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METHODOLOGICAL FRAMEWORK FOR IMPROVEMENT OF THE SYSTEM FOR HUMAN CAPITAL MANAGEMENT IN ASSAREL-MEDET JSC – PANAGYURISHTE, BULGARIA

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ABSTRACT. A methodology for improving the management system is presented for human capital management in Assarel-Medet JSC. It analyzes the internal and external factors that influence this process. As external factors affecting the system are stated the economic conditions, regulatory conditions, the characteristics of the industry, technological changes, demographic situation and competition. As the main internal factors are highlighted the size of the organization, organizational structure, development strategy, the mission of the organization, management and corporate culture. The author's model for improvement of the system for human capital management in the company is based on the analysis of these factors.

There are seven stages in which the process of improving the system goes through. The procedure for selecting the primary information, determining the focus-groups of the study, the methodology of the processing of the collected data and the used methods of analysis are presented. The results obtained make it possible to draw conclusions that support the thesis and the research goal and are an argument for the real-time appraisal of a developed model for improvement of the human capital system in Assarel-Medet JSC.

Keywords: methodology, human resources, management, model.

МЕТОДИЧЕСКИ ПОДХОД ЗА УСЪВЪРШЕНСТВАНЕ НА СИСТЕМАТА ЗА УПРАВЛЕНИЕ НА ЧОВЕШКИЯ КАПИТАЛ В АСАРЕЛ-МЕДЕТ АД – ПАНАГЮРИЩЕ, БЪЛГАРИЯ

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РЕЗЮМЕ. Представя се методика за усъвършенстване на системата за управление на човешкия капитал в „Асарел-Медет“ АД. Анализират се вътрешните и външни фактори, които влияят на този процес. Като външни фактори се определят икономическите и нормативните условия, производствената специфика, технологичните промени, демографската ситуация и конкуренцията. За вътрешни фактори са приети мащабите на организацията, организационната структура, стратегията за развитие, мисията на организацията, управлението и фирмената култура. Върху анализа на тези фактори е изграден и моделът за усъвършенстване на системата.

Представени са седем етапа, през които преминава процесът на усъвършенстване на системата. Посочена е процедурата свързана с избор на инструментариум за събиране на първична информация, с определяне на фокус-групите на изследването, методиката на обработка на данните и за техния анализ. Получените резултати позволяват да се направят изводи, които подкрепят тезата и изследователската цел и са аргумент за апробирането в реални условия на изграден модел за усъвършенстване на системата на човешкия капитал в „Асарел-Медет“ АД.

Ключови думи: методика, човешки ресурси, управление, модел.

Introduction

In the globalised world, characterized by highly interrelated processes, the companies are faced by increasing number of challenges that must be overcome. Competitors from all over the world, the innovation capacity and the continuous shortening of the life cycle of products on the market are essential to the development of the organization. In this context, keeping and development of highly qualified personnel is a source of competitive advantage for the organizations and a responsibility of the human resources specialists. This in turn puts the human resources management in the centre of business efficiency and is a particularly important factor for the success of the organization.

Precisely because of the arguments presented, the topic of improvement the system for human capital in the organization

is fundamental for the development and its existence in a strategic perspective.

The conduct of empirical research could go through a different set of stages. In the scientific literature there is no absolute unity among authors concerning the number of stages of work – some propose smaller, others - a higher number.

After analysis and review of a range of contemporary authors, developing their scientific activity in the field of methodologies for scientific research: P. Lulanski, the collective team of G. Bizhkov and V. Kraevski, N. Dimitrov, B. Gospodinov and collective team and others, we believe that the methodological framework of this research should be structured in the following way:

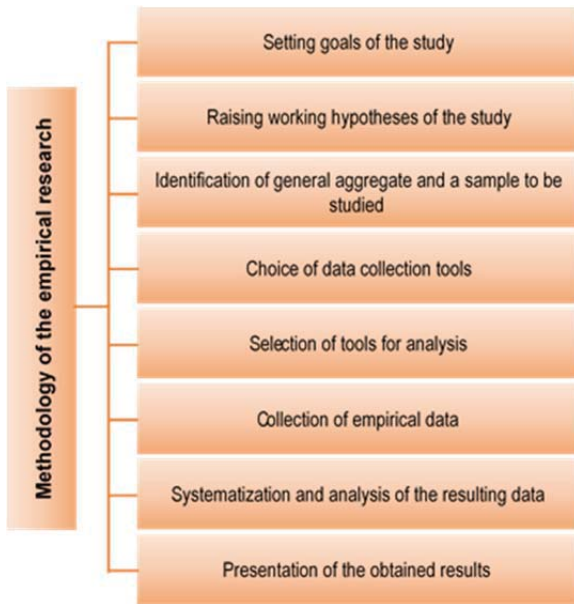


Fig. 1. Stages of the methodology of the empirical research

The purpose of the conduct of empirical research is to verify (adapt) in real conditions the model built for improvement of the system of human capital in the organization Assarel-Medet JSC. The specific subject of the study is the effectiveness of the model for improvement of the system of human capital in a given business organization, and the object of the empirical research represents the company Assarel-Medet JSC.

The main company's activities are open pit mining and processing of copper and other ores, biochemical extraction of copper and the engineering and commercial activities related to them. It carries out researching, engineering-implementing, project-designing, environmental and other activities. Assarel-Medet JSC produces and sells high-quality copper concentrates and cathode copper. The company possesses unique for the country mining machines and most contemporary flotation equipment from leading world manufacturers.

Specific to the branch characteristics of the mining industry should be taken into account: the mining sector is capital requiring, the access to mineral resources is specific, and the industry is extremely dependent on the status of the market.

In each organization, as well as in Assarel-Medet JSC, the factors that influence the human capital management system in the organization must be taken into account. Work efficiency of the employees is the most important indicator and its dimensions may be sought mainly in three directions—performance, efficiency and productivity, which are actually measurable.

Human resources management is defined as integrated use of procedures, policies and management practices on hiring, maintaining and development of employees in order for the organization to achieve its long-term strategic goals. It includes six broad areas: human resources capacity, human resources planning, staffing policy and practice, evaluation of human resources, performance management, as well as training.

A system for evaluation of the human resources, which operates effectively, assists the organization in developing a set of policies, practices and systems, that enhance the skills and motivation of the staff, in order to achieve the highest possible level of performance over a longer period of time, should be put in place.

