and independence of Ukraine and the imposition of martial law in Ukraine" was approved at the meeting [21].

At 02:01 on 26 November 2018 the Ministry of Foreign Affairs of Ukraine issued the statement in connection with another act of aggression against Ukraine and expressed its strong protest to the Russian Federation in connection with the armed attack and capture of the Ukrainian navy ships "Berdyansk", "Nikopol" and the tug boat "Yana Kapu", as well as the wounding and capturing of members of their crews [37]. At the same day was issued the Decree of President of Ukraine Petro Poroshenko № 393/2018 "On the imposition of martial law in Ukraine", which introduces martial law for 30 days - from 14:00 on November 26 to 14:00 on December 26 [28]. On 27 November 2018 Ukraine took steps to alert the international tribunal that is considering Russia's violations of the 1982 U.N. Convention on the Law of the Sea in the Black Sea, Sea of Azov, and Kerch Strait, of recent actions by Russia that have significantly aggravated the parties' dispute [38].

According to the Ukrainian authorities the attack on Ukrainian ships that was carried out during a sea crossing from the port of Odessa to the port of Mariupol, in accordance with the provisions of all effective multilateral and bilateral international treaties and navigation rules, is nothing but another act of armed aggression of the Russian Federation against Ukraine, as defined, in particular, in Article 2 of the Charter of the United Nations and the provisions of UN General Assembly Resolution 29/3314 of 14 December 1974 on the definition of aggression. Russia has de facto expanded its military aggression against Ukraine to the sea. Latest events in Ukraine confirmed the violation of the rule of law and the European values [37].

2. The Western response for violation of rule of law

Russia executed hostile actions not only in Ukraine but also among the Western countries. These actions can be grouped into five categories:

1. Military aggression and revanchism.
2. Support for political extremism (far-left and far-right).
3. Offensive cyber-attacks and disinformation campaigns.
4. Using energy as a 'wedge strategy' against energy-dependent states.
5. Exportation of weaponized corruption [17].

Western countries responded only by non-military instrument such as imposition of economic sanctions on parts of the Russian economy and selected individuals after 2014 [2]. They can't use the military response, especially article 5 of The North Atlantic Treaty to deter Russia because Ukraine doesn't participate to this organization [44]. Although the Russian military has been actively provoking the Baltic republics within the last 2 years [25]. The West is failing to come up with meaningful non-military forms of deterrence take in consideration the fact that Russian aggression is escalating and does not show any signs of stopping: Russian interference in the 2016 Dutch EU-Ukraine Association Agreement referendum [4]; the 2016 Brexit referendum [24]; the 2016 Italian constitutional referendum [3]; the 2017 French presidential elections [18]; the 2017 Catalonia crisis [19] and the 2017 German parliamentary elections [9]. The West has not punished Russia for any of these hostile acts.

US presidential election in the 2016 caused the strategic awakening of a large portion of the American political establishment (apart from the president) to the Russian threat [15]. Washington has put in place extensive and escalating sanctions against Russian behaviour and has invested large sums in countering Russian influence and disinformation in Europe too [23]. The UK has experienced two stages of awakening: the Russian chemical attack on UK soil in spring 2018 (the Skripal poisoning case) [5] and the ongoing investigations into Russian influence in the 2016 Brexit vote (UK Parliament, Digital Culture, Media and Sport Committee 2018) [11]. French President Emmanuel Macron has accused recently Russia in Russian influence on yellow vest riots [7]. These facts confirmed that Russia try to buy the political influence in Western Europe because there is no resistance to it. After financial backing France-National Front and its leader Marine le Pen [1], French President Emmanuel Macron has announced plans for a new law to combat so-called fake news, but there was no serious respond to counter the Russian influence in French politics [6]. Despite all these cases some European political parties with direct institutional links to Russian entities have entered governments in Italy and Austria [27].

Germany as a leading country EU in stopping Russian aggression till now doesn't convinced the all political establishment to strengthen the sanctions take in consideration the Nord Stream 2 project through, despite the objections of its allies. For example, in April 2018 the EU Commission refused to back the project, saying it did not contribute to the EU goals of diversifying the gas supplies. On the global stage, critics accuse Berlin of ignoring

the interests of its allies by filling Russia's coffers at the time of a diplomatic conflict. US President Donald Trump slammed Berlin in July 2018, saying it was "captive to Russia" due to its energy policy. This selfishness and unwillingness to take the lead in punishing Russia for its numerous atrocities and other hostile actions effectively means that there can be no expectation that Berlin could be the leading principled power [10].

A review of policy countermeasures by EU member states shows that the political will to implement structural policies to counter this Russian threat is limited. The main reason for this is a lack of understanding of the urgency of the threat and territorial remoteness. Because of this political environment, it is unlikely that Europe will soon engage in punishing Russian behaviour except the soft power and therefore in effectively trying to deter the aggressor. Nevertheless, Western countries are still in the phase of discussion of policies how to deter and stop Russia and what the states should do domestically to decrease their vulnerabilities [14].

3. The role of the Organization for Security and Co-operation in Europe in resolving Ukrainian crisis

Today there is a lot of discussion among scholars about the role of the OSCE in solving the security problems in Ukraine. The OSCE, as the regional organization responsible for security issues on the European continent, decided to provide support to Ukraine at the request of the Ukrainian government and with the agreement of all 57 OSCE member-states. As a result, on 21 March 2014 was adopted by the Permanent Council of OSCE the Decision №1117 on deployment a special OSCE monitoring mission of international observers to Ukraine [29].

The Mission currently consists of almost 700 unarmed civilian monitors from more than 40 OSCE participating States. The SMM aims to gather information and report on the security situation establish and report the facts, especially on specific incidents on the ground. The Mission monitors talk to various community groups - authorities at all levels, civil society, ethnic and religious groups and local communities. The goal of the SMM is to help Ukraine to reduce tensions and facilitate dialogue between all the sides. The mandate of the Mission covers the entire territory of Ukraine. The Mission's Head Office is in Kyiv, and the monitoring teams work in 10 biggest cities of Ukraine: Chernivtsi, Dnepropetrovsk, Donetsk, Ivano-Frankivsk, Kharkiv, Kherson, Kyiv, Luhansk, Lviv, Odessa. The Mission also has several Hubs and Forward Patrol Bases. Almost 600 monitors work now in Donetsk and Luhansk regions. The presence of the OSCE Mission to date is conditioned by the long-term crisis in the East region of Ukraine and the unresolved conflict between Ukraine and the Russian Federation, which in turn is a serious threat to security in the European space. Therefore, finding effective mechanisms for Ukraine's cooperation with the OSCE in shaping the European security and stability system is extremely relevant and a socially significant problem [30].

The political significance of the OSCE lies in the fact that it is the only European security organization that is directly involved in early warning and conflict resolution and post-crisis reconstruction, widely applying methods of preventive diplomacy. As the largest of the existing regional security organizations, the OSCE promotes the development of a new, co-operative, comprehensive European security model. In particular, the OSCE solves a wide range of security issues: arms control, border management, conflict prevention and resolution, countering terrorism, policing, reform and co-operation in the security sector, human rights protection, economic and environmental security issues [31].

The OSCE's central intermediary instrument is the Tripartite Contact Group (TKG), founded in June 2014 with the aim of establishing a diplomatic dialogue between Ukraine and the Russian Federation, as well as discussing the implementation of the Peace Plan of the President of Ukraine P.O. Poroshenko. Within the framework of TKG, consultations are held between the representatives of Ukraine, Russia and the OSCE and negotiations on concrete steps on the implementation of the Minsk Agreements. The TKG is headed by the Special Representative of the OSCE Chairman-in-Office in Ukraine, Ambassador Martin Saidik (Austria). In the framework of TKG in Minsk, four working groups on political, security, economic and humanitarian issues are held periodically. TKG work is provided with political support from the governments of the Normandy format (Ukraine, Russia, Germany, France). One of the important concrete results of TKG's work was the implementation of the agreement on the release on 27 December 2017 of 73 Ukrainian citizens illegally detained in the ORDLO [32].

The OSCE has significant experience in conflict resolution and conflict management. This is especially true for the so-called "frozen" conflicts on the European continent. The last years in the four main conflicts in the post-Soviet space (Georgia, Nagorno-Karabakh, the Transnistrian conflict) the OSCE demonstrated different levels of engagement. The lowest level was observed in Georgia, especially after the Russian Federation blocked the decision to extend the mission mandate at the end of 2008, after the Russo-Georgian conflict in August 2008. This led to an actual loss of weight in the area of conflict resolution in the South Caucasus.

The OSCE's activities in the settlement of the Transnistrian conflict are ambiguous. On the one hand, the involvement of this organization in the settlement process was very positive, as it allowed to internationalize the negotiation process and attract the attention of the international community. In addition, the presence the OSCE missions held back the hostile actions of the parties in conflict situations, as the awareness of the international community's monitoring was important. Ukraine actively participated in the peace process and had the status of an official mediator in the settlement of the Transnistrian conflict in the format of 5+2. On the second hand, there is a sharp critique toward the OSCE. Many experts indicated the numerous ineffectiveness of peacekeeping efforts and the OSCE monitoring mission because this organization has no effective instruments and tools that could force countries to fulfil their commitments. And this is clear in the failure of the

OSCE to enforce the decisions of the Istanbul Summit on the export of weapons and ammunition from the Russian 14th Army from the territory of Transnistria. The decision-making process and the coordination of activities continue for so long that the time for the effective implementation of this decision is lost. In addition, the activities of the OSCE Mission in Moldova are extremely negative on the left bank of the Dniester. Though Transnistria has the OSCE representation, it does not trust it, it's criticized for formalism, bias and enthusiasm. According to the Transnistrian monitoring, the OSCE is one of the means of collecting military-strategic information, since representatives of the CIA play a dominant role in the organization. The OSCE is blamed for turning itself into an instrument of pressure, pursuing a policy of double standards and protecting the interests of the Western world, regardless of the objective reality that exists in the conflict zone [13].

The Carnegie Europe see a significant role of OSCE for Ukraine in two scenarios. One of the OSCE's main tasks would be damage limitation. If Russia continues to play an adversarial game but has no interest in a massive escalation of the conflict, the OSCE's political and security instruments can serve as channels of communication and help develop measures to ensure a minimum level of stability. The organization's other function would be to offer Western governments a platform for holding those responsible for the breach of the OSCE's principles accountable and for maintaining the pressure for a fair and just political solution. The second scenario would involve a change of heart of the leadership in Russia and a reset of power. This event could be a strong commitment to a political solution of the Ukraine crisis. In this scenario, the OSCE could serve as a broad framework for negotiations of a comprehensive settlement and play a leading role in facilitating and monitoring its implementation [22].

In author opinion the OSCE doesn't directly resolve the territorial dispute, assumes the role of mediator. The previous experience of engaging in conflict resolution in the post-Soviet space, the possibility of blocking decisions by the Russian Federation through consensus, the lack of work on mistakes in previous conflicts, non-recognition of the Russian Federation as an aggressor country by the OSCE reduced the OSCE's operational activity only to activities of the Special Monitoring Mission. At the same time, this role shouldn't be underestimated, since it was the OSCE that managed to deploy its mission as soon as possible, which is, in particular, fundamental to monitoring the ceasefire. The future of the OSCE depends on fruitful cooperation between Russia and the West. As a comprehensive and inclusive forum, the OSCE offers a platform for dialogue between the two sides however, its capacity to influence the quality of their relations is rather limited. The important decisions are ultimately made in national capitals or in other organizations like UN. Therefore, the impact of the OSCE on the security in Ukraine is debatable. The safety of Ukraine mostly lays in the hand of two involved parties which have their own views in future development of its countries. Plus, historical heritage after the collapse of USSR exacerbate the political situation which directly affect the security of Ukraine. Only honest dialog between Ukraine and the Russian Federation can resolve not only the territorial differences but the crisis as well [34].

4. The Ukrainian crisis: a test for international law

The general aims of modern international law are specified concisely in the preamble of the Charter of the United Nations, " to save succeeding generations from the scourge of war, which twice in our lifetime has brought untold sorrow to mankind, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained" [8]. It is different from domestic law in many fundamental respects, i.e. the law seen by most as a format or paradigm of how a legal system should work. The crucial characteristics of international law is that it does not have a central legislator, there is also a limited global authority as well as limited enforcement possibilities. Moreover, to add another "special" feature – the main actors of international law are states, which are sovereign. As a result, more powerful states can influence the content of international law and its reality.

Given the above features, there is a surprising level of compliance with the discussed legal order. There is a vast array of international law treaties which help the world function, pertaining to areas as varied as humanitarian law, human rights, aviation, sports, peace and conflict termination, intellectual property and many others. Furthermore, over history a number of permanent and temporary tribunals have brought a further degree of compliance with international law, the ICJ, being the main example. However, in the context of the annexation of Crimea peninsula, one may even question the validity of international law. Does this system work only in peaceful circumstances and can it be easily disregarded in times of conflict, especially in the current multipolar world, as some claim? Has a period of a unilateral US policy led to the diminished role of international law? Perhaps events such as the NATO intervention in Kosovo and its recognition as an independent state later or the de facto unilateral American intervention in Iraq has led other countries, wielding substantial power, to "think" they are empowered to perform some acts they see as "legitimate", but not necessarily legal? However, accepting the notion that "all options are on the table" for the powerful is a de facto abandonment of international law and leaving it all to pure geopolitics, which would lead only to chaos. There is a need for a discussion regarding the shape of international law, effectiveness being the main concern. The world is too complex for a uniform set of rules. There is also a need to take into account the actual power play in the world, as international law doesn't exist in a vacuum. This goes to the inherent characteristic of international law, namely, the lack of a global police/enforcement service and the already mentioned fact that the one institution capable of a somewhat similar function (the UN SC) can be easily blocked. However, one should not forget, even though the UN SC failed to react directly, the US, the EU, and other countries and organizations have imposed sanctions [47]. By way of an indirect effective cooperation, these sanctions led to a substantial economic effect, thus, very likely, achieving its goal of acting as a deterrent, at least to some degree.

However, it is also notable that the Russian government issued countersanctions, aimed at the aforementioned states and political blocks, which raise the issue of sanctions being a double-edged sword. Nevertheless, international law should not be reduced to occasional issuing of sanctions as a way to force compliance. The preferred usage of this legal system's mechanisms is to resolve disputes peacefully and ensure compliance in this way.

The Ukrainian crisis demonstrates that the United States and the European Union, which have led global opposition to Russia's involvement in Ukraine, have held uniform views on major international legal issues raised by that involvement. This unified stance suggests that the transatlantic zone is where shared basic values and principles of a global order do not exist only as a matter of abstract rhetorical agreement but also get translated into concrete policies and are applied to concrete cases.

One cannot effectively argue with the fact that international law was and sometimes is ignored by the major powers. The great powers always find ways to navigate through the sometimes-muddy waters of international law in order to secure their interests. One example of that is the veto mechanism of the UN's Security Council, making any action against its permanent members impossible or at least very difficult. However, there is an indirect effect of international law in this respect: regardless of the legitimacy of the accusations against Russia in the conflict at hand, the Russian authorities came up with a substantial line of defence of their supposed activities on Ukrainian soil. Moreover, a single violation or even several violations do not mean the entire international legal system is ignored.

It can be said the classical rules of international law have been watered down in the recent two decades, by the very critics of Russia, in particular the US and NATO, i.e. by the Iraq intervention lacking the consent of the UN SC. Seeing the problematic legality of such interventions, the world powers try to shift the discussion to the issue of legitimacy, rather than legality.

With all that being said – international law should not be abandoned, especially now, in a world which is increasingly interconnected. It contains multiple instruments which might and should be used to end the present conflict in Ukraine as quickly as possible, in order to save lives and provide a compressive solution for Ukraine, securing the long-term peace. International law was developed as a system of rules, the aim of which is to organize the international community. Although from the get-go, it was lacking a central law-giver or enforcement measures, typical for inter-state law, it had other instruments and measures – this specifically pertains, inter alia, to the role of IGO's as facilitators of peace negotiations and peace builders as well as humanitarian law, which mitigates the violence in armed conflicts [26].

Conclusions.

Moscow is using Ukraine as its biggest testing field abroad to check the rule of law in the 21st century and the behaviour of the UN, the OSCE, the Western countries as well as Ukraine. For the Ukrainian crisis the UN can't directly resolve the territorial dispute due to Russia being a permanent member of UN Security Council with its right to veto and using as such in this respect. That's why the deployment of the UN Peacekeeping Operations very difficult question.

The annexation of the Crimea peninsula and the conflict in East Ukraine, Ukraine-Russia sea clash on November 25th 2018 has become a challenge not only for Ukraine but also for the Western countries and the UN, the OSCE as a whole institution as well as the principles laid down by the Charter of UN, the Helsinki Final Act in 1975, the 1990 Paris Charter, the Budapest Memorandum of 1994, the 1997 Treaty of Friendship, Cooperation and Partnership between Russia and Ukraine. Till now all the above mentioned institutions responded only with its non-military instrument such as imposition of economic sanctions. However, there are discussions among the experts to find out more effective instruments to deter the behaviour of the Russian Federation.

Not only the future of Ukraine but also the further development of the world security system and international relations will depend on the effectiveness of the resolution of the conflict in Ukraine. Issues of territorial integrity and state sovereignty are considered as basic human rights and the annexation of the Crimea peninsula was not even subject to hypothetical discussions as they were endorsed by all the participating countries. The UN's inability to respond adequately to the annexation of the Crimea peninsula and address the Ukrainian issue in the East of Ukraine can negatively affect the principle of the rule of law and the credibility of Article 2 of the United Nations Charter (all Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations).

There are other lessons to be learned from the current conflict in Ukraine. This crisis is not only a test for the rule of law but also on the effectiveness of the UN as a universal security organization to save succeeding generations from the scourge of war. A deficiency in the UN system concerning its functioning is related to the lack of democratic mechanisms and accountability. The composition of the Security Council still reflects the power distribution of 1945 as the five permanent members (the United States, France, the United Kingdom, China and Russia) hold more powers and privileges (the outdated individual right to veto decisions) than the non-permanent ones. Since the power distribution has strongly changed during the last decades and values of equivalence between sovereign states have spread in the international community, the composition of the Security Council appears to be anachronistic.

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CHEMISTRY KNOWLEDGE COMPETENCES OF TECHICAL UNIVERSITY STUDENTS

Abstract. *Subject competence is a necessary element in the training of a competent specialist of building profile. The indicators of professional competence of a specialist are not only knowledge and skills forming the general professional intelligence (cognitive and activity components), but also professional position and individual psychic features (motivational-value component). The tasks of research were to formulate clear criteria for assessing the level of competence in chemistry; to develop methods of teaching chemistry to student builders; to compare the developed techniques with the traditionally used at the university; to evaluate the effectiveness of the developed techniques during the coming years. Experimental was carried out in the professional training of Lutsk National Technical University (Ukraine) students of the study programme "Construction and Civil Engineering". On the analysis of the motivation of the educational activity and the qualitative indicators of success the conclusions about the effectiveness of the proposed training system, which has been successfully used at the university, have been confirmed. A statistically significant confirmation of the effectiveness of the competence approach to the study of natural sciences in the technical university have been obtained.*

JEL Classifacation: I23

Introduction.

One of the actual tasks of higher education is the training of a competitive, educated, competent personality with such qualities as an innovative type of thinking, intellect, will, ability to operate in a dynamically changing world, readiness for creative activity, self-realization, and self-improvement. The quality of education is increasingly being measured not just be the level of knowledge gained during schooling, but also by the level of competence possessed by students at doing a particular job after completing their education.

Three categories of key competencies (interacting in socially heterogeneous groups, acting autonomously, and using tools interactively) are indispensable prerequisites for an individually successful life and for sustainable social, economic and democratic development of society [13; 14]. If competence is the desired criterion for educational quality, it can be easily established that suitable instruments and methods of measurement are needed for this kind of quality evaluation, which, however, are not yet available [10; 11]. The latest academic competency-based research for education focuses on innovative practices, strategies, and real-world scenarios [8; 12; 15].

Since the beginning of the XXI century a competence approach become the leading educational paradigm, the theoretical developments have been actively implemented in the realm of the educational process in educational institutions in Ukraine [5]. The lecturer faces the problem of finding approaches and techniques for the training of future specialists. However, the quality teaching of fundamental or professional disciplines is based on three components: 1) purpose (clear identification of the competencies that need to be formed); 2) methodology (methods of forming competencies and control stage of their achievement); 3) means (methodological and material support of the educational process).

Professional competence is seen as the generic, integrated and internalized capability to deliver sustainable effective (worthy) performance (including problem solving, realizing innovation, and creating transformation) in a certain professional domain, job, role, organisational context, and task situation [9]. A competency is a part of generic competence; it is a coherent cluster of knowledge, skills and attitudes that can be utilized in real performance contexts.

In the production of competence in the universities it is extremely important to identify proactively competence needs and new competence combinations for the future, and in results fulfil the needs of the organisations as they transform and develop their core competences. Generic competences enable ethical, reflective, and innovative operation in the ever more networked activities of the globalised world [7].

Competences enables the student to understand, evaluate und assess information, which they have to collect, interpret and identify the main issues. It challenges the students' way of thinking logically, using the key assumptions of the respective subject area and even develop this area further by research [3].

The professional competence of future builders can be defined as the ability to carry out professional functions of the achieved qualification level based on the acquired integrated knowledge, skills, experience and personal qualities. The indicators of professional competence are not only knowledge and skills, which form the general professional intelligence (cognitive and activity components), but also his professional position and individual psychic features (motivational-value component).

Subject competence is a necessary element in the training a competent builder. The system of preparation of future builders consists of three components – cycles of disciplines of

humanitarian, social, economic training, natural science and professional-practical training in the specialization. The disciplines of science education (including chemistry) lay the foundation for future professional competence.

The aim of studying chemistry for future builders is the formation of chemical competence (component of professional competence), which includes:

- chemical thinking as an understanding of the interconnection of material objects of reality by the scheme: the structural organization of matter – physical and chemical properties – place in nature and interconversion – application – the impact on the environment;
- chemical literacy – the ability to record chemical formulas and equations, understand their essence and carry out necessary calculations; the ability to find necessary chemical information and use it; the ability to handle chemicals, make certain transformations with them, and predict the results of these transformations;
- chemical responsibility – awareness of the role of various chemicals and materials in human life and in the environment.

The major questions of the research were:

1) how to formulate clear criteria for assessing the level of competence in chemistry;
2) how to develop methods of teaching chemistry to students-builders;
3) how to compare the developed techniques with the traditionally used at the university;
4) how to evaluate the effectiveness of the developed techniques during the coming years.

1. Methodology of Research.

The analysis of scientific literature and experience of work at the technical university made it possible to highlight the following criteria for the training of professional competence of future builders: cognitive, activity and motivational. Based on the selected criteria, according to the Bespalko's knowledge acquisition process model [1] and Biggs SOLO taxonomy [2], one can determine following levels of professional competence formation for future builders: reproductive (low), reconstructive (average), productive (high), creative (perfect) [4; 5]. This research was guided by the assumption that the assimilation of knowledge, skills and competences, the formation of competence on their basis is a complex process that involves sensory-specific perception of the content, its awareness, discovery of new properties and attributes, establishment of links between them and, finally, mastering certain methods of action in the process of students' cognitive activity.

The cognitive (knowledge) criterion reflects the level of obtained knowledge by future specialists in the building profile on a particular discipline of science or vocational training. Productive indicators estimated the cognitive criterion. We included introductory

knowledge control, results of intermediate, module controls and exam sessions during the experiment.

Indicators and levels of evaluation of the cognitive criteria are:

– level of knowledge: the presence of minimal knowledge, the lack of their systematization (reproductive); subjective knowledge is partially systematized, but not sufficiently integrated (reconstructive); good systematized knowledge (productive); knowledge has a creative, poly-functional character, characterized by system of connections (creative);

– flexibility of knowledge: solving of simple, standard tasks under the supervision of a teacher (reproductive); solution of tasks, as a rule, in standard situations (reconstructive); independent use of knowledge in typical and non-standard situations (productive); knowledge has a creative, poly-functional character, the desire and ability to solve the tasks with creative character (creative);

– strength of knowledge: low reproducibility of the material (reproductive); partial reproduction and ability to use previously obtained knowledge (reconstructive); high reproduction of knowledge, its replenishment after studying the subject from other sources (productive); the ability to transfer the acquired knowledge to other areas of activity (creative);

– development of thinking: low level of intelligence, the flow of mental processes is slow (reproductive); sufficient level of mastery of the basic thinking operations for standard solutions (reconstructive); rapid course of thought processes, originality of thought, non-standard approach (productive); the flexibility of thought processes, the ability to predict, the developed creative thinking (creative).

Activity criterion characterizes the ability of students to apply their experience to solve creative, educational and professional tasks, and to plan further professional and personal self-development. Indicators and levels of evaluation of the activity criteria are:

– ability to solve tasks: solving typical simple tasks; the inability to write the reaction equations (reproductive); solving problems of medium complexity level using the given algorithm; the ability to write equations of typical transformations with minor mistakes (reconstructive); independent solving of problems of medium and high complexity level; ability to write equations of transformation correctly (productive); solving complicated and non-standard tasks, non-trivial approach, ability to make a task; the ability to write equations and to predict products of unknown reactions (creative);

– ability to work with information: reproduction of information according to the instruction of the teacher; inability to find new information (reproductive); partial possession of the skills of work with informational sources; inability to analyse information (reconstructive); advanced skills of work with information, the ability to analyse and reproduce it (productive); independent search, analysis and synthesis of information; ability to use it properly (creative);

– ability to work with substances: the ability to reproduce chemical experiments under the direction of a teacher, low understanding and the inability to predict the results of their activities (reproductive); the ability to independently work according to the instruction, the ability to make conclusions is partly developed (reconstructive); the ability to work independently and analyse the results of experiments (productive); the ability to predict the results of the interaction between substances by analysing their structure and properties (creative);

– the ability to analyse the chemical context of the environment: misunderstanding of the chemical context of either domestic or professional (building) processes and phenomena (reproductive); understanding of the chemical nature of individual household and building materials and processes; ability to work safely with substances, materials and devices (reconstructive); understanding of the processes taking place in the production of building materials and structures and their exploitation; the ability to evaluate the danger of certain substances or processes for humans and the environment (productive); the ability to analyse and predict environmental phenomena from a chemical point of view; applying knowledge and skills to create new materials and technologies (creative).

Procedural indicators evaluated activity criterion. We took into account the implementation of laboratory and practical work, individual calculation and research tasks, construction projects, participation of students in the research work of the department.

The motivational-value criterion characterizes the young person's personal attitude to the chosen profession, studies and future professional activity. The motivational-value criterion was evaluated according to the personal indicators specified next. We conducted observation, testing and questioning of students. Indicators and levels of evaluation of the motivational-value criteria are:

– interest in learning and subject: the lack of interest in the subject and the learning curriculum, situational interest in particular topics (reproductive); interest in learning activities is low, selective interest in the study of discipline (reconstructive); a steady interest in learning in general and discipline in particular (productive); a steady interest in learning, a special interest in the subject (creative);

– ability to self-education: no ability to self-study, a tendency to fulfil the minimum requirements for the completion of training (reproductive); self-education skills are partially developed, there is no initiative in obtaining new knowledge (reconstructive); the desire for self-education and self-development is developed, but manifests itself not systematically (productive); systematic conscious self-educational activity, aimed at increasing own competence (creative);

– interest in the chosen specialty: the lack of motivation and interest in the future profession, the occasional choice of education (reproductive); a formal interest in a builder specialty, studying is just a necessary step for obtaining a diploma (reconstructive); conscious choice of the future profession, the initial activity is deliberately directed at

acquiring of professional competence (productive); awareness of the personal and public knowledge of the specialty of the builder, the desire to change the world (creative);

– reflection (introspection): the ability to self-examination is not formed (reproductive); in-person skills are present, more or less they reveal under the influence of external factors (reconstructive); the ability to perform an adequate self-assessment, the ability to self-organize personal, educational, professional activities (productive); awareness and comprehension of the results and prospects of own activity; ability to overcome obstacles and to succeed (creative).

Experiment was carried out in the natural conditions of the educational process. All students of the speciality "Engineering and architecture" (Faculty of Construction and Design, Lutsk National Technical University) became the sample of research. The number of students varied due to the differences in university admission.

At the initial stage (2013), 97 students were involved (experimental groups – 48, control groups – 49) to the experiment, at the final stage (2014-2017) – 202 students. The gander distribution of the sample was following: 27.5% female and 72.5% male students. The age of participants was 18-20 years.

The educational process was organized by credit-module technology (course “Chemistry”, 3 credits ECTS). The course consisted of 30 lecture hours, 30 hours of laboratory practice and 30 hours of independent work. During the experiment, special attention was paid to the motives of educational activity, students' activity and the strength of the formed skills and abilities.

Each student group of 30-32 students was divided into two subgroups by random selection. In the first subgroup the training (laboratory workshop and independent work) was conducted by experimental approach; in the second – using common educational methods. Lectures were read to the all students. Control and experimental groups of students obtained the same amount of educational material. The logical sequence and timing of study were maintained. Numerical determination of each criterion was made by the formula:

$$K = \frac{N}{N_{max}},$$

where N – the number of points scored by the respondent, N_{max}– the maximum possible number of points for the researched indicator.

The levels of formation were correlated with the rating system of evaluation in technical universities, therefore the reproductive (low) level corresponded to the criterion of formation K reproductive – 0.35-0.59 (unsatisfactory – FX); reconstructive – 0.60-0.73 (satisfactory – E, D); productive – 0.74-0.89 (good – C, B); creative – 0.90-1.0 (excellent – A). According to this system, the inadequate level of formation if the criterion K <0,35 (unsatisfactory - F) can be assumed.

For quantitative assessment and analysis of the results of experimental education, methods of mathematical statistics were used.

These methods allowed to evaluate the degree of reliability of the conclusions drawn. To test the null hypothesis (H_o) that there is no difference in the distribution of student groups by the levels of initial achievements, the parametric criterion Pearson χ^2 was used. The zero hypothesis consisted in the absence of differences in the values of the sample mean: $H_0 : \bar{x}_1 = \bar{x}_2$, where $\bar{x}_1$ – the average score in the control group, $\bar{x}_2$ – the average score in the experimental group, i.e. the experimental and control groups were homogeneous, they did not differ significantly in their success. Then the alternative hypothesis looks the following way: $H_1 : \bar{x}_1 < \bar{x}_2$. The level of significance for its verification is $\alpha = 0.05$. We used Student's t-criterion to solve the problem. We compared the difference between the two average samples with the magnitude of the mean square error of these data.