The main advantages of an effective system for management of human capital, which is built in Assarel-Medet JSC can be derived in the following way:

- ✓ to promote the systematic planning in accordance with the organization's mission;
- ✓ to increase the capacity of the organization to achieve the organizational goals;
- ✓ to provide a clear definition of the responsibilities of every employee in the performance of his/her duties;
- ✓ to promote achieving a greater equity between remuneration and level of responsibility;
- ✓ to determine the levels of control and support the management of human resources;
- ✓ to increase the level of productivity and the efficient use of skills and knowledge of the employees;
- ✓ to ensure the achievement of results, resulting in reduced costs through increased efficiency and productivity;
- ✓ to increase the ability of the organization to manage the external and internal changes.

For a more comprehensive implementation of the assessment of the labour achievements in Assarel-Medet JSC a system for human capital management is built, including all necessary activities in the assessment of human resources and their presentation.

Factors, that influence the system for management of human resources are external and internal.

At the basis of this system for assessment of labour's achievements are the factors which have a direct or indirect impact on the behavior of the employees in the performance of their duties.

In the first large group of factors fall the **external factors**, that affect the system of human capital. B. Kane and I. Palmer, ("Strategic HRM or Managing the Employment Relationship", International Journal of Manpower, 1995) noted that the external factors are putting pressure on the organisations in respect of the management of human resources and cannot be controlled or changed and they are the **economic conditions, technological changes, normative acts and government regulations, demographic situation and competition**.

The **internal factors**, affecting the system for human capital management, are the aggregate of all events and changes that can occur within the organization: **the organization size, mission of the organization, organizational structure, strategies for development, organization management and corporate culture**. On the basis of the degree of manageability of the individual factors, the model for improvement of the system for human capital is built.

In order to reach the maximum objectivity of the research and effectiveness of the model, four main types of evaluations should be used for analytical base: **cognitive and personal evaluation, motivational evaluation, evaluation according to the standards for performance and organizational assessment.**

The model for improvement of the system for human capital in Assarel-Medet JSC contains the stages of a thorough

diagnosis of the current state of the main aspects of the system for human capital. These stages are planning and assessment, planning of the change, individual and team development, career planning, recruitment, employees selection, performance evaluation, succession planning, implementation of work, remuneration, compensations and/or other awards, providing safe working conditions.

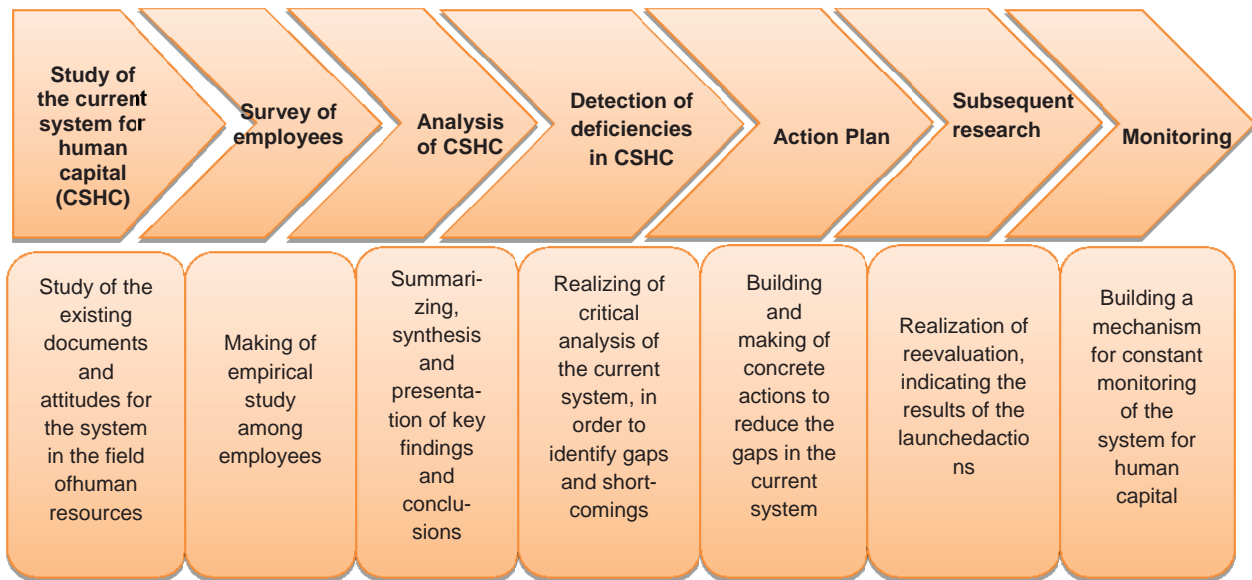


Fig. 2. Model for improvement of the system for human capital in Assarel-Medet JSC

Figure 2 displays the model of the methodology for improvement of the system for human capital in Assarel-Medet JSC. The figure clearly outlines the presence of seven main stages. Each of them includes specific actions and activities to be carried out, and is characterized by its features. The stages are meaningfully differentiated, but at the same time are related and have consistent dependence, i.e. the second stage cannot begin before the first one is completed, the third one before the second, etc. This is shown by the use of arrows to illustrate the name of the individual stages. The last stage of the presented model ends up again with an arrow, because the stage of "monitoring" is deemed to be permanent and continuous, so the process should not end after its single implementation.

Each stage includes the following features:

- **Study of the current system for human capital** – study of existing documents and attitudes for the system in the field of human resources. The first stage of the model represents a study of the current system of human capital through a survey of existing documents and attitudes. It consists of an analysis of official documents, analysis of the strategy of the organization and analysis of all available for the organization written manifestations of human capital system.
- **Survey among employees** – making the empirical survey among employees. Implementation of the empirical survey

among the employees in the organization for the current system of human capital can be done with various tools suitable for such research or a combination thereof, for example, interviews, questionnaires, focus groups, and monitoring. The aim of this study is to establish the manifestation of the non-documented elements of the system and to determine how the people in the organization perceive and interpret the information received on the individual elements from it.

- **Analysis of the current system for human capital** – summarizing, synthesizing and presenting the key findings and conclusions. The third stage may be called the analysis of the results obtained. At that stage an analysis is made of the obtained evaluations and results from the diagnosis of the documents, as well as from the held empirical research on existing and accepted system of human capital among employees of the organization. The purpose is bound with the presentation of the overall appearance of the current system of the human capital.
- **Detection of deficiencies in the current system for human capital** – the realization of critical analysis of the current system in order to identify gaps and shortcomings. This stage is a natural extension of the preceding, as based on the main conclusions and generalizations inferred, a critical analysis is made of the information received. On this basis specific gaps and shortcomings

should be established and identified in the current system of human capital. In other words, identification of the weaknesses and searching of concrete ways to solve them is vital.

- **Action plan** – construction and implementation of concrete actions to reduce the gaps and shortcomings of the current system. The fifth stage of the model is characterized by the implementation of the planned actions with the aim of improving the current system of human capital in the organization. Before implementation of the appropriate action, it is necessary to formulate an action plan and accordingly, to prioritize the selected steps.
- **Subsequent research** – implementation of re-examination, which should indicate the results of the action taken. The sixth stage of the model for improvement of the system of human capital in the organization requires that after a certain period, for example six months, nine months or a year (after the operation of the action plan), a repeated investigation to be carried out. This study should be of the same target group and with the same tools. The goal is to follow the current situation and level of development of the identified factors after the taken actions. Subsequent research takes place after a longer period of time, six months, nine months or a year in order to be able to see the actual results from the application of the system of activities.
- **Monitoring** – building a mechanism for continuous monitoring of the system of human capital. The finishing stage of the model is the monitoring. The essence of the stage represents the building of a mechanism for continuous monitoring of the system of human capital. The purpose of this mechanism is non-deviation from the desired characteristics and construction of constant feedback about the status of the system of human capital. This final stage of the model for improvement of the system of human capital in the organization is of permanent nature and should become part of the duties of the human resources department of the organization.

Conclusions

The presented model for improvement of the system of human resources management has its real implementation in the mining industry and in particular in Assarel-Medet JSC. The management is a dynamic and open process, as the key stages refer to the repeated and subsequent research, as well as the continuous monitoring. The improvement of this model suggests the usage of a number of tools of known up to this moment methods and techniques. With the advent of new technologies, the possibilities for upgrading are increasing. The management shall meet and even outpace the dynamics of

development in the different areas within the organization, as well as the social processes and expectations. The system for the management of the human capital becomes a key factor and a real partner in improving of the business processes, as the human resources manager is already equivalent and, in some cases, a leading business partner that consolidate and fulfill the connection between the other managers in the company, helping them improve their individual performance, as well as to achieve the business goals of the organization. The model contains a huge dose of universality and despite being tested in Assarel-Medet JSC, it may be applied to other organizations and sectors, considering their specific characteristics.

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The article is reviewed by Prof. Dr. Desislava Kostova and Assoc. Prof. Dr. Ivanka Shushulova.

ANALYSIS OF THE PRODUCTION, CONSUMPTION, AND PRICES OF CRUDE OIL

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ABSTRACT. The report presents world production and consumption of crude oil in the period between 1997 and 2016 and the forecast of the American Information Administration for 2017 and 2018. World crude oil reserves in 2015 are presented according to data provided by OPEC. The change in average crude oil prices for the period 2004 ÷ 2017 and in the monthly average prices for the period January 2007 ÷ May 2017, according to OPEC, are also analysed. The International Energy Agency's long-term forecast for world consumption and for the change in crude oil prices by 2040 is presented. Key factors exerting influence on crude oil prices are outlined.

Keywords: world production and consumption of crude oil; crude oil prices; key factors influencing crude oil prices.

АНАЛИЗ НА ПРОИЗВОДСТВОТО, ПОТРЕБЛЕНИЕТО И ЦЕНИТЕ НА СУРОВИЯ ПЕТРОЛ

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РЕЗЮМЕ. В доклада е представено световно производство и потребление на суров петрол за периода 1997 ÷ 2016 г. и прогноза на Американската Информационна Администрация за 2017 и 2018 г. Представени са доказаните запаси от суров петрол за 2015 г. по данни на ОПЕК. Анализирани са изменението на средногодишните цени на суровия петрол за периода 2004 ÷ 2017 г. и на средномесечните цени по данни на ОПЕК за периода Януари 2007 ÷ Май 2017 г. Представена е дългосрочната прогноза на Международната агенция по енергетика за световното потребление и изменението на цените на суровия петрол до 2040 г. Изведени са основните фактори, оказващи влияние върху цените на суровия петрол.

Ключови думи: световно производство и потребление на суров петрол; цени на суровия петрол; ключови фактори, влияещи върху цените на суровия петрол.

Introduction

Forecasting output, consumption and prices of crude oil has been carried out since the middle of the 20th century. Dozens of world, national and branch agencies and organisations all over the world prepare and periodically update their own medium-term, long-term and super long-term forecasts for the production, consumption and prices of this important energy raw material.

Along with the production and consumption of crude oil, prices are also affected by change of volume of the proven geological reserves of this raw material.

World production and consumption of oil

The best known institutions that make and update their forecasts for the production, consumption and prices of energy sources, and of crude oil in particular, are two: the American Energy Information Administration (US EIA) and the International Energy Agency (IEA). The latter currently has members from 29 countries.

S&P Global Platts is another popular source in terms of the latest news concerning the market information on oil, natural gas, electrical energy, shipping transport, oil products, metals and agro-cultures. The agency's website releases analyses and forecasts that support sales and facilitate investment decisions. Oil and natural gas quotations published by the agency generally serve as benchmarks in determining the current and futures prices of crude oil.

Fig. 1 introduces the change in world crude oil production and consumption for the period between 1997 and 2016 together with the American Information Administration forecast for 2017 and 2018. The graph is made according to data provided by the American Information Administration (US EIA, 2017).

The data presented in Fig. 1 shows that production and consumption of crude oil over the last twenty years has increased by about 33%. At some points, production exceeded consumption and at others it was the opposite. These temporary surpluses and market deficits were offset by the change in commodity stocks of this raw material over the years.