2. Results of Research.

Let's analyse the main results of the study of the cognitive, activity and motivational-value criterion of the chemical component of the professional competence of the university students. Control sections were carried out in the first lessons, after the completion of module I and after the completion of the study of discipline. The data of the comparative analysis (Table 1) indicate that the experimental teaching methodology allowed not only to improve the quality of fundamental knowledge and skills of students, to ensure their stable dynamics, but also to influence the motivational and value orientations of students, which allowed to significantly improve the formation of professional competence of future builders. There was a positive dynamics of the formation of the cognitive component of chemical competence in both the experimental and control group of students, but the qualitative indicators of this criterion after the completion of the experiment differed significantly. For example, there is a substantial increase in percentage of the students with a high (32.65%) and perfect (14.29%) level of chemical knowledge formation in the experimental groups, whereas in the control groups these indicators make up 22.92% and 10.42%, respectively. Furthermore, the proposed system resulted in a significant decrease in the number of students with unsatisfactory knowledge (2.0% in experimental groups, compared with 12.5% in the control group). Thus, the studied system stimulates the teaching of both students with a high level of knowledge and students with an underdeveloped cognitive component. In experimental groups, students were in a state of permanent pedagogical control (test technologies were applied in almost every occupation), which also positively influenced the dynamics of the cognitive competence criterion.

In the control group there was a slight increase by 2-5% in the qualitative indicators of the activity criterion, while the experimental group demonstrates a significant (1.8-2 times) improvement of this indicator. This result is explained by the introduction of interactive teaching methods that stimulate educational interest and increase cognitive activity of students. The professional orientation of tasks and experimental research contributed to the positive dynamics of the activity criterion.

Table 1. The dynamics of the chemical competence formation of future builders

Group	Level	*N*					
		I section		II section		III section	
		n	%	*n*	%	*n*	%
		Cognitive					
Control (48)	Insufficient	8	16.67	7	14.58	6	12.50
	Reproductive	19	39.58	18	37.50	12	25.00
	Reconstructive	9	18.75	11	22.92	14	29.17
	Productive	9	18.75	9	18.75	11	22.92
	Creative	3	6.25	3	6.25	5	10.42
Experimental (49)	Insufficient	12	24.50	4	8.16	1	2.00
	Reproductive	16	32.65	15	30.61	9	18.41
	Reconstructive	5	10.20	8	16.32	16	32.65
	Productive	14	28.57	16	32.65	16	32.65
	Creative	2	4.08	6	12.24	7	14.29
		Activity					
Control (48)	Insufficient	3	6.25	3	6.25	0	0
	Reproductive	17	35.42	19	39.58	16	33.34
	Reconstructive	14	29.17	12	25.00	13	27.08
	Productive	10	20.83	11	22.92	13	27.08
	Creative	4	8.33	6	12.50	6	12.25
Experimental (49)	Insufficient	8	16.33	0	0	0	0
	Reproductive	10	20.41	14	28.57	6	12.25
	Reconstructive	19	38.78	13	26.53	19	38.76
	Productive	9	18.37	13	26.53	16	33.34
	Creative	3	6.25	9	18.37	8	16.33
		Motivational-value					
Control (48)	Insufficient	10	20.83	12	25.00	10	20.83
	Reproductive	13	27.09	15	31.25	13	27.09
	Reconstructive	20	41.66	12	25.0	16	33.33
	Productive	5	10.42	7	14.58	7	14.58
	Creative	0	0	2	4.17	2	4.17
Experimental (49)	Insufficient	9	18.36	6	12.25	0	0
	Reproductive	15	30.61	14	28.57	12	24.50
	Reconstructive	18	36.74	12	24.49	13	26.53
	Productive	10	20.40	12	24.49	16	32.65
	Creative	0	0	5	10.20	8	16.32

In experimental group, it was possible to distribute the time of classroom lessons (performing more experiments, calculating tasks by rejecting traditional polls near the board, which was used in control groups) more efficiently. 87.2% of experimental group students chose work on a construction project with a problematic, creative nature, and successfully presented it, while students of control groups (67.4%) performed independent calculation works. At the initial stage of experiment, the greatest differences between control and experimental groups of students were revealed in the study of the formation of the motivation-value criterion of chemical competence. We were convinced that stable motivation of learning contributes to the achievement of high cognitive and performance indicators – components of future professional competence. A systematic explanation of the significance of the studied material for future professional activities, stimulation of cognitive activity, taking into account personal interests and inclinations in the educational process contributes to the formation of the motivational and value component of the competence of future builders. An important factor was also the focus on success ("Little success in fulfilling the task, experiment today – great success in future professional activities"). This aspect was ignored in the control groups where students were trained in traditional knowledge-focused technology. Based on experimental research of the chemical competence formation of future builders, an integrated (averaged) indicator of the formation at the beginning and at the end of the pedagogical experiment was calculated (Fig. 1). In experimental groups the number of students with chemical competence formed at the creative level was twice higher, and the number of students with insufficient level of formation was five times lower in comparison with the control groups.

Distribution of students of the studied groups at the beginning of the experiment on the level of educational achievement practically did not differ: the null hypothesis H_o was chosen. $\chi^2_{emp} = 0.76$, $\chi^2_{0.05} = 9.52$, $\chi^2_{emp} < \chi^2_{0.05}$.

At the end of the initial stage, the comparison between the distribution of students of control and experimental groups by the levels of educational achievements was again conducted, but the corresponding distributions were compared at the beginning and at the end of the experiment. Hypotheses in this case had the form:

– empirical distributions of students of experimental groups according to the levels of educational achievements at the beginning and at the end of the experiment do not differ from each other (H_o);

– empirical distributions of students of experimental groups according to the levels of academic achievement at the beginning and at the end of the experiment are different (H_1).

The empirical value of the criterion χ^2_{emp} is 12.50. Therefore, inequality is fair: $\chi^2_{emp} > \chi^2_{0.05}$ (12.50 > 9.52).

In addition, the criterion χ^2 was used to compare the distribution of control group students at the beginning and end of the experiment. The hypotheses (H_o and H_1) in this case were set in the same way as the definition of χ^2 for experimental groups: the absence of changes in student distributions and their availability.

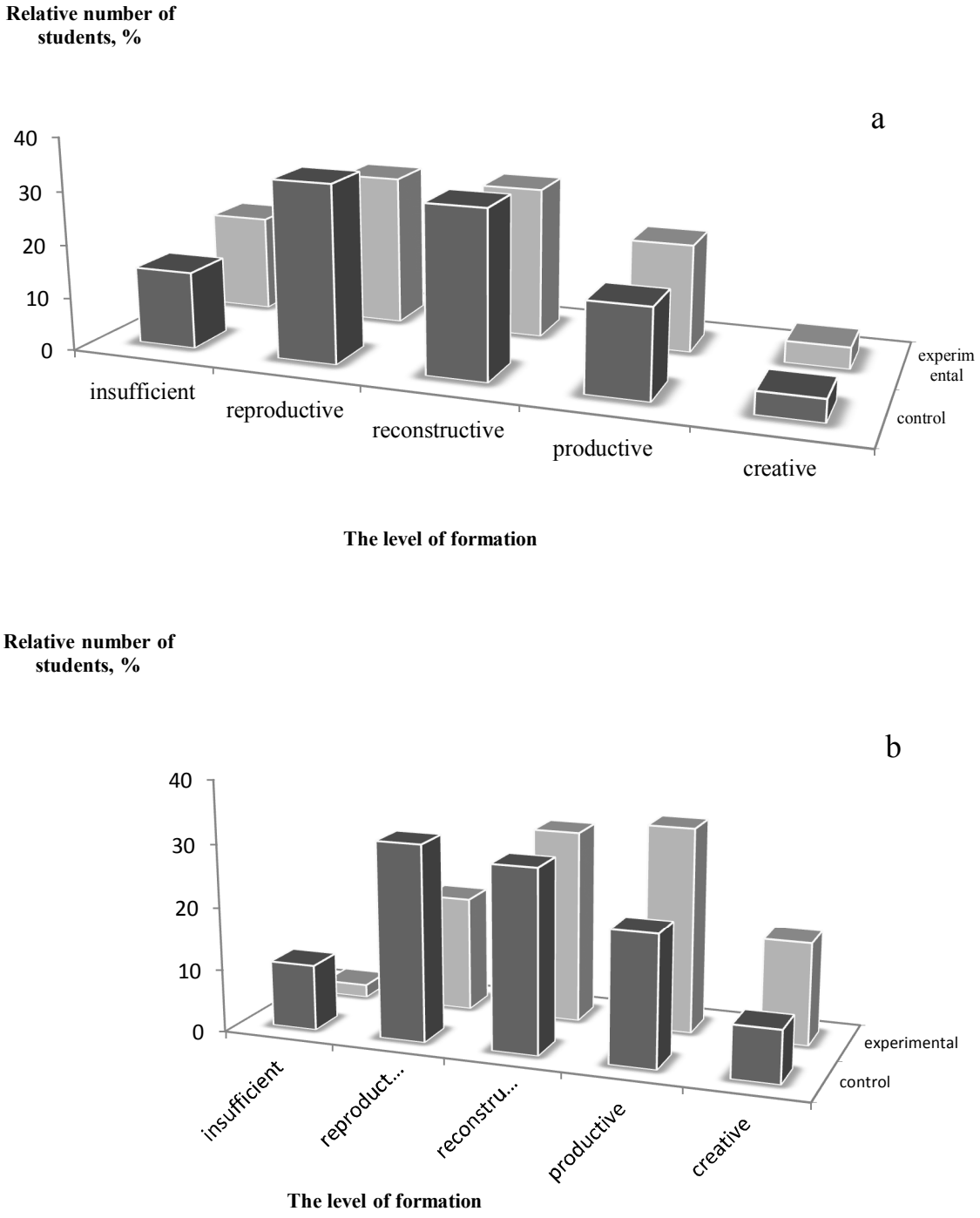

Fig. 1. Chemical competence at the beginning (a) and after (b) the experiment.

$\chi^2_{emp} = 1.30$. Therefore, inequality is fair: $\chi^2_{emp} < \chi^2_{0.05}$.

Therefore, the obtained results allow assuming that the empirical distribution of control group students at the beginning and end of the experiment did not change significantly, while in the experimental groups we recorded statistically significant changes.

The table value of Student's t-criterion for the number of degrees of freedom $v = (n_1+n_2-2) = 95$ and the significance levels 0.05 is $t_{0.05.} = 1.98$, and at the significance level of 0.01 $t_{0.01.} = 2.62$.

Since t= 3.09 is greater than the tabular one, the null hypothesis is not confirmed, i.e. the difference between the mean scores in the control and experimental groups with a probability of 99% cannot be explained by the randomness of the sample, and, accordingly, the level of success in experimental groups is objectively higher. This indicates the effectiveness of the proposed education system. Created education system was applied annually for the first year students. The results of students' progress over the last 5 years differ insignificantly (Table 2), the value of the t-criterion is lower than the table level at the significance level of .01 (Table 3). Of course, students' success also depended on the level of education acquired in secondary school, but even students with a low initial level of knowledge could successfully master the chemistry course. According to the active use of the competent approach, the number of students at the reproductive level did not exceed 7.69%. The best results of the formation of chemical competence were determined in the 2015-2016 school year and then 25.64% of students achieved a creative level. Thus, we obtained a statistically significant confirmation of the effectiveness of the competence approach to the study of natural sciences in the technical university.

Table 2. The formation of the chemical competence of future builders throughout 2013-2017 years

Levels	Number of students / year									
	2013/2014 The end of experiment		2014/2015		2015/2016		2016/2017		2017/2018	
	N=49		N=54		N=39		N=55		N=52	
	n	%	n	%	n	%	n	%	n	%
Insufficient	1	2.04	0	0	0	0	0	0	0	0
Reproductive	9	18.37	3	5.56	2	5.13	2	3.64	4	7.69
Reconstructive	15	30.61	16	29.63	9	23.08	24	43.64	23	44.24
Productive	16	32.65	31	57.40	18	46.15	20	36.36	21	40.38
Creative	8	16.33	4	7.41	10	25.64	9	16.36	4	7.69

Table 3. Results of calculation of student's t-criterion

Group	Average exam grade	N j-th group	SS	μ	t
Experimental	71.45	49	9916		
Group 2014/2015	70.85	54	8380	2.66	0.38
Group 2015/2016	74.74	39	8187	3.11	1.06
Group 2016/2017	72.69	55	9564	0.47	0.47
Group 2017/2018	69.04	52	9606	2.81	0.86

Achievement of the goal (increasing the chemical competence of future builders) was based on a clear understanding of the objectives of training. A set of educational-programmatic and methodological materials was developed, in particular:

– a work syllabus on the discipline "Chemistry";

– system of content modules; variants of individual tasks for incoming, current, final control, complex control works;

– a set of methodological support for students (lecture notes, methodological guidelines for laboratory classes and independent work);

– methodical recommendations for the organization of scientific work of students.

Control and experimental groups of students were given the same amount of educational material for the same time, the logical sequence of the study was maintained. The control and experimental groups significantly differed in the methodology of conducting laboratory lessons and the approach to independent non-auditing work, therefore it was assumed that the difference in the results of the training would be determined, first of all, by the parameters of the quality of knowledge of students (volume, systematicity, comprehension, depth), activity parameters (ability to carry out experimental research, operate information, present results) and motivated learning activities. The conducted experiment confirmed the expectations.

During the pedagogical experiment, a purposeful observation of the students' educational activity at classroom lessons (lectures and laboratory classes) and consultations was carried out. While analysing the educational and cognitive activity of students, particular attention was paid to the motivation, the degree of their activity and interest in learning, to the availability and effectiveness of the used learning methods.

According to the observation results, the effectiveness of the proposed training system was established. Students of the experimental groups were more active, more fluent in teaching material during oral responses, aimed not only to describe the stages or peculiarities of a given chemical process, but also to substantiate their practical significance.

Students of the experimental groups demonstrated a faster course of thought processes, the originality of thought, more often chosen the optimal approach to the solution of the tasks. Many students have developed awareness and understanding of the results of learning activities, understanding their significance for the prospects of the future profession. In experimental groups, significantly more students, who completed additional tasks, prepared also presentations and reports on their own initiative [6].

Students of the control groups, who studied under the traditional system, showed more surface knowledge. Especially big was the difference in the ability to solve non-typical tasks. Conversations with students from the control groups showed that most of them tried to memorize the content of the training material by rote; students did not understand the relationship and professional importance of individual topics of natural sciences.

In the control groups, compared to the experimental ones, there was a greater number of students with a low or no ability and desire for self-education, there was a tendency to fulfil the minimum requirements for obtaining an assessment and completion of training.

Therefore, control tests and surveys demonstrated how the chemical (natural sciences) competencies in control and experimental groups changed over time. According to the results of the observation of the students of the control and experimental groups during the classes, based on the analysis of the motivation of the educational activity and the qualitative indicators of success, the conclusions about the effectiveness of the proposed training system, which has been successfully used at the university to date, have been confirmed.

Conclusions.

Based on the obtained results, one can conclude that the system of professional training of future builders, designed in the framework of credit-modular technology based on a competent approach, contributes to improving the quality of the learning process and raising the level of both substantive and professional competence. High performance was facilitated by updated programs, realized interdisciplinary connections and professional orientation, introduced innovative technologies and techniques (interactive, problem, project training) and developed system for monitoring academic achievements.

The modern labour market requires the graduate to have not only profound theoretical knowledge, but also the ability to independently apply them in non-standard, dynamic production situations, master new technologies and materials, improve their own skills and succeed. Higher education becomes more competitive by changing the direction of learning from gaining knowledge to forming of the proficiency. Moreover, this forces to change the style of teaching each subject.

Therefore, the educational guidelines can be changed: instead of "remembering the rules" to "be able to apply them", instead of "study the formulas" to "understand them", instead of "read in the textbook" to "explore experimentally." We have shown to students that chemistry is a science that allows us to understand the transformation of materials in the process of their operation and utilization, and to understand this is extremely important for a competent builder. Therefore, we have achieved the most important - not raising the level of knowledge, but increasing the motivation to study. In addition, the modern building industry, like the modern world, lives on the slogan "Teaching throughout life".