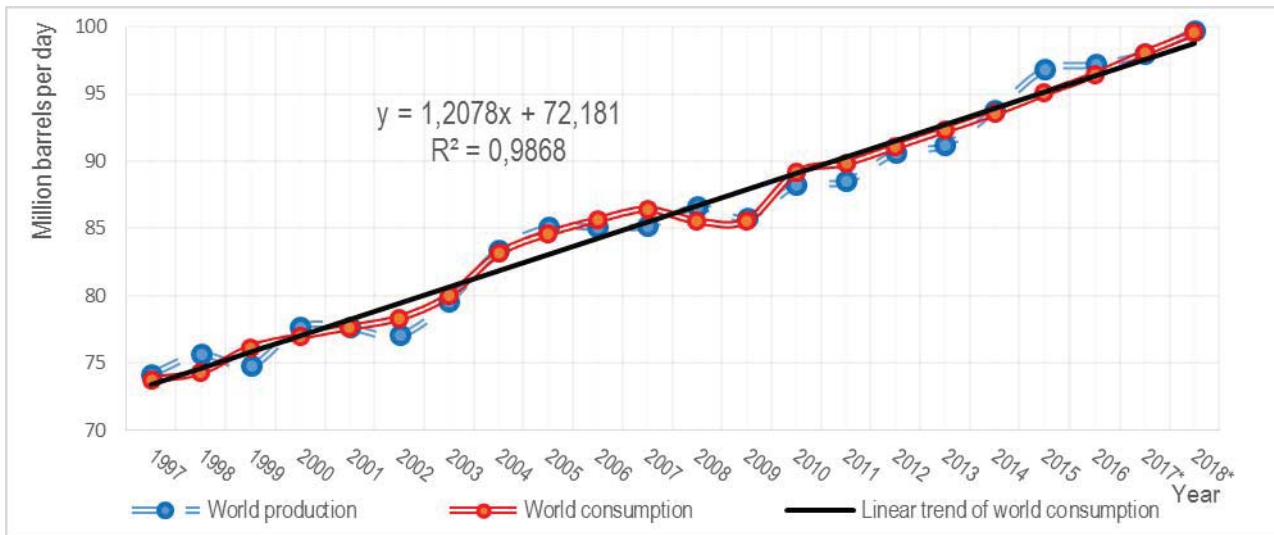


Fig. 1. World production and world consumption of crude oil per day for the period between 1997 and 2016 and the trends for 2017 и 2018

According to data provided by OPEC, in 2015, oil production by the organisation amounted to 31.8 million barrels per day. According to data by the US IEA, world oil production within the same year was 96.8 million barrels per day. This shows that OPEC member states account for about 32.85% of world oil production.

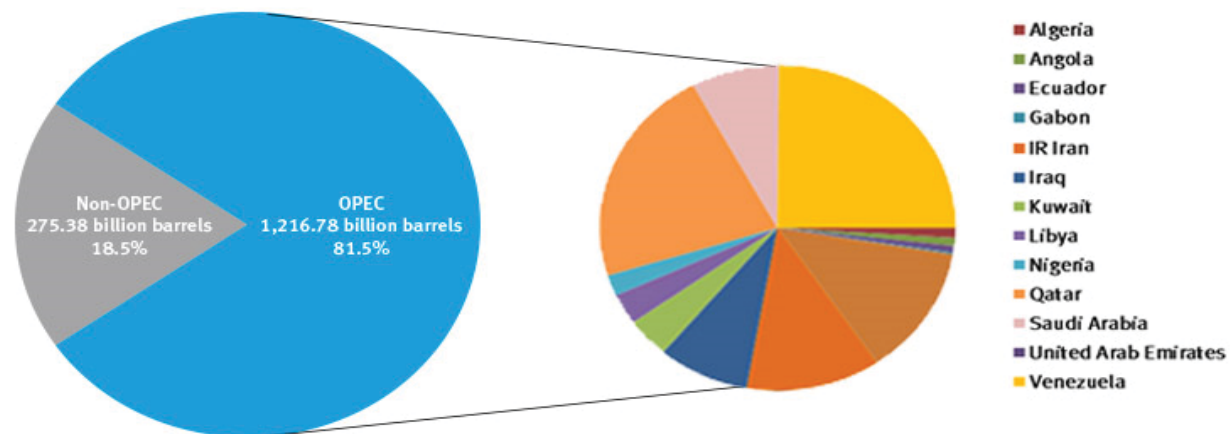
The US IEA forecast for 2017 and 2018 points to an increase in oil production and consumption of up to 99.8 million barrels per day in 2018, which is an approximate annual average production growth of about 1.0%.

The linear trend of world consumption during the period analysed, as shown in Fig. 1, has been one of growth and is characterised by a very high determinant coefficient of 0.9868.

Crude oil reserves

According to data provided by OPEC, about 81.5% of the proven geological reserves of crude oil throughout the world are in the oil fields located on the territory of the OPEC member countries. The data as of the end of 2016 are presented in Fig. 2.

OPEC share of world crude oil reserves, 2016



OPEC proven crude oil reserves , at end 2016 (billion barrels, OPEC share)

Venezuela	302.25	24.8%	Kuwait	101.50	8.3%	Qatar	25.24	2.1%	Gabon	2.00	0.2%
Saudi Arabia	266.21	21.9%	United Arab Emirates	97.80	8.0%	Algeria	12.20	1.0%			
IR Iran	157.20	12.9%	Libya	48.36	4.0%	Angola	9.52	0.8%			
Iraq	148.77	12.2%	Nigeria	37.45	3.1%	Ecuador	8.27	0.7%			

Source: OPEC Annual Statistical Bulletin 2017.

Fig. 2. OPEC share of world crude oil reserves, end of 2016.

The OPEC countries account for about 81.5% of the global geological reserves, with approximately 69.0% of the global reserves in the Gulf region.

In 2016, the proven crude oil reserves were estimated to be 1492.16 billion barrels. With the current world consumption, those will be sufficient for about a period of 40 years. The most significant stocks are in the following countries: Venezuela - 302.25 billion barrels (24.8%), Saudi Arabia - 266.21 billion barrels (21.9%), Iran - 157.20 billion barrels (12.9%), Iraq - 148.77 billion barrels (12.2%), Kuwait - 101.5 billion barrels (8.3%), UAE - 97.8 billion barrels (8.0%), etc. (see Fig. 2.).

Analysis of the change in crude oil prices

The price of crude oil depends on both its quality and location, and, likewise, on a whole set of geopolitical and economic factors. It should be pointed out that oil price has been significantly dynamic within the past and the current centuries.

As a result of the global financial and economic crisis of 2008 ÷ 2009, oil prices plummeted sharply to reach record levels of US\$ 131.22 per barrel in July 2008. Then came a period of downs and ups. February 2016 saw a 30-year bottom of US\$ 29.61 per barrel. Since then, oil prices have been marked by fluctuations and in June 2017, it was US\$ 44.58 per barrel.

World oil prices in the period from January to May 2017 climbed against the background of the new US sanctions against Iran.

Brent oil has risen by 0.35% reaching US\$ 57.01 per barrel in March 2017. The Iranian national oil company has increased oil output to 4 million barrels per day. At the same time, however, in compliance with the OPEC agreement, Tehran should not exceed the level of 3.79 million barrels per day. Iranian oil company leader Ali Kardor has voiced his confidence that the export of raw materials is going to reach 3 million barrels a day by the end of 2017. He has also pointed out that in December 2016 Iran reached a record rate of petroleum product export for Europe amounting to 900 thousand barrels a day. In late November 2016, at its meeting in Vienna, OPEC decided to reduce oil production to 32.5 million barrels a day. It was then claimed that during the first half of 2017 the members of the cartel would reduce the average daily yield by nearly 1.2 million barrels. An exception was made for Iran since international sanctions against this country had only recently been lifted.

OPEC has allowed the Islamic Republic to increase oil production by 90,000 barrels per day to a level of 3,797 million barrels per day. Nigeria and Libya were also allowed not to reduce yields, Russia's Information Agency (TASS) recalls. Iran has summarized the results from an auction held on 15 February 2017, wherewith the Russian Gazprom and Lukoil companies participated, that concerns the development of oil fields, Reuters reported. The Iranian National Petroleum Company is preparing a second list of foreign companies that will be eligible to tender for oil extraction from localities in Iran.

Fig. 3 shows the change in the average annual crude oil prices for the period 2004 ÷ 2017. The graph in figure 3 is based on OPEC Backed Price.

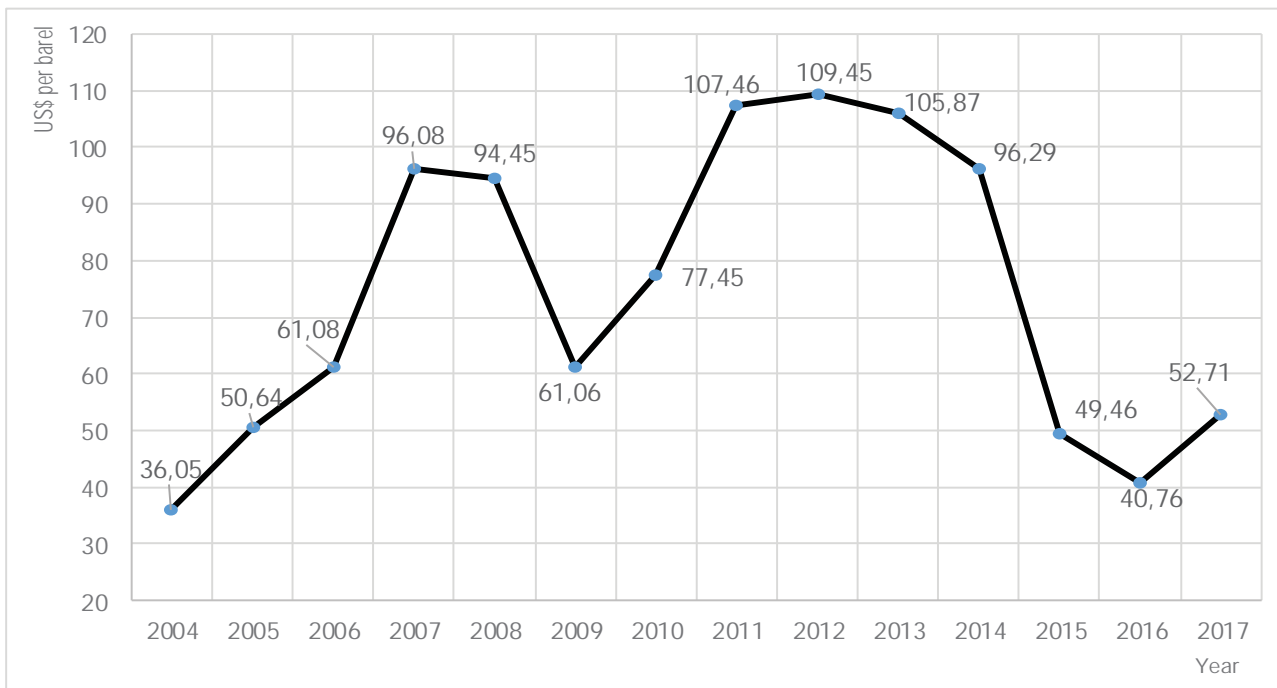


Fig. 3. Annual crude oil prices for the period 2004 - 2017

As can be seen from the data in Fig. 3, the average annual crude oil prices for the period between 2004 and 2017 are characterised by extremely high dynamics.

From April 2009 to December 2014, there was a steady rise in crude oil prices. By the beginning of September 2010, they rose to about 2.5 times, bringing about an increase in production costs in all sectors of world economy.

No estimate can be given as to the direction of the price of oil in the next few months of 2017.

According to Kaloyan Staikov of the Institute for Market Economics (IME) "it is difficult to say unequivocally since there are balanced factors for the movement of prices on the oil markets in both directions" (Petkova, 2017). The direction of oil flows has changed following the OPEC agreement of November 2016. OPEC does not expect a rebalancing of the oil market before the second half of 2017.

Statkov also explains that commerce in recent months has been affected by OPEC communications, but the main factor for oil prices has been the commodity stocks. They still outpace consumption, and it is precisely the consumption that will determine, whether the price will go up or down in future.

Estimates for 2017 suggest a slowdown in the economic growth of such countries as China, as well as a rather unclear situation for Europe. "This pushes prices down", Staikov said.

Another significant factor is US President Donald Trump. He has promised incentives for the US economy, which raises the value of the US dollar. The more expensive US currency always results in cheaper oil. In addition to the policy of increasing interest rates, which the Federal Reserve has already announced, US investment will be stimulated, but the US currency will also be made more expensive. This factor also presses the oil price down.

According to Ivan Ivanov, Chairman of the Commission for Energy and Water Regulation (KEVR), the oil price rise was not going to be long-term. The effects of the OPEC decision would be forgotten as early as the spring of 2017. He predicted that the reduction in raw material quantities on the market caused by the freezing or limiting yields in the countries of the organization would very quickly be replaced by oil from US shale fields.

Oil prices have an impact on the price of natural gas in Bulgaria, albeit with a several month delay. The reason is the formula used, which takes into account the price of alternative fuels. The fact is that the gas market has changed in recent years. Extra sources are now available, not just the so-called "tubular" gas, and this forces the manufacturers to gradually become more considerate to their customers.