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USE OF THE INTERACTIVE WHITEBOARD AT PHYSICS LESSONS FOR STUDENTS OF NON-PHYSICAL SPECIALTIES OF PEDAGOGICAL UNIVERSITIES

Abstract. *The article deals with the techniques of using an interactive whiteboard at Physics lessons for students of nonphysical specialties at pedagogical Universities in Ukraine. The considerable attention is paid to the improvement of the educational process for students of nonphysical specialties by means of using an interactive whiteboard at physics lessons. The basic forms, methods and tools that lead to effective formation of students' new knowledge in physics are clearly highlighted. The modern approaches to lectures in physics using an interactive whiteboard are systematized and substantiated, which are used at lessons with the purpose of giving students new knowledge. It is shown that during such lessons, the teacher should make every effort to ensure that students do not remain passive listeners. It is noted that one of the stages of the teacher's work with an interactive whiteboard at lectures is using presentations created in Microsoft Office. The attention is drawn to the fact that the use of an interactive whiteboard allows teachers to conduct dynamic classes in physics using author's materials and the materials created by other authors on appropriate data storage devices and on the Internet. The article presents the basic tasks of teaching physics that motivate students' active work during classes and it leads to the development of their mental activity, in particular, to the formation of natural science and philosophy thinking and outlook. Some features of using an interactive whiteboard during lectures and practical classes in physics for future teachers of chemistry and biology are analyzed on the example of the topic "Physics of the atom".It has been found out that interactive whiteboards are an important tool for conducting lessons of physics. One can show presentations, demonstrations, do simulation, make records and sketches with the help of an interactive whiteboard. In addition, the use of an interactive whiteboard in classroom enhances students' activity, increases the tempo of work of both a teacher and a student and increases the motivation of students to study. It is established that the use of an interactive whiteboard in the educational process does not solve all pedagogical problems. At the same time, working with it not only facilitates the presentation of educational material, but requires the teachers and students to be more aware of the use of multimedia technologies.*

JEL Classification: I21, I23

Introduction.

The process of studying physics at the university should have a professional orientation aimed at training highly skilled specialists. It is difficult to predict what the graduates of a higher education institution will face in practice, with the practical use of what part of physics they will have to deal with. So it is necessary to provide such a level of training in physics for students of non-physical specialties, which will allow to create a base for mastering disciplines of the subject block and will correspond to the tasks of the current stage of reforming of the secondary and higher professional education.

At present, there is a problem of scientific understanding: on the one hand, the understanding of the technological approach to teaching the course of physics for future teachers of chemistry and biology, on the other, the understanding of the content of the course in physics with the material of fundamental, applied, practical and professional orientation. The solution of the problem is to involve students in carrying out the research tasks that will enhance the quality of their professional training.

During the research on the problem of professionally oriented training of future teachers of chemistry and biology while teaching physics, the reasons that do not allow students to reach the proper level are found out. The essential reasons for the comparatively low quality of the training of future teachers of chemistry and biology in physics can be the following: the discrepancy of the content of the discipline “Physics” for students of non-physical specialties of pedagogical universities to the present state of natural sciences; insufficient training in physics for future students; lack of effective motivation to study physics; inconsistency of the existing forms of organization of educational and cognitive activity to the needs of professional training of students of non-physical specialties at the first (Bachelor) level of higher education; insufficient reflection of the professionally oriented material in the existing content of the subject “Physics”.

The solution of these problems requires enriching the content of students’ training in physics based on the study of the current level of development of science and technology; introduction of the fundamental, applied, interdisciplinary, practical component in combination with professional orientation; development of the methods for teaching physics in accordance with the traditional and innovative approaches for its mastering; use of the modern information technologies of teaching. For the present, these approaches can be realized through the use of modern learning means.

An important step in the use of modern information technology is interactive whiteboards that ensure completeness of educational material presentation during the lessons. The effectiveness of their use in the classroom is no doubt, as while using them one can write, wipe, move objects, control software with the help of a marker or a finger; in other words, one can correct and reproduce educational material which together creates better opportunities for its learning by students. An interactive whiteboard is used together with a computer, a multimedia projector and multimedia products.

Some more programs are also added to the interactive board to ensure its effective use. An interactive whiteboard simultaneously works as a computer monitor and a simple board. With the help of it one can not only display information from a computer, but also realize such relationships like “teacher-computer”, “teacher-student-computer”.

The works of V. Abramov [3], V. Antonenko [1], V. Armstrong [2], D. Averis [7], S. Barnes [2], G. Bonch-Bruevich [3], S. Brown [4], P. Clarkson[5], S. Curran [2], V. Door [7], J. Gee [6], D. Glover [7], F. Hardman [11], S. Higgins [11], V. Leonskiy [1], S. Lerman [12], C. Lewin [10], D. Miller [7], S. Mills [2], T. Nosenko [3], H. Smith [11], B. Somekh [10], S. Steadman [10], R. Sutherland [2], I. Thompson [2], R. Zevenbergen [12] and others are dedicated to the introduction of interactive boards in the educational process. The use of interactive boards in the classroom of secondary schools is elucidated in the works of P. Byel’chev, T. Dovga, I. Kysla, S. Pasanova and others (for Physics lessons), E. Arshanskiy, O. Byelohvostov, L. Vorobieva, T. Derkach, L. Ignatieva, R. L’gova, E. Nechytaylova and others (for Chemistry lessons), E. Arbuzova, A. Braslavska, K. Galoyan, E. Dan’kova, T. Ivanova and others (for Biology lessons).

The aim of this article is to prove theoretically and to show in practical way the technique of using an interactive whiteboard at Physics lessons for students of non-physical specialization at pedagogical Universities.

1. Use of the interactive whiteboard during lectures

Physics is one of the most important subjects for understanding the essence of the world around us. In order to form the basic principles of physics in future teachers, as well as to reveal the most interesting and complex moments, various technologies and equipment are used. The modern classroom of physics is filled with such applied stuff, which in practice explains every law and its action. The use of interactive whiteboard can help to make the learning process and perception of information easier.

The term “an interactive whiteboard” stands for a touch screen, which can be controlled not only by a computer mouse, but one can make notes by the touch of a finger or special markers. In our teaching activities, we can use two types of the interactive whiteboard: SMART Board DViT (Digital Vision Touch) 480 [9] and Panasonic UB-T580 [8]. We have lectures with the interactive whiteboard SMART Board DViT 480 and practical classes with the interactive whiteboard Panasonic UB-T580, because in the classrooms where there are such interactive whiteboards are designed for lectures and practical classes correspondingly. Let us give some examples of using an interactive whiteboard in practical classes of Physics for future teachers of Chemistry and Biology.

One of the stages for a teacher in lectures with the interactive whiteboard is to work with presentations created in Microsoft Office. The use of such presentations enables the teacher to use additional tools, namely in the mode “Pointer” and “Magnifier”.

Equally important for the teacher is the interactive whiteboard with the opportunities to work in the mode of “white” board. Using this mode we can make all the necessary notes

without chalk during the sessions. In addition this function makes it possible to save previously created notes and use them in the next classes.

Finally you can use educational material created with the help of the programs in the interactive whiteboard. This may be material from own funds or from the Internet.

To successfully intensificate the students' learning activity in Physics lessons we use such program to the interactive whiteboard SMART Board DViT 480:

- notebook (SMART Notebook);
- virtual Keyboard (SMART Keyboard);
- additional (marker) tools (Floating Tools);
- video recorder (SMART Recorder);
- video player (SMART Video Player).

In addition to these programs, there are other software adapted to work together with SMART Board. The most popular are the three main applications of Microsoft Office: Word, Excel, Power Point.

It must be taken into account that the software was developed for the group work on the interactive whiteboard, which added some specificity to the work of the teacher during the lessons and provided an opportunity to create a huge number of various interactive tasks done in the classroom as well for students' independent work.

Using the interactive whiteboard we are able to carry out dynamic classes of Physics with author's learning aids and those created by other authors on the proper carriers and in the Internet. Let us give some examples using the interactive board during lectures and practical classes in Physics for the future teachers of Chemistry and Biology.

The students of these specializations are limited with formal knowledge in Physics. As a rule they usually have some knowledge but it is limited with the educational material within school textbooks in Physics. They cannot use the knowledge received at school for applied and practical purposes. Therefore the main task of the teacher is to find such forms, methods and tools that could lead to the effective mastering of new knowledge by students.

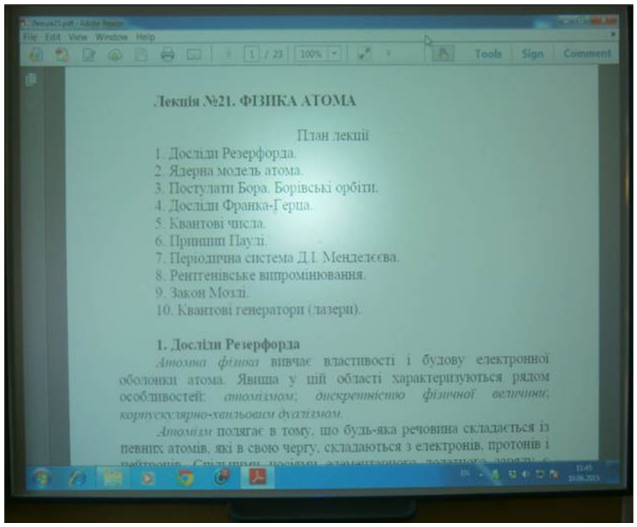

Fig. 1.

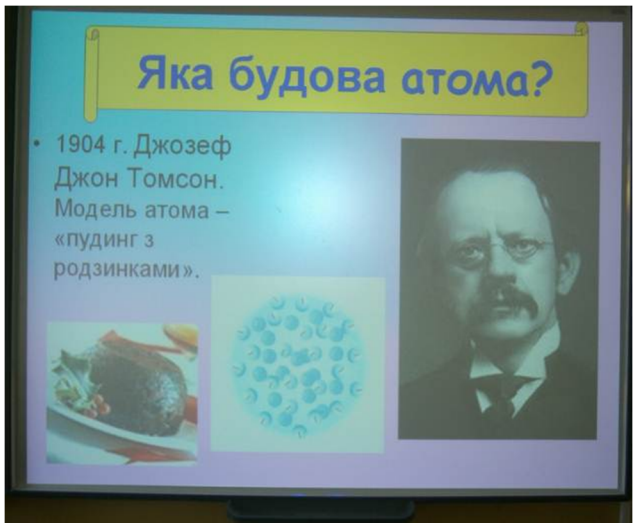

Fig. 2.

All lectures in Physics stand for giving new knowledge to students. Therefore, during the lecture a lecturer must make every effort to ensure that students do not remain passive listeners. The main objective of the lectures for teachers is the creation of active work of students in class that will lead to the development of intellectual activity, including the formation of natural scientific thinking and outlook. As an example let us take the topic "Physics of Atoms". The topic of the lesson is given on the interactive whiteboard and the students are introduced to the issues that will be considered in class and the issues for self-independent study (Fig. 1). We begin our lesson with the issue of "Rutherford's Experiments". We focuse the students' attention on the first model of the atomic structure suggested by the English physicist J.J. Thomson in 1904 (Fig. 2).

Rutherford used for this purpose a flow of positively charged α-particles emitted by some radioactive substances (such as polonium) and have the charge $+2e$ and mass which is $6{,}64 \cdot 10^{-27}$ kg (Fig. 3-4). Passing a beam of α-particles through a thin gold foil, Rutherford found out that a quantity of particles deflected to a very significant angle from the original direction, while the others even bounced off the foil.

Fig. 3.

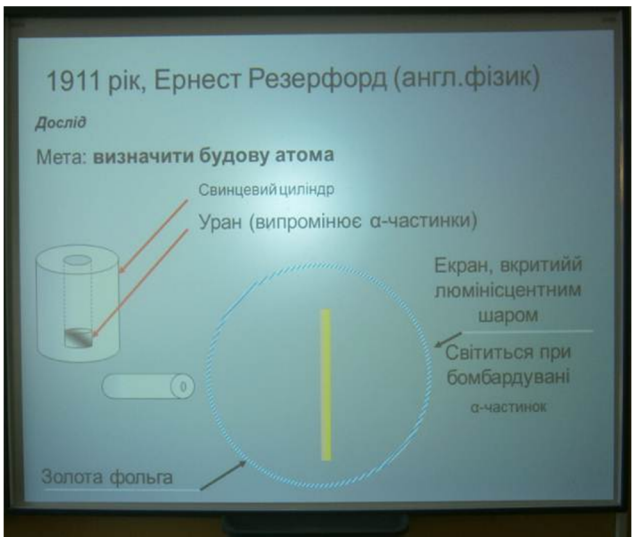

Fig. 4.

The simplified diagram of Rutherford's experiments is shown in Figure 5. The source of α -particles was placed inside the lead block with a narrow channel. All α- particles except those which moved along the narrow channel, were absorbed by lead. A narrow beam of α- articles was falling on the gold foil perpendicular to its surface. Behind the foil there was a movable screen covered with fluorescent substance; α- particles having passed through the foil caused flashes on the screen. This apparatus in the vacuum enabled to observe α- particle scattered by angle 150^0. It is important to emphasize that this result can not be explained within the model of J. Thomson because the positive charge of the atom distributed throughout its volume could not so much affect the massive and fast α-particles.

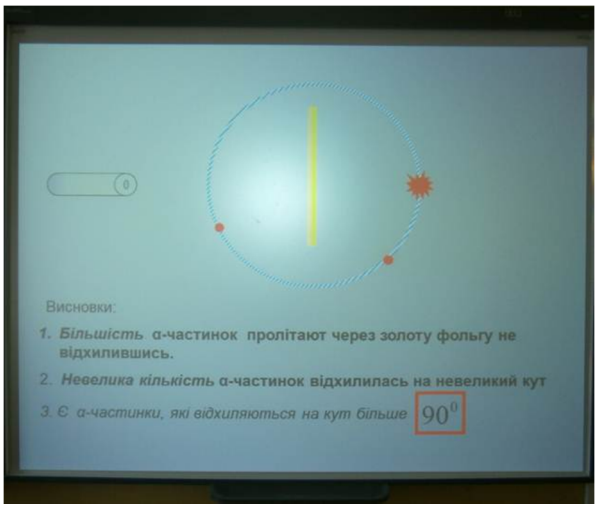

Fig. 5.

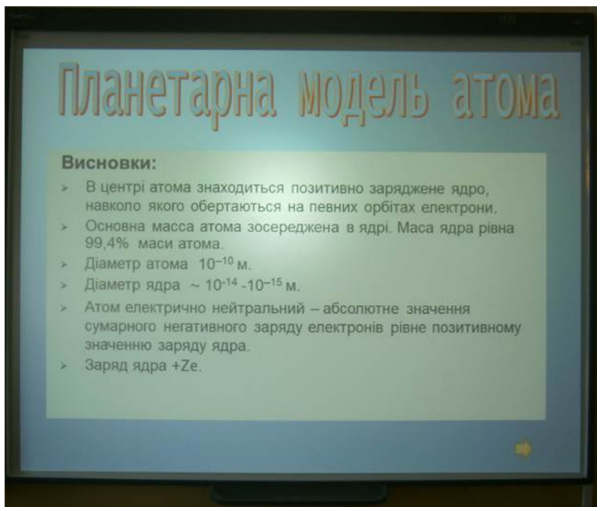

Fig. 6.

Based on the conclusion mentioned above we start the next issue “Nuclear Model of the Atom”. In this matter, the students pay attention to the fact that summarizing the results of the experiments, Rutherford proposed the nuclear (planetary) model of atomic structure in which an atom looks like a miniature solar system. According to this model, the whole positive charge and almost the entire mass of the atom (99.4%) are concentrated in the atomic nucleus. The nucleus size $\left(\sim 10^{-15}\ \text{m}\right)$ is very small compared to the size of an atom $\left(\sim 10^{-10}\ \text{m}\right)$. Around the nucleus in the closed elliptical orbits the electrons are moving and creating the electron shell of an atom. The nuclear charge is equal to the total charge of the electrons (Fig. 6). Then we offer the students to watch the video about the planetary model of an atom proposed by N. Bohr and E. Rezerford (Fig. 7).

After having watched the film we should make a generalization, namely we pay the students’ attention to the fact that the motion in its orbit, like any curvilinear motion, is a motion with acceleration. According to the laws of classical electrodynamics, the curvilinear motion must be accompanied by light emission of corresponding frequency. Therefore, in the motion of an electron around the nucleus, an atom must continuously radiate energy. But the reduction of energy leads to a reduction of the radius of the electron orbit, thus the electron must move in a spiral approaching the nucleus. And since the velocity of the electron does not change, the circular frequency of its rotation might be increasing and the frequency of radiation should be continuously increasing, it means that the radiation spectrum might be continuous. Continuously approaching the nucleus the electron should fall into the nucleus in a short perid of time, thus Rutherford’s model of the atom is an unstable system. As a conclusion we should mention that atoms are really very stable systems and have linear but not continuous emission spectra. Having mentioned the two previous issues at, we demonstrated the use of the interactive board as a simulator of slides and video episodes. We’ll show the use the interactive board in the mode of “a white board” while explaining the next issue “Bohr's Postulates. The Orbits of Bohr” to the students. We start this issue with the next atomic model proposed in 1913 by N. Bohr, a physicist of the twentieth century.

Fig. 7.

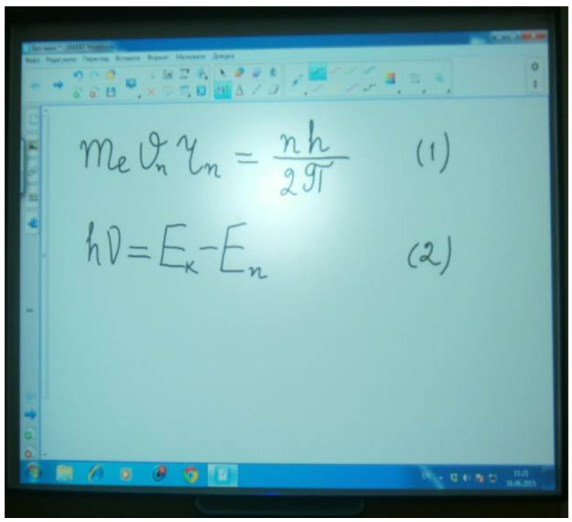

Fig. 8.

He introduced the idea of a quantum theory to the nuclear model of Rutherford and developed the theory of hydrogen atom which was fully confirmed experimentally. Besides the presentations and video proposed above we explain the educational material using the corresponding notes on the interactive whiteboard and student workbooks. It should be emphasized that on the basis of the Bohr theory of the atom there are two major rules called postulates. The lecturer gives the first postulate and writes the condition on the board which corresponds to the orbits of the stationary states of electrons in an atom (Fig. 8):

$$m_e \upsilon_n r_n = \frac{nh}{2\pi}, \tag{1}$$

where r_n is the radius of the n^{th} orbit, $N = \frac{1}{2} N_0$ is the electron velocity in this orbit, m_e is the mass of the electron, $m_e \upsilon_n r_n$ is momentum on this orbit, n is an integer called principal quantum number of the electron $(n \neq 0)$.

Having given the definition of the second postulate, the lecturer writes the formula for the quantum of energy which equals to the energy difference between the stationary states of electrons before (E_k) and after (E_n) the motion (Fig. 8):

$$hv = E_k - E_n . \tag{2}$$

These conclusions should be well kept in mind while solving problems. As we can see in Figure 8, in the mode of “a white board” we have the opportunity to write with a marker or a finger. In addition we can reduce these notes (Fig. 9), we are able to fold, to move them in a comfortable side of the board (Fig. 10), to save and to restore the notes at any time. Combining traditional teaching with the mode of “a white board” we draw students' attention to the fact that the emission occurs when the atom moves from the state with higher energy to the state with lower energy (Fig. 11a). Atom energy absorption is accompanied with its motion from the state with less energy to the state with more energy (Fig. 11b). Since these atom motions from one state to another in a schematic plan does not cause any difficulty, we do their sketches in the mode of “a white board”.

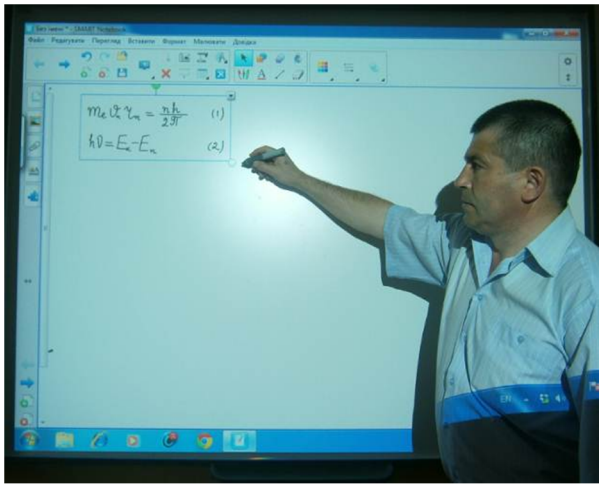

Fig. 9.

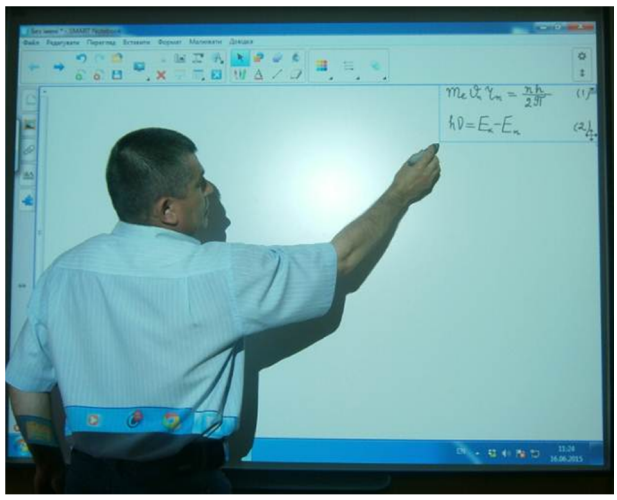

Fig. 10.

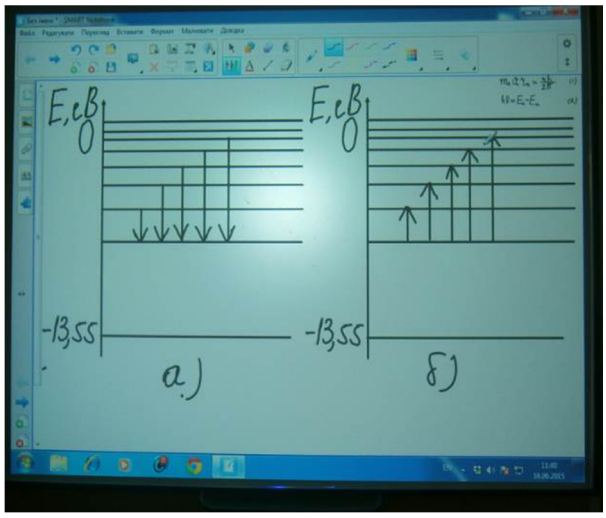

Fig. 11.

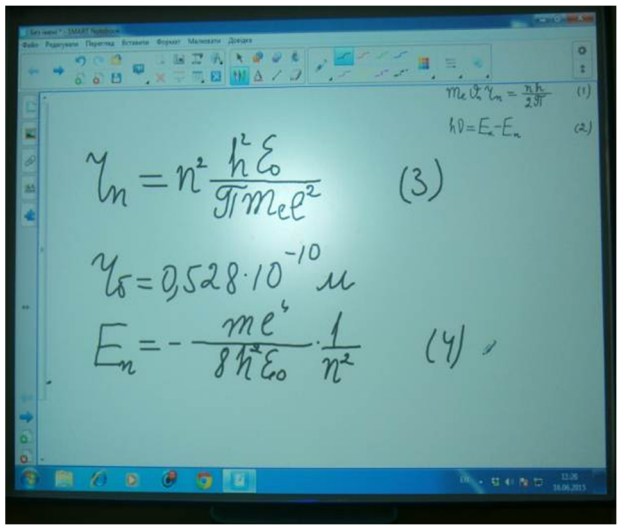

Fig. 12.

Continuing the explanation of the educational material we draw students' attention to the use of the Bohr postulates. We emphasize that due to their use we can make possible to calculate the circular electron orbits of hydrogen atom and successfully explain some patterns in the spectrum of its emission. On the board we write the expression of the Bohr radius (Fig. 12):

$$r_n = n^2 \frac{h^2 \varepsilon_0}{\pi m_e e^2}, \tag{3}$$

where e is the charge of electron and proton, ε_0 is the electric constant.

We do not insist on obligatory derivation of this formula (3) and the following formula (4), and we write them in the final form.

We say that, if we assume $n = 1$, then we get the value of the first Bohr radius, which is a unit of length in atomic physics: $r_Б = 0{,}528 \cdot 10^{-10}$ m (Fig. 12).

We write the energy in any energy level as a formula (Fig. 12):

$$E_n = -\frac{me^4}{8h^2 \cdot \varepsilon_0} \frac{1}{n^2}. \tag{4}$$

After having written the formula (4) we conclude: the total energy of an electron in a stationary orbit is inversely proportional to the square of its number.

It is important to emphasize that the Bohr theory can explain the presence of linear spectra generated in the hydrogen atom in the motion from one stable state to another (Fig. 13). If the drawings are simple, we make their sketches in the mode of "a white board" and complicated ones are made in the mode of "Slide" (see. Fig. 13).

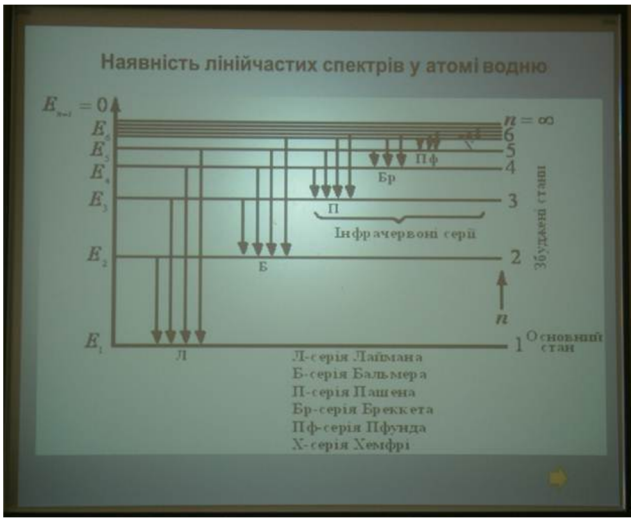

Fig. 13.

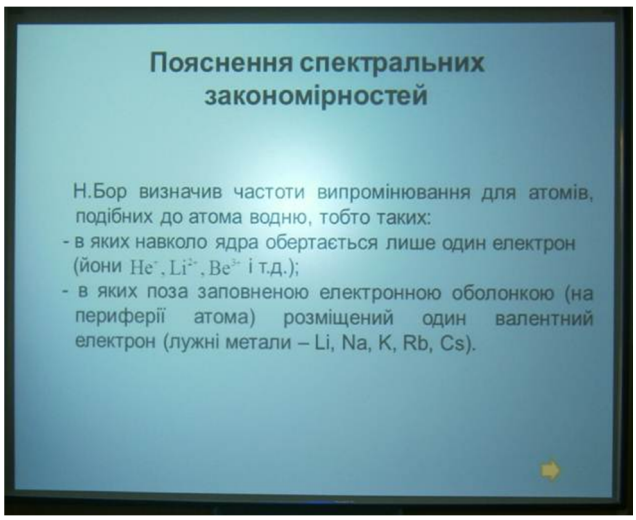

Fig. 14.

Finally we draw students' attention to the fact that similarly Bohr defined the frequency of the radiation for atoms like hydrogen atoms: ions - He^{+}, Li^{2+}, Be^{3+} etc.; alkali metal - Li, Na, K, Rb, Cs (Fig. 14). Thus, while learning this topic by the students we briefly showed the use of the interactive board in lectures. The next stage of our article is to demonstrate the use of the interactive board in practical classes.

2. Use of the interactive whiteboard during practical classes

Together with the lectures in physics, where the main aspect is the use of multimedia, it is also important to consolidate and use the theoretical knowledge, in particular, in practical lessons while doing tasks, where there is a reproduction of real phenomena and processes observed in nature. These features of natural patterns, we can demonstrate with the help of an interactive whiteboard in the form of slides, video clips, etc. While doing tasks with the help of the multimedia whiteboard, we can show pictures in both static and dynamic mode, to view video clips of various physical, chemical and biological phenomena and processes occurring in nature. The pictures, which in the process of solving tasks need to be completed, play an important role. This can easily be done using an interactive whiteboard. The formation of physical notions, learning physical laws and theories is a long process that requires not only the initial perception of knowledge, but their systematic assimilation during practical classes. The use of the interactive whiteboard in practical sessions allows to make them more modern and visual. The practical sessions of this type can develop cognitive capabilities of students and encourage them to the active participation.

Using interactive forms of learning in practical classes a teacher has the opportunity to give visual examples of applied and practical use of physical phenomena and laws. These visual, dynamic and interactive approaches allow students to think independently, analyze physical processes, show resourcefulness and ingenuity. It is known that the physical notions are formed as a result of solving tasks. Therefore, while solving tasks with the help of the interactive whiteboard in practical classes, we should form interest in the student, as well as during the lectures. It is necessary to disclose specific approaches to solving tasks. It is especially important that this approach (use of an interactive whiteboard) should take a limited place and does not replace the other approaches. Teaching experience shows that solving tasks not only with the traditional approach, but also with the use of multimedia provides an effective study of the teaching material, its mastering, training, control and directs each student to do a differentiated choice of tasks in accordance with student's level of training. Each practical class in physics for future teachers of chemistry and biology should meet the following requirements: a clear statement of the didactic and educational goal, establishing a logical connection between the objectives of each lesson, the general tasks of teaching and education in training of a specialist; scientific choice of teaching material for the lesson corresponding to the level of students' development; the focus of the class on the formation of natural science thinking; optimal combination of methods and means of teaching; organization of individual and group work of students.

In the process of solving tasks the students master the methods of researching various natural phenomena, get acquainted with new progressive ideas and views, discoveries of domestic and foreign scientists, the achievements of science and technology. Using an interactive whitebooth on practical physics classes helps students develop new skells and abilities, including the ability to design, make decisions and do creative work, and maintain a high level of innovation. The correct choice of educational tasks is very important; they determine the rationality and compactness of the use of the interactive whiteboard. Successfully selected tasks promote the development of interest in self-acquisition of knowledge, develop critical thinking, and help master complex phenomena in society and nature for future teachers of chemistry and biology. Of course, it is worth remembering that doing tasks and exercises for these specialization serves as preparation for students' future practice, use of the acquired knowledge and skills for the study of professional subjects. For example, let's take the task of the chapter "Atomic Physics". Solving the problem of Physics is made in the traditional sequence. Besides reading the conditions of problem for the entire audience, we show its condition on the interactive board: "Rutherford observed that in any coordinated attack with nuclears Cu of α-particles with energy of 5 MeV , the last ones fly back with energy of $3{,}9$ MeV . Identify the mass ratio of core Cu and α-particles" (Fig. 15). After reviewing the condition of the problem,we make a preliminary analysis of the problem: we get to know the unknown terminology, revise if necessary the appropriate material and so on. After that a teacher calls one of the students to analyze the conditions of the problem, find out its physical content, the way of finding the solution.