The World Trade Organization (WTO) contributes on a global scale to lowering trade barriers by means of: reducing duties, fees and other constraints; securing the uniformity of trade regulations by the introduction of international standards; overcoming conflicts of interest through the creation of mutually beneficial trading conditions. Its core business is

founded on open trade that is based on commercial interests. WTO's policy is aimed at expanding market opportunities and promoting free competition.

Crude oil, natural gas and coal, whose prospecting and exploitation require significant investment and operating costs, are of strategic importance for the global energy balance. The total oil consumption over the past 20 years increased by more than 33%. It is the largest in industrialised countries such as the USA, China, Japan, Germany, France, Italy and others. Research has shown that with an increase in economic activity in the world by 1%, global energy consumption increases by an average of 0.5%. It is expected that, in 2030, the quality of life of about 80% of the planet's population will depend heavily on the energy resources used.

Global demand and supply of energy carriers depends mainly on the development of world economy, the growth rates of the individual sectors of the economy, the growth of the population of the planet, the amount of explored and proven deposits of underground natural resources, and the mining and extraction facilities constructed in various countries. The main indicator for ensuring the world economy with energy raw materials is the ratio between the volume of proven geological reserves and the yield level.

Global oil trade in covers their exports and imports both worldwide and in individual regions and countries. World market conjuncture is primarily determined by the impact of a number of economic and political factors. In 2016, the largest exporters in terms of value were the Gulf countries and Russia.

The International Energy Agency (IEA) predicts for global consumption of oil and other liquid fuels to range from 90 million barrels a day in 2017 to 100 million barrels a day in 2020 and to around 121 million barrels a day in 2040.

In its annual report for 2016 (U.S. EIA, 2016), the International Energy Agency predicts that the change in crude oil prices for the 20 years to come will vary within the limits shown in Fig. 4.

According to the IEA, the strategic development will be oriented towards solving the following priority tasks:

- exploitation of new oil and gas fields needed to meet the growing demand for energy raw materials;
- construction of new pipelines and gas pipelines to supply energy raw materials to consumers;
- expanding international cooperation to attract the necessary investments;
- Improvement of extraction and processing technologies with a view to improving economic and environmental efficiency;
- developing long-lasting and mutually beneficial connections between countries producing energy resources and those consuming energy resources;
- stabilising the international markets for energy raw materials in order to ensure global consumption;
- intensifying the interaction while ensuring the required safety of the energy equipment;
- coordination of efforts and actions to overcome possible energy crises in the world economy, etc.

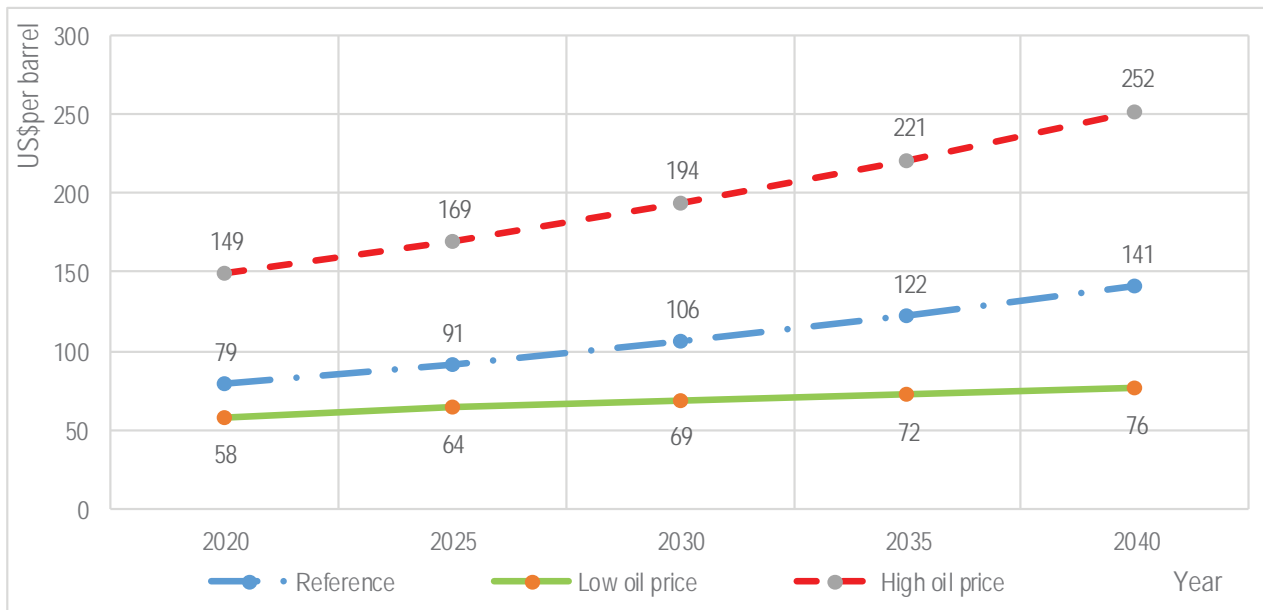


Fig. 4. Expected crude oil prices according to IEA

In the present century, the world trade in energy raw materials will continue to have clear geo-economic and geopolitical dimensions. Those are determined by the strategic interests of individual countries and, above all, of developed countries and are due to the great geographic diversity in the location of the world centres of production and of those of energy consumption in the world.

Should oil prices rise, this could boost US shale production and gain market shares at the expense of OPEC, Citigroup Bank experts said. According to analysts at Morgan Stanley Bank, the American shale industry is the "obvious winner" of OPEC's decision.

Shale producers in the USA will be stimulated by oil prices in the range of at least US\$ 50 to US\$ 60 a barrel, rendering an account of sustained growth for several years to come, Citigroup Bank reports.

Although lowering yields to 32.5 million barrels per day does not immediately solve the supply problem, it can potentially lead the world oil market to rebalancing, which will be felt in the first half of 2017, Morgan Stanley Bank pointed out. With a yield of 33 million barrels a day, rebalancing will only have effect in the second half of 2017, though "supply outside OPEC may put this moment at risk," the bank stated in its report. It also said the following: "The truth is that when production outside OPEC grows, the cartel will not be able to manage prices in the medium term."

The aim of all of these agreements is to raise crude oil prices in the short term, but this could hardly be achieved in the medium and long term.

Fig. 5 shows the change in the average monthly crude oil prices for the period between January 2007 and February 2017. The figure is based on OPEC Backed Price.

From January 2014 to January 2016, there was a significant drop of up to \$ 27.25 per barrel. Since the beginning of last year to date (i.e. June 2017), the price of crude oil has almost doubled to US\$ 44.58 per barrel.