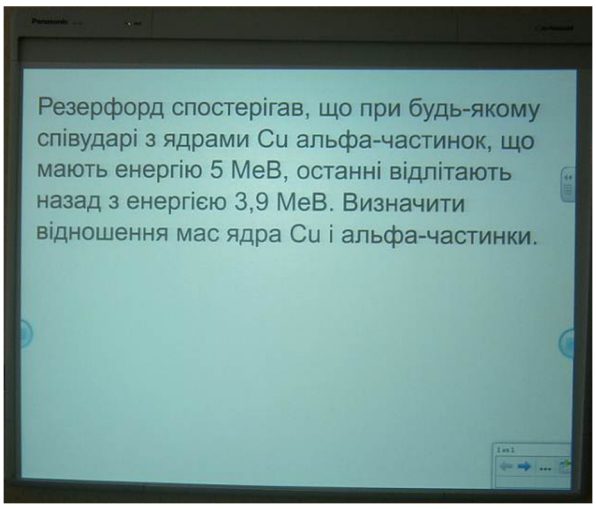

Fig. 15.

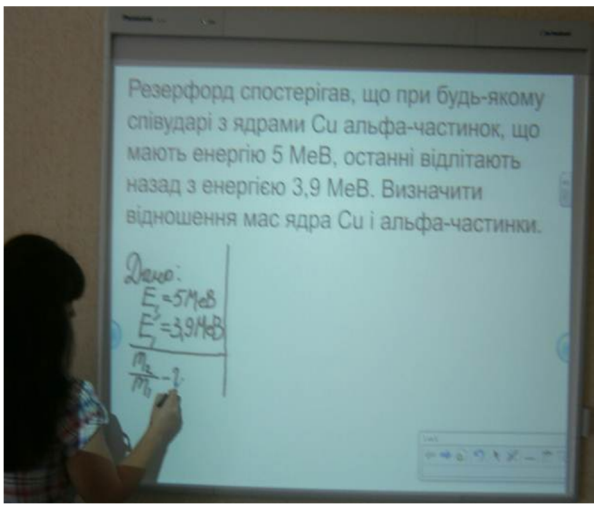

Fig. 16

The student writes briefly the condition of the problem, if necessary he reduces these conditions to the system of CI units (Fig. 16). For a better understanding of the problem it is advisable to do a schematic drawing, to demonstrate an experiment, watch video with such a phenomenon, process, law and so on. All these elements are very easy to observe while using the interactive board (Fig. 17). The proposed problem has a large solution so a part of the material written on the whiteboard can be saved, reduced (Fig. 18) and transfered to a comfortable place for us on the board (Fig. 19), or we can go to a new page.

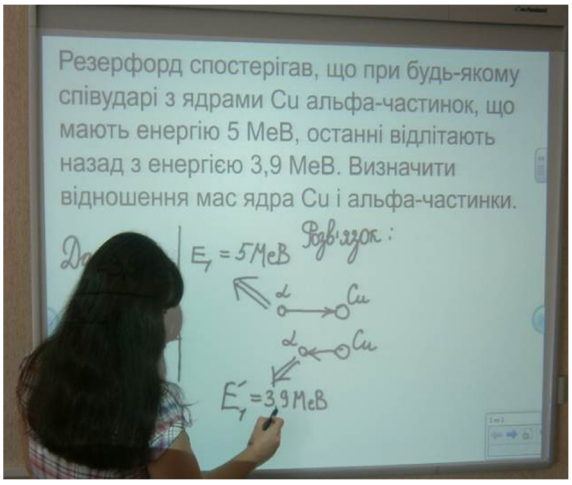

Fig. 17.

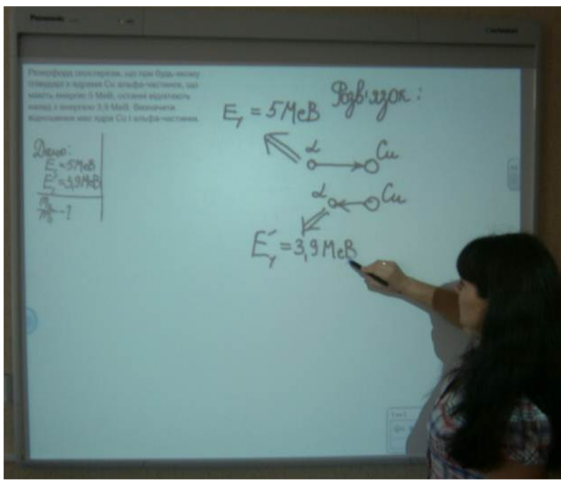

Fig. 18.

In a common blackboard we wipe the notes and in order to return to them we need to write these notes again on the blackboard. In the case of using the interactive board, we can use the notes once written at any time. This approach can be used in any part of the course in physics. The calculated tasks of such content should also be offered to master the material while testing students' knowledge and skills. We also realize: there is a specific problem that students, while conducting numerical calculations using the innovative approach, do not always overlook the essence of the physical problem. In spite of the foregoing, within this innovative approach, not every student can understand the general physical situation, which is in the condition of the task, clearly imagine the physical process or phenomenon, formulate a sequential solution of the task and only then receive an answer to the task.

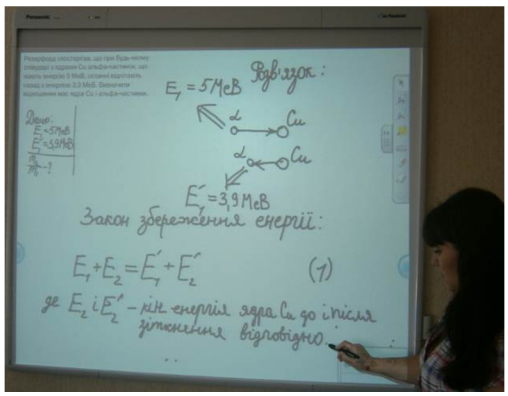

Fig. 19.

Before solving tasks using the interactive whiteboard, we recommend discussing the issues related to solving this task. While searching the answers to the tasks, the students develop a general vision for solving and analyzing the physical laws and phenomena that underlie them. It should be noted that the use of the interactive whiteboard when solving physical tasks leads to saving teaching time at lesson, allows the teacher to automatically compute the data presented in tables, graphically to represent physical processes and phenomena, and to analyze and compare the results obtained by using the graphs, diagrams. While solving the problem at the interactive whiteboard, a student starts to face some difficulties that he cannot figure out or imaginary restore a phenomenon, process, law, etc., he can use the appropriate software or the Internet, which can show it in the form of slides or video. Having received the appropriate information the student continues to solve the problem. The combination of such possibilities of the interactive whiteboard is important for the development of students' cognitive abilities. With the appropriate software for interactive boards we can also conduct laboratory sessions.

It can be stated that when using the multimedia approach in solving tasks, students' knowledge is specified, the conditions are created for understanding the essence of phenomena and processes of nature. The physical theories, concepts and quantities reach the realistic meaning; the students develop the ability to think, establish causal relationships, find out the main thing and reject non-existent. Solving tasks with the help of the interactive whiteboard allows students to be aware of the knowledge, deprive them of formalism.

The topical issue in studying the course of physics by future teachers of chemistry and biology is its relationship with other sciences: it is important not only the knowledge but also its summary in the general picture of the world. This is of great importance for students' formation of the scientific worldview and for understanding the complex problems of the present: social, environmental, economic. While studying the course of physics by the students of non-physical specialties of pedagogical universities, in our opinion, it is necessary to consider also the following circumstances: the increasing role of physics in scientific and technological progress; the interdisciplinary connections and their obligatoriness for obtaining professional basic education.

Conclusions.

We investigated the educational and cognitive activity of the future specialists in chemistry and biology in terms of the computer-based approach based on the use of the interactive whiteboard. It was clarified that teaching the special subjects, the use of teaching methods and the methods of mastering the educational material can be supplemented and improved by the appropriate use of the information technologies. This is often achieved by means of using the interactive whiteboard and the corresponding software package that is consistent with the general teaching methodology. This package of applied computer programs gives the teacher and students a guided set of training exercises and tasks.

It is found out that existing multimedia boards are convenient not only for students in studing, but also help teachers in multimedia education, as they improve the organization of the educational process and directly help to provide educational material of reference, applied, practical and professional content. The use of the interactive whiteboard while training future teachers of chemistry and biology as a basis for optimization of the educational process during the study of physics is considered. In particular, considerable attention is paid to the use of the interactive whiteboard during lectures and practical classes.

The organization of the educational and cognitive activity of the future teachers of chemistry and biology with the help of an interactive board during the study of physics was studied and the following tasks were solved: the methodical features of the motivation development in educational activity of students of natural sciences in pedagogical universities; the methodological approaches to the formation of natural sciences competence in physics; systematic improvement of the methodology of the organization of the educational and cognitive activity with the use of multimedia, which leads to productive mental and practical activities of students in the process of mastering the educational material. Thus, an interactive whiteboard is an important tool for carrying out lessons. With the help of an interactive whiteboard we we can give presentations, demonstrations, simulations, make notes, sketches, etc. In addition, using interactive whiteboards in the classroom helps students to improve their activity, to increase the teacher’s pace of work as well as students’ and to form motivation of students to learn. But the use of an interactive whiteboard in the educational process does not solve all educational problems. Interactive whiteboards do not only help to present educational material, but they require a high awareness of multimedia technology from teachers and students.

The conducted research on the problem of using an interactive whiteboard during lectures and practical classes in physics for future teachers of chemistry and biology does not reveal all aspects of the organization of the educational process and the qualitative training of specialists-naturalists. In the future, the reseach on this issue can be carried out in order to improve the content and system of teaching physics, taking into account the use of the interactive whiteboard during laboratory work, individual tasks and independent work.

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TOURIST INTERNET ADVERTISING: CURRENT STATE AND TRENDS OF DEVELOPMENT

Abstract. *The article deals with the features of the tourist Internet advertising. Different approaches to the interpretation of the concept "Internet-advertising" have been presented. Parameters for comparing traditional and Internet advertising have been highlighted. The most typical types of tourist Internet advertising in Ukraine (contextual, banner, mobile, native, advertising in social networks) have been investigated. Examples have been given. The level of popularity of using mobile phones in travel planning and booking of air tickets and hotels has been established. The volume of the advertising and communications market of Ukraine and the structure of Internet advertising have been analyzed. The services of the most popular reservation systems in Ukraine have been investigated. On the basis of aggregation of search queries, the rating of the most popular foreign and domestic destinations among Ukrainians has been formed.*

JEL Classification: L83, L86, M37

Introduction

Diversification of Internet technologies has stimulated their transformation from means of automation of production to the platform of business development. Active development of the Internet contributes to the formation of network formations that significantly affect the scope of commodity circulation, so the Internet is not only a place of information exchange, but also a platform for the sale and purchase of both electronic content and material goods [1, p. 1011].

Internet advertising is important for the tourism industry, because it provides a wide audience and is characterized by a "low entry threshold" for creating advertising campaigns, which is especially important for travel agencies. The coverage of the target audience is confirmed by the following indicators of the development of the Internet: the number of Internet users in 2018 increased by 7% compared with the previous one and amounted to 4,021 billion people; the number of users of social networks in 2018 amounted to 3,196 billion, which is 13% more than in 2017; the number of mobile phone users increased by 4% in 2018 and amounts to 5.135 billion people. It should also be noted that not only the quantitative indicators, the number of users increased, but also the qualitative ones - the time of staying in the network. As a result, we can state that as a person works, he (she) creates his (her) habitat and recreation environment on the basis of interaction with the Internet. Buying clothes, food, home appliances, furniture was just as commonplace as a trip to the store, but the obvious advantage is time saving. Recent Global Web Index data shows that the average Internet user spends about 6 hours a day as a result of interacting with Internet devices. In the scale of all Internet users we receive 1 billion years online in 2018. Therefore, advertising for travel services on the Internet is a time requirement. Price advantages, as well as simplified creation and editing processes, turn Internet advertising into a unique platform for the development of tourist business.

Thus, the chosen direction of research is relevant, due to the need to increase the sales of travel services and the annual increase in the number of Internet users.

1. The essence of the "Internet advertising"concept and its most common types in the field of tourism

According to the Law of Ukraine "On Advertising", advertising is information about a person or a product, distributed in any form and any way, and designed to form or support the awareness of consumers of advertising and their interest in such a person or product [2]. The last edition of the above-mentioned law does not include the term "Internet advertising", but the development of this segment will oblige clarification of the standard and legal concepts and additions to the law.

The definition of internet advertising is found in the works of O.Sukhariev, N.Kurmanov, K. Melkovska, D. Shakhova, Sh.Rivers, A. Shlosser, S. Shavit, A.Kanfera, P. Deshval. Let's consider more in detail what substantive content of this concept is contained in the works of the above-mentioned scholars.

O. Sukhariev, N. Kurmanov, K.Melkovska believe that Internet advertising is the next stage in the evolution of advertising, where there is a possibility of profound influence on the consumer, constant analysis of visit and impression statistics, as well as changes during the advertising campaign [3. p. 243]. A. Shlosser, S. Shavit, A.Kanfer considered Internet advertising as any form of commercial content that is available on the Internet, developed by enterprises to inform consumers about a product or a service [4, p. 36].

According to D. Shakhov, Internet advertising is a purposeful communicative activity, based on a comprehensive interaction in the Internet environment, in order to increase the interest and actions to the object of advertising, on the one hand, and to make a profit or get the benefits - on the other hand [5, p. 275-276]. According to Shane Rivers: "Internet advertising is a process of marketing services or products on www (WorldWideWeb), implemented through search engines, banner ads on the site, e-marketing and allows a product or a service to reach instantly the target audience [6, p.10].

P. Deshval considers Internet advertising as a type of mass communication based on a traditional form of advertising, but develops his own communication strategies in inrecaction with new technical and media requirements [7, p. 201]. Scientists R. Zef and B. Aronson in the second edition of their book "Advertising on the Internet" refer to two definitions: "Internet advertising is the convergence of traditional advertising and marketing direct response"; "Internet advertising is the convergence of branding, distribution of information and sales - all in one place" [8]. Internet advertising is the notification of consumers by various means, presented on the Internet, about the activities of the company, aimed at achieving the ultimate goal - the sale of goods and services [9].

A meaningful analysis of the above interpretations shows that the overwhelming majority of scholars in defining the definition of "Internet advertising" emphasize firstly that Internet advertising is a consequence of the development of traditional advertising; secondly, it activates the interest of the target audience, and thirdly, it contributes to making profits on the basis of sales of goods and services. Thus, we can argue that Internet advertising is a transformational type of traditional advertising driven by the evolution of information and media technologies that increase the sales of advertising objects.

Comparative characteristic of traditional and Internet advertising, shown in table 1 demonstrates the advantages of the latter. In general, the benefits are global coverage, automation of monitoring, minimum costs for changes and corrections, and focusing on the target audience. Taking into account the above characteristics, the tourist Internet advertising promotes the sales of tourist products and services. Using online advertising provides a competitive edge in terms of better understanding of customers, adding value to products, expanding sales channels, and increasing sales through marketing campaigns, involves building and managing websites for expanding customer base, sales, and post-sales services. Advertising means on the Internet are extremely diverse, they cover a lot of methods and forms of interaction with the consumer. For the tourist industry of Ukraine, the following types of Internet advertising are the most typical: contextual, banner, mobile, native and advertising in social networks. Let's look more closely at these types. Contextual advertising involves the creation of advertisements that will be displayed in search engines for specific advertisers for queries.