The reason for the rise in oil prices is the statement by the Saudi Arabian Energy Minister that all OPEC and non-OPEC participants have agreed to extend their agreement for a further nine months.

It is interesting to know who will profiteer from the low prices. "Cheap oil is profitable for consumers."

According to Radev (Radev, 2016), what is characteristic of the current drop in global oil market prices is that it is caused by changes in both demand and supply. On the one hand, there is a boom in shale oil production in the United States, and on the other hand is the weak demand on the global market.

The major factors affecting demand, supply, and prices of crude oil are extremely diverse. In the long terms, oil prices are influenced by the following factors: the economic growth of the global economy; population growth; the change of proven geological reserves; regional military conflicts; OPEC production regulations and the cartel agreements to limit mining and to impose import quotas for member states over certain periods of time; internal military conflicts; the security of crude oil supplies for oil refineries; the imposing of an embargo and of import restrictions; climatic cataclysms; the effect of seasonality; the imposing of import duties and the like; world production and consumption of oil; market speculations; exchange rate fluctuations; intense competition, etc.

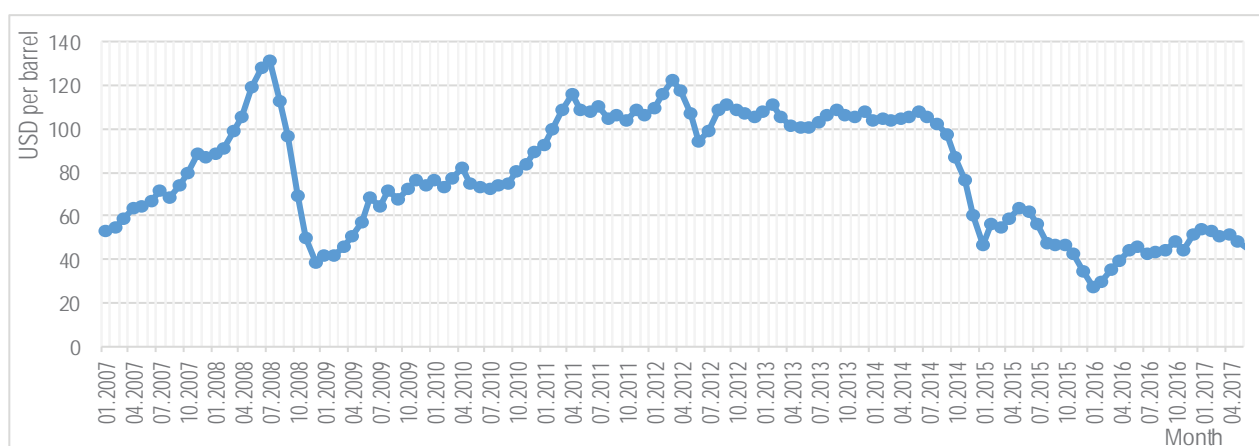


Fig. 5. Average monthly crude oil prices according to OPEC data for the period January 2007 ÷ May 2017.

Conclusion

Crude oil production and consumption in the period between 1997 and 2016 has grown by about 33%, from 75 million barrels per day in 1997 to 97 million barrels per day in 2016.

The U.S. IEA forecast for 2017 and 2018 is for oil production and consumption to increase to the level of 99.8 million barrels per day in 2018, which is about 1.0% average annual output growth.

Average annual crude oil prices during the period 2004 ÷ 2017 are characterised by extremely high dynamics, which is mainly due to temporary surpluses or deficits in the stock volume.

If oil prices are on the rise in the short term, shale production and other producers may be boosted to gain market share at the expense of OPEC. This would again push prices down.

In the long terms, global demand, supply and prices of energy carriers depend on: the development of the world economy; the growth rates of the individual sectors of the economy; the growth of the population on the planet; the geo-economic and geopolitical situation; the amount of explored and proven geological reserves, and the constructed mining facilities in various countries. Cartel agreements, on the other hand, have a rather short-term effect.

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The article is reviewed by Prof. Dr. Desislava Kostova and Assoc. Prof. Dr. Juli Radev.

LABOUR PRODUCTIVITY IN THE MINING INDUSTRY – TRENDS AND PERSPECTIVES

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ABSTRACT. The report summarizes the trends in the labour productivity index of the world, European (EU-28), and Bulgarian economies for the period between 2000 and 2016. It represents a prediction of the International Labour Organization for its dynamics up to 2021. The changes in the labour productivity of Bulgaria and in the "Industry" sector for the indicated period are examined. They are determined on the basis of current prices and of 2010 prices per employee and per hour worked. The tendencies in the change of the labour productivity for the "Mining and Quarrying" sub-sector for the period between 2008 and 2015 are described, based on the income generated by the activity per employee, and some conclusions are drawn.

Keywords: labour productivity, mining industry, economic analysis

ПРОИЗВОДИТЕЛНОСТ НА ТРУДА В МИННАТА ИНДУСТРИЯ – ТЕНДЕНЦИИ И ПЕРСПЕКТИВИ

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РЕЗЮМЕ. В доклада са обобщени тенденциите в изменението на производителността на труда на световната, европейската (ЕС-28) и българската икономика за периода 2000 ÷ 2016 г. Представена е прогноза на Международната организация на труда за нейното развитие до 2021 г. Проследено е изменението ѝ за България и за сектор „Индустрия“ през посочения период, като е определена на база текущи цени и по цени от 2010 г. на един зает и на един отработен час. Изведени са тенденциите в производителността на труда за подсектор „Добивна промишленост“ за периода 2008 ÷ 2015 г., изчислена на база приходи от дейността на едно заето лице и са направени някои заключения.

Ключови думи: производителност на труда, минна индустрия, икономически анализ

Introduction

The increase in world production and consumption of mineral deposits has become a favourable factor for the dynamics of mining and processing of underground natural resources and, hence, for the realised labour productivity in the mining industry. In recent years, the Bulgarian mining industry has achieved one of the highest rates of labour productivity as compared to the other sub-sectors within the "Industry" sector, as well as within this country's national economy.

The objective of the current report is to outline some trends and perspectives for the development of the labour productivity indicator and to reveal the factors for its raising through the analysis of the available statistical information on a global, European, national and industrial branch level.