Table 1. The comparative characteristic of traditional and Internet advertising

Parameter	Internet advertising	Traditional advertising
Peculiarities of coverage	A large number of tools for attracting consumers. A short time of impact on the target audience. Possible broad reach, all over the world.	The tools are sufficient, the coverage is limited to the place of distribution of advertising, but advertising is remembered for a longer time.
Monitoring	Performed automatically, the results are available at any time in online mode.	Complicated: There are no accurate methods for tracking and evaluating results.
Show time	Days, hours or 24/7 set by the advertiser.	Advertising on TV and radio is broadcast at a certain time, which after the purchase of an advertising package can no longer be changed. Prints are published periodically by the publisher.
Changes and corrections	Can be done in minutes and at a minimum cost.	Not always possible, they require a lot of time and extra money.
Targeting	Advertisements can be shown to a specific target audience.	Offline advertising broadcasts broadly, rigid targeting is not possible.

Source: made by the author according to [9-10]

To do this, the travel company must register in the system of contextual advertising of the selected search engine, deposit money on the account, create advertisements and adjust their display; money is automatically withdrawn from the account on the fact of the ad transition to the site. As we see from Figure 1, according to the typical request for a tourist trip in Transcarpathia, one of the most popular destinations in Ukraine, 218,000 results were obtained. Along with the given query, the system offers similar keywords (for example, Transcarpathia weekend tour, trips to the Carpathians and others) and a list of pages. Contextual advertising on the first page of the search engine is the most popular, since the proposals of these tourist enterprises will be seen by potential tourists in the first place. For companies that specialize in typical popular tourist destinations, it is advisable to buy premium content advertising packages that include hundreds of key queries in popular search engines. Advertising in social networks is the easiest and cheapest kind of tourist Internet advertising. The world's most popular social network is Facebook with 2200 billion active users a month, Instagram second with 800 million, Qzone - 563 million active users. In Ukraine, the leader among social networks is also Facebook, which covers 43.5% of users. The second place is VKontakte network - 22.89% of users, on the third place is YouTube - 13.94% of users. The main feature of tourist advertising in social networks is the constant updating of information and communication with subscribers, the answer to the questions. The sign of the effectiveness of this advertisement are positive comments. Figure 2 shows a sample page in the Facebook social network of the travel agency "More Touriv".

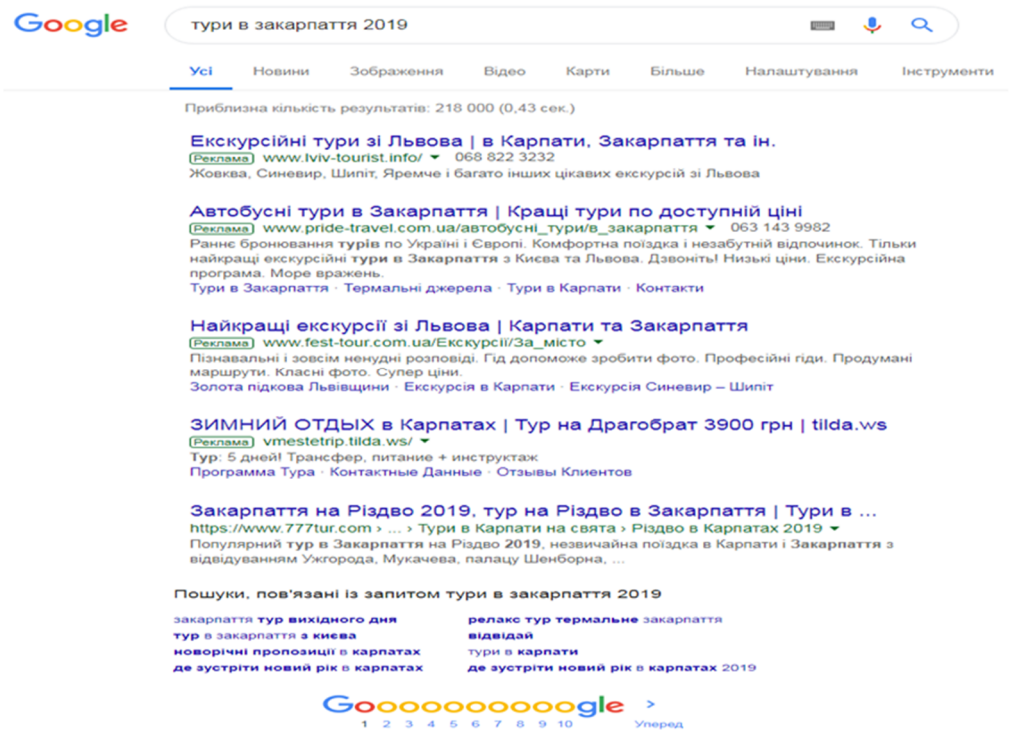

Fig. 1. An example of a tourist-based contextual advertisement in Google's search engine in Ukraine

Reviews of the work of this company are positive which is confirmed by obtained points.

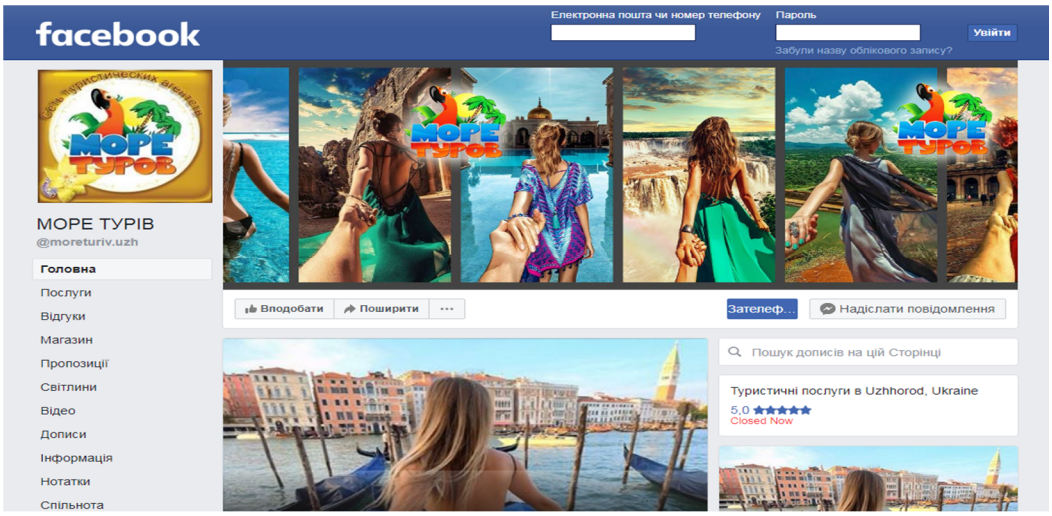

Fig 2. An example of advertising in the social network Facebook used in Ukraine

A more expensive version of advertising in social networks are customized posts of top bloggers, who write a positive feedback for the agreed payment about the tourist service with a link on the company's website. The next type of popular Internet advertising in Ukraine is banner advertising, which is a static or animated image, when clicked on which client goes to the advertiser's site. Basically, banners are located on sites with high attendance.

Figure 3 shows examples of travel banners on the popular Ukrainian weather website. Existing tourist banners show the same offer, but are presented in different ways in order to attract the attention of different segments of consumers.

Due to the large number of flashing banners, people pay less attention to them and there is the effect of "banner blindness". Therefore, tourist companies diversify the types of banners: stretching, media, pop-anders, banners-imitation. You can increase the visibility of travel banners by tracking eye movement while visiting sites.

Fig 3. Tourist banners in Ukraine

Native advertising is an advertisement naturally inscribed in the context of any message interesting for a user that is not immediately recognized as an advertisement and therefore is not ignored [9]. The native tourism advertising includes: information and entertainment articles, recommendations and comments of experts, branding of thematic pages, for example, the tour operator's logo on the main page of the tourist magazine. Very often news articles, newspapers or magazines contain news articles about opening new hotels or updating their material and technical resources. The benefits of native advertising are trust in information and a greater degree of interest because the material is not associated with advertising. Figure 4 shows a sample of native ads. Under the guise of an informational announcement about the opening of a new 5-star hotel for potential consumers, information is available about its location, institution services and price ranges. As a result, a person creates a holistic impression of the hotel and during the trip to the area; she (he) can decide to place it in it.

The magazines are the platforms for the advertisement of travel services. The most popular tourist magazines in Ukraine, which are represented on the Internet, are the following publications: Hospitality Academy, International Tourism, News of the tourist industry, Hotel and Restaurant Business, Restaurateurs. The articles are placed in thematic sections and then remain in the archive of the publication.

Fig. 4. An example of native advertising in Ukraine

Mobile travel advertising continues to gain momentum due to the constant localization of the device along with potential travelers. The key trend of mobile travel advertising is its personalization - the selection of tour package proposals according to previous searches. According to forecasts by Zenith media communications agency, by 2020, 30.5% of global advertising investment will amount to mobile advertising compared to 19.2% in 2017 and in 2021 it could overtake TV advertising [11].

The evolution of smartphones has contributed to profound changes in the field of tourism and recreation. Smartphones with corresponding applications significantly changed the tourists approaches to travel planning. Traveling mechanism has become a permanent interaction with the Internet, the constant use of smartphones. In India, 87% of last year's searches for travel took place on mobile devices, Brazil - 67%, Japan - 59% (Fig. 5).

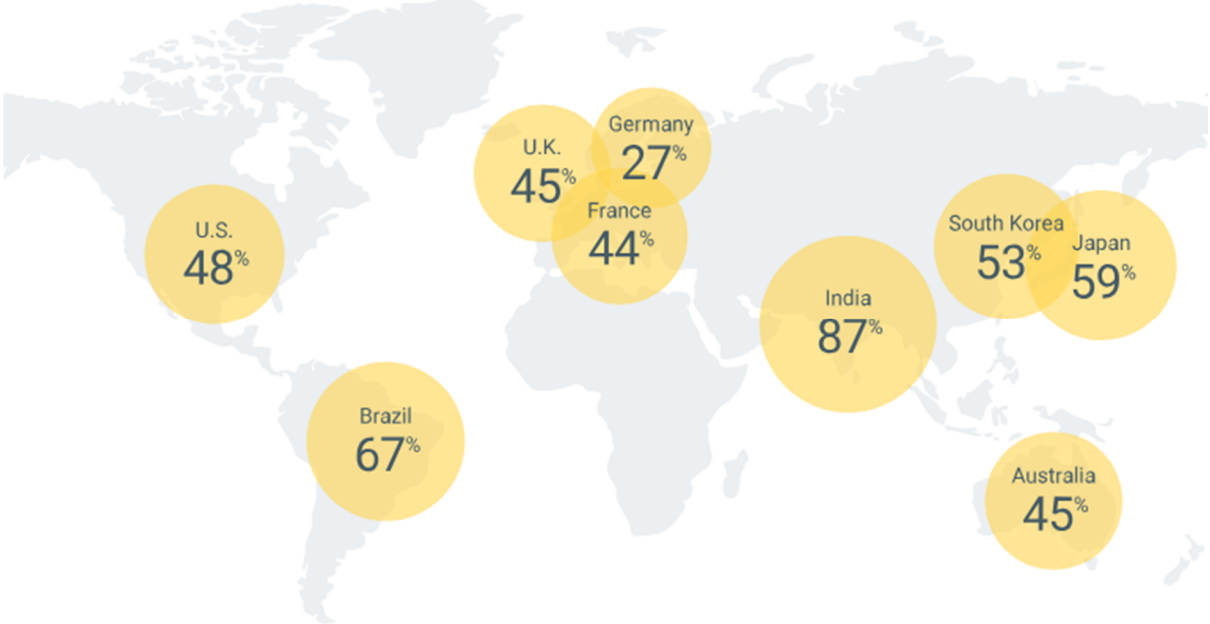

Fig. 5. Using mobile phones when planning and booking travel, 2018
(GoogleConsumerInsights [12])

In the context of smartphones use, tourists expect to receive individual offers. To be effective, mobile travel programs must take into account the variability of user interests.

Taking into account basic context information such as location and time by the smartphone, implementation of a filtering strategy will allow you to create personalized offers based on user-generated content (including social network analysis).

A worldwide trend is the growth of the mobile phone use to search for tourist attractions, hotels, restaurants. According to GoogleConsumerInsights, smartphones are the most used to search hotels and airline tickets in India - 77% and 76% respectively (Figure 6). Indians are world champions in digital travelling.

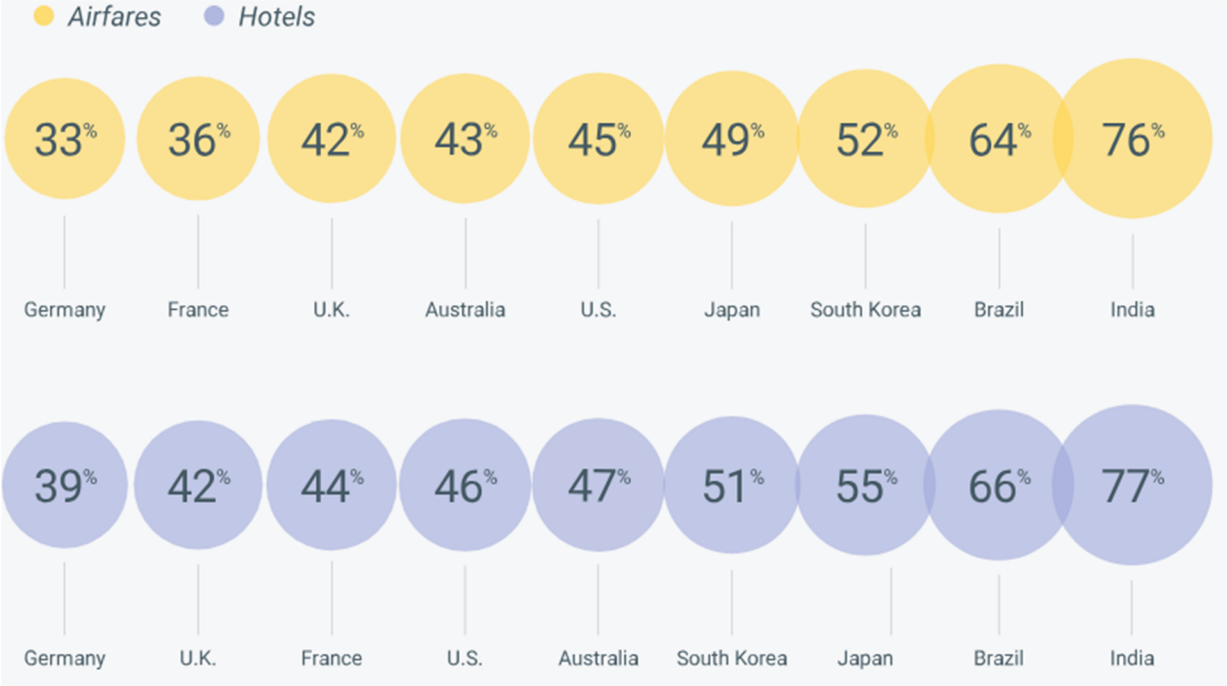

Fig. 6. Using smartphones to search for hotels and airline tickets, 2018 (Google Consumer Insights [12])

The largest number of travelers who use their mobile phone to search for holiday destinations is concentrated in South Korea - 83% (Fig. 7).

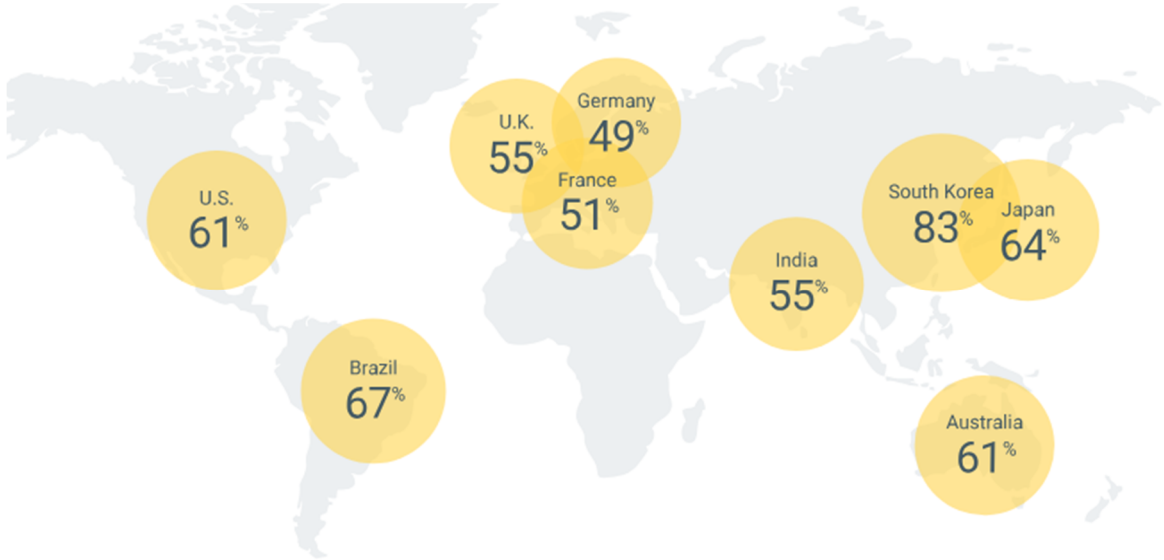

Fig. 7. Using a mobile phone to search for tourist destinations, 2018 (Google Consumer Insights [12])

A significant number of Internet users check daily their mobile phone first in the morning. Intensive use of telephones is facilitated by high-speed and high-quality Internet and availability of a large assortment of budget smartphones on the market. Therefore, if the consumer cannot afford to buy a stationary computer, laptop or tablet, then the best option is a smartphone.

2. Factors of the development of the Internet advertising market

According to the expert assessment of the All-Ukrainian advertising coalition, the volume of the Ukrainian advertising and communication market in 2018 amounted to 17520 million UAH, which is 3,479 million UAH more than in the previous one (Table 2).

Table 2.Volume of advertising and communications market of Ukraine [13]

Kinds	Results 2017, mln.UAH.	Results 2018, mln.UAH.	Percentage change 2018 to 2017	Forecast for 2019, mln.UAH.	Percentage change 2019 to 2018
TV advertising, total	7 329	9 269	26%	11 526	24%
Direct advertisements	6 355	8 071	27%	10 089	25%
Sponsorship	974	1 198	23%	1 438	20%
Advertising in the press, total	1 355	1 612	18,9%	1 843	14,4%
National press	816	965	18%	1 101	14%
Regional press	224	277	24%	321	16%
Specialized press	315	370	18%	421	14%
Radio advertising, total	480	578	20%	715	24%
National Radio	348	418	20%	518	24%
Regional radio	47	54	15%	65	20%
Sponsorship	85	106	25%	133	25%
UNO Media, total	2 692	3 493	30%	4 307	23%
Outdoor advertising	2 263	2 923	29%	3 601	23%
Transport advertising	327	444	36%	553	25%
Indoor advertising	102	127	24%	152	20%
Advertising in cinemas	40	48	20%	58	20%
Internet advertising	2 145	2 520	17%	3 772	50%
Total advertising media market	14 041	17 520	25%	22 221	27%

Structurally, the largest share of revenues comes from TV advertising - 9269 million UAH. Internet advertising occupies the third position with an indicator of 2520 million UAH. The absolute growth of the media market in 2018 was 25% compared to the previous one. According to the forecast, the largest percentage of growth in 2019 is expected in Internet advertising - 50%.

The digital advertising experts of the All-Ukrainian advertising coalition, while preparing an assessment of the market volume, adhere to the IAB (Interactive Advertising Bureau) classification in order to make the process, structure, logic of estimation and forecasting fully in the global context, but not all categories of IAB can be 100% attributed to the classical media Therefore, it was decided to form a separate estimate of the Internet market volume according to the standards and categories of the IAB and only some parts of the Internet market (banner advertising, digital video, sponsorship) to be included in the volume of the Media ads [13]. Search (paid search engine delivery), including part of the GDN is the largest Internet market volume - 6500 mln. UAH. (Table 3). Banner ads, ads in social networks take the second position with an indicator of 951 million UAH. The share of mobile advertising is presented in each type of Internet advertising. Its share is more than 50%, which indicates that most Ukrainians use smartphones.

Table 3. Internet advertising market of Ukraine [13]

Kinds	Results 2017, mln.UAH.	Results 2018, mln.UAH.	Mobile Share (traffic)	Percentage change 2018 to 2017	Forecast for 2019, mln.UAH.	Percentage change 2019 to 2018
Banner ads, social media ads, rich media	825	951	56%	15%	1 189	25%
Sponsorship	181	210	53%	16%	273	30%
Mobile advertising	426	-				
Digital video, inc. Youtube	713	1359	60%	91%	2 310	70%
Total internet media	**2 145**	**2 520**	**-**	**17%**	**3 772**	**50%**
Search (paid search engine placement), including part of the GDN	1 800	6 500	63%	261% (техніч)	9 100	40%
Other Digital	400	520	-	30%	676	30%
Total Internet market	**4 345**	**9 540**	**-**	**120%**	**13 548**	**42%**

The turnover of goods and services in the e-commerce market of Ukraine in 2017 amounted to about 50 billion UAH. In 2018, the turnover increased to 65 billion UAH. The largest group of sites in the online trading segment is the projects of EVO company - Prom.ua, Bigl.ua, Crafta.ua, Shafa.ua. All of the above sites are marketplaces. During 2017 Ukrainians spent 14.2 billion UAH on them, which is almost 70% more than the previous one. 31% of Ukrainian Internet users have made online purchases at least once [14].

Internet technology in tourism is not limited to advertising but is also characterized by an online travel market that allows you to order services all over the world, presented in one interface. The following most popular reservation systems operate at the Ukrainian tourist market:

- ABS Online – tour operator reservation system "Arteks";
- Booking.com – a company with an office in Amsterdam, is part of ThePricelineGroup, a global leader in online tourism and related services;
- ContentInn – Amadeus reservation system, in Ukraine represented by the legal entity "Content Ukraine";
- Expedia – one of the oldest sites of travel-topics, online since 1996, is not officially represented in Ukraine;
- GoGlobalTravel – platform with head office in Tel Aviv. Works in markets throughout the Mediterranean and in Europe, with strategic partners located in Asia and America;
- GTO – Ukrainian operator, system of own development;
- IATI – online reservation system for Turkish origin, in the market since 2010;
- LCI TravelSolutions – online booking system for MTC GROUP S.A. - Host company with offices in Switzerland, France, Italy, USA, Ukraine and Russia;
- Natecnia – booking system from the tour operator "Natalie Tours". Introduced as main in 2016;
- "Fishka" - dynamic package tours in 50 directions with instant confirmation of air tickets and most of the hotels offered;
- OnlineBistro – Ukrainian project - a system with quite wide opportunities for booking and dynamic packaging;
- Travel-Life.PRO – the company provides hotel reservation services and transfers around the world and car rental. On request, group requests are processed (including during a conference and service of business trips) and make reservation of additional services (excursions, reservation of a table in a restaurant, etc.);
- TUI – The operator, in addition to the standard search engine, offers a selection of hotels around the world (over 310 thousand) based on Amadeus ContentINN;
- Vitiana – an online reservation system for hotels and apartments that works only with tour operators and travel agents. Specialization - the creation of individual tours to anywhere in the world. Established specifically for the Ukrainian market, taking into account all its features;
- PAC World – online designer for individual travel, developed by the tour operator company PAC GROUP. The whole process of developing and editing the tour is fully automated [15].

Reservation services research suggests that most of them offer reservation of airline tickets, hotels, car rental and transfer. Only GTO, Natecnia, PAC World, Vitiana offer excursions. Complex service packages are available on systems such as Expedia, GTO, IATI, Natecnia, OnlineBistro (Table 4).

Table 4. The most used reservation systems in Ukraine [15]

Name	Services						Commission *	Payment
	Air tickets	Hotels	shuttle service	Car rental	excursions	service packages		
ABS Online	+	+	+		+		12-14%	account, card
Booking.com	+	+		+			5-7%**	Card
ContentInn	+	+	+				net prices	account, card
Coral+	+	+	+				9%	Card
Expedia	+	+		+		+	net prices	Card
GoGlobal		+	+	+			net prices	foreign currency account, card
GTO	+	+	+		+	+	10-12%	account, card
IATI	+	+	+	+		+	net prices	account
LCI TravelSolutions		+	+	+			net prices	account, card
Natecnia	+	+	+		+	+	10-12%	account
OnlineBistro	+	+	+	+		+	net prices	account, card
PAC World	+	+	+	+	+		10-15%	account, card
Travel-Life.PRO		+	+	+			10-13%	account, card
TUI		+					5%	account
Vitiana		+	+	+	+		net prices	account, card

*Note: * The commission on airline tickets may differ from the indicated or missing; ** is credited within 30-60 days from the date of return of tourists.*

Based on the aggregation of Google search queries, one has generated ranking of the most popular foreign destinations among Ukrainian as 2018 the first place is Turkey, followed by Egypt - the third - Bulgaria (Fig. 8). Top 10 foreign destinations close Croatia and Bali.

Fig. 8. The most popular recreation queries in foreign destinations among Ukrainians in 2018 (GoogleTrends [16])

Considering requests for domestic tourism, the following places are highlighted: Zatoka, Berdiansk, Odesa, Karpaty, Kyrylivka, Krym, Henichesk, Skadovsk, Shchaslyvtseve ta Zaliznyi Port (fig. 9). Zatoka, Berdiansk, Odesa, Karpaty, Kyrylivka, Krym, Henichesk, Skadovsk, Shchaslyvtseve ta Zaliznyi Port (Fig. 9).

Fig. 9. The most popular recreation queries in Ukraine in 2018
(GoogleTrends [16])

Comparing GoogleTrends data with the figures of the State Statistics Service, we state their homogeneity, as the largest number of tourists from Ukraine went to Turkey (955463 people) and Egypt (708262 people). Therefore, search queries are the primary basis for identifying a vacation object and purchasing a tour package.

Google algorithms determine the point on the graph for the selected period, when the query was most popular, and accept it for 100, and all other points on the graph are determined from a percentage point to a maximum [16]. Choosing to compare the most popular holiday destinations in Ukraine, a comparison was made of their seasonal requests. Figure 10 shows that Zatoka, Berdiansk and Odessa are most popular in the summer. The largest number of search queries for these places was observed in June. In November and December, there are no requests for recreation at all. That is, we can state that due to the seasonality of the destinations queries in search engines related to travel and leisure are also correlated.

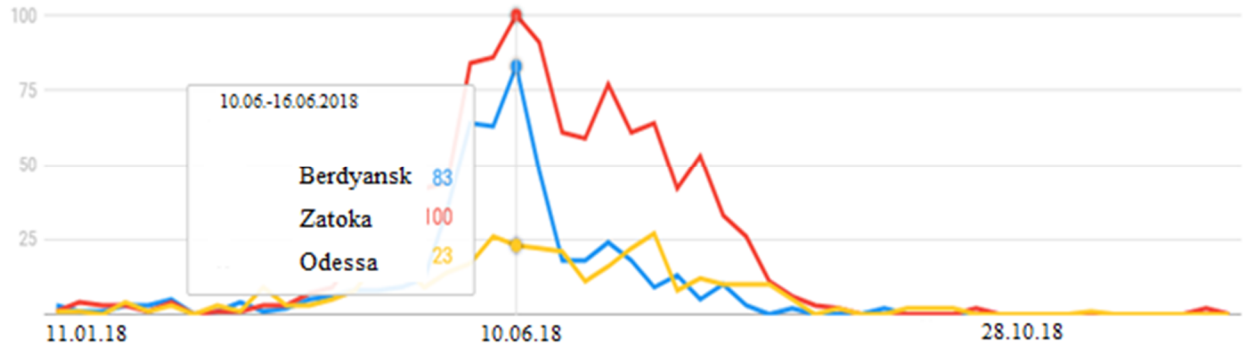

Fig. 10. Seasonality of search queries (made by the author in GoogleTrends)

Conclusions

Based on the study of online travel advertising, we can draw the following conclusions. A comprehensive analysis of scientific literature suggests that the overwhelming majority of scholars in determining the definition of "Internet advertising" emphasize, firstly, that Internet advertising is a consequence of the development of traditional advertising; and secondly - activates the interest of the target audience, and thirdly - contributes to the profit. Thus, we can argue that Internet advertising is a transformational type of traditional advertising driven by the evolution of information and media technologies that increase the sales of advertising objects. The overall benefit of online advertising is a global coverage, an automation of monitoring, minimal cost of changes and correction and focusing on target audiences.

Advertising tools on the Internet are extremely diverse; they cover a lot of techniques and forms of interaction with the consumer. It has been revealed that for the tourist industry of Ukraine the following types of Internet advertising are most typical: contextual, banner, mobile, native and advertising in social networks. It has been established that smartphones with the corresponding applications substantially changed tourists' approaches to travel planning, as the transformation of the travel mechanism itself, which is currently based on continuous interaction with the Internet.

The global trend is to increase the use of mobile phones to search for tourist attractions, hotels, restaurants, which is due to fast and high-quality Internet and availability of a large assortment of budget smartphones at the market. Google aggregates search queries based on the ranking of the most popular overseas and domestic destinations among Ukrainians by 2018. Comparing Google Trends data with the factors of the State Statistics Service, we state their homogeneity. Therefore, search queries are the primary basis for determining a vacation object and purchasing a tour package. We can state that due to the seasonality of the destinations, queries in search engines are also correlated with travel and leisure.

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CONTINUOUS EDUCATION AS A MEANS OF FORMING PROFESSIONAL CULTURE OF FUTURE SPECIALISTS

Abstract. *The article highlights professional culture as a vector of forming successful professional self-development on the basis of continuous education. The etymology of concepts "continuous education" as well as "professional culture" is analyzed, the definition of the concept "professional culture" is formulated, the peculiarities of professional culture together with its elements are stated. The source of the concept of continuous education is noted to be the religious and philosophical ideas as well as the doctrine of the constant spiritual perfection of man. The notion of continuous education is described. The principles of designing a system of continuous education: integrity, multiculturalism, continuity, interactivity, humanistic orientation and democracy are defined. The principles, that form the basis for theoretical and practical development of the concept of continuous education are indicated. The content and conditions for the formation of the professional culture of future specialists throughout life, the levels of the modern specialist professional culture shaping are determined and described. The role of future specialists as a subject of professional culture is singled out. It is proved that specialists in the process of professional activity implement and create socio-cultural values. This paper analyzes the essence of continuous education together with its values. The conceptual notions and contradictions in the role of education content change are defined, the essence of continuous education as a means of forming professional culture of a specialist, professional training and his/her professional formation is analyzed.*

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