Situation and dynamics of labour productivity for the period between 2000 and 2016

Fig. 1 shows the dynamics of variation for labour productivity determined in US \$ in terms of the Purchasing Power Parity (PPP) per employee in the world, the European (EU 28) and the Bulgarian economies for the period between 2000 and 2016. The figure also gives the International Labour Organisation (ILO) forecast for its development until 2021. The figure is based on ILO data.

The data in Fig. 1 shows that during the period 2000 ÷ 2016, the world, American, European and Bulgarian economies have achieved a steady rise in labour productivity, determined in international US\$ in terms of purchasing power parity per employee. The only exception is the value of the 2009 indicator, when the negative effects of the global financial and economic crisis on all economic systems were sensed most acutely. In 2009, the indicator for Bulgaria shrank by US\$ 280 per employee, or by 0.80%; for the EU, this drop was by 2054 US\$ per employee, or by 2.63%; on a global scale it was by US\$ 166 per employee, or 0.71%. In 2008, the American economy reported a fall of US\$ 166 per employee, or 0.16%.

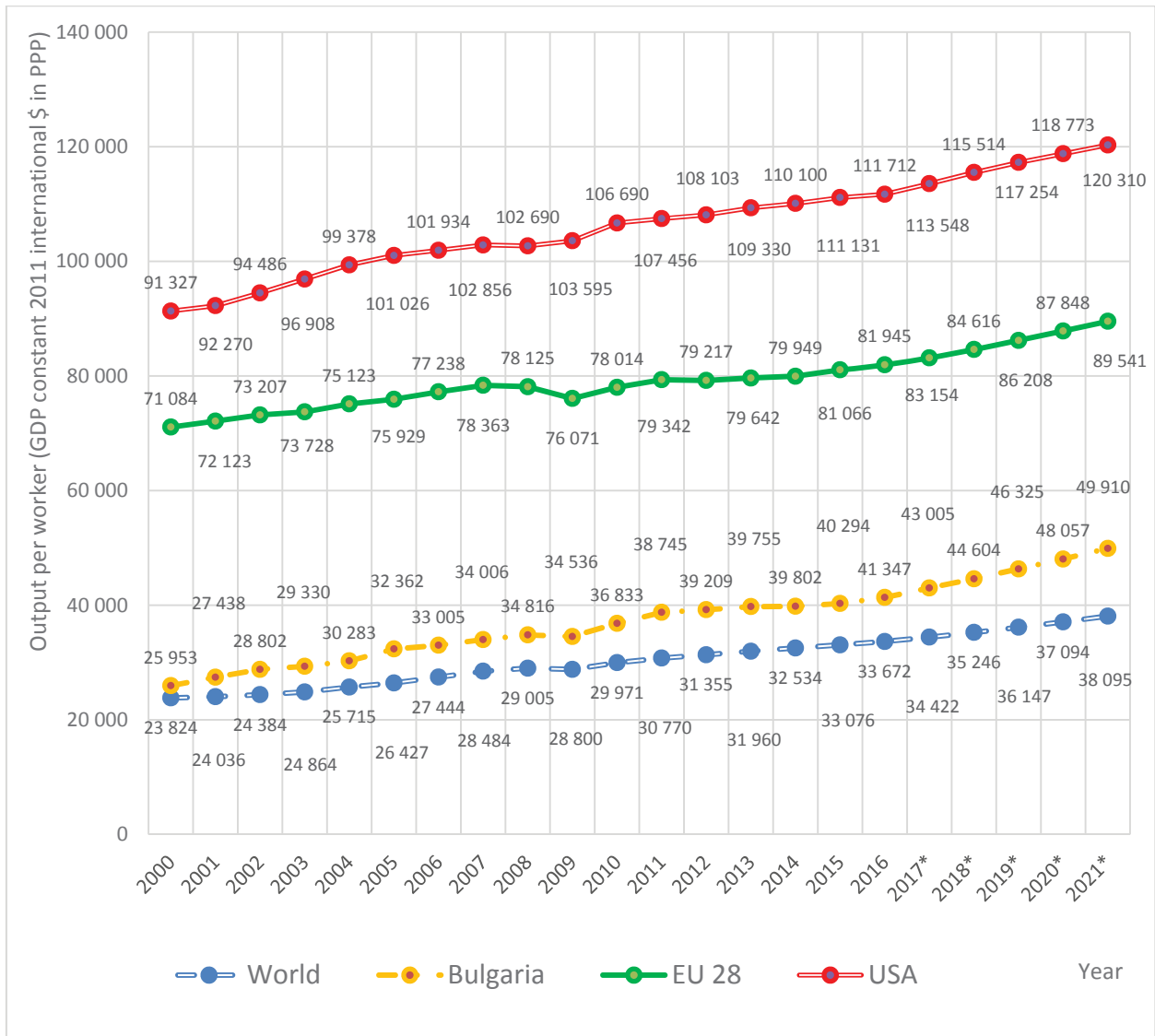


Fig. 1. Labour productivity per worker (GDP constant 2011 international US\$ in PPP)
Source: International Labour Organization, www.ilo.org, 2017.

The ILO's forecast for the period 2017 ÷ 2021 is for a sustainable growth. Of all monitored economies, the highest average annual growth for the forecast period, amounting to 3.21%, is envisaged for Bulgaria. The world economy ranks next with a rate of 2.13%, followed by the EU and the US - with rates of 1.54% and 1.19%, respectively. Expectations for Bulgaria are justified as this country started at very low levels: US\$ 41,347 per employee, as compared to US\$ 81,945 per employee in the EU 28 (about 50% lower) or to US \$ 111,712 per employee (63% lower) in 2016.

Labour productivity in Bulgaria

The *Infostat* information system of the National Institute of Statistics (NSI) offers information about the analysed period between 2000 and 2016 concerning the realised labour productivity in the national economy of Bulgaria which is determined on the basis of the gross domestic product (GDP)

per employee at current prices and at constant prices as of 2010. Labour productivity is also determined on the basis of the GDP per spent man-hour at current prices and at constant prices as of 2010.

Fig. 2 presents the change in labour productivity for Bulgaria, determined on the basis of GDP per employee at current prices and at constant prices as of 2010. The graph is made using *Infostat* data

From the information provided in Fig. 2, it can be seen that the realised labour productivity for the period 2000 ÷ 2016 at constant prices and at constant prices was marked by a sustainable growth. Again, the year 2009 is an exception: then the constant price index as of 2009 was down by BGN 382 per employee, i.e. by 1.90%. For the period 2000 ÷ 2016, the indicator realised a 245.01% growth at current prices, whereas at constant prices the rise was 63.58%.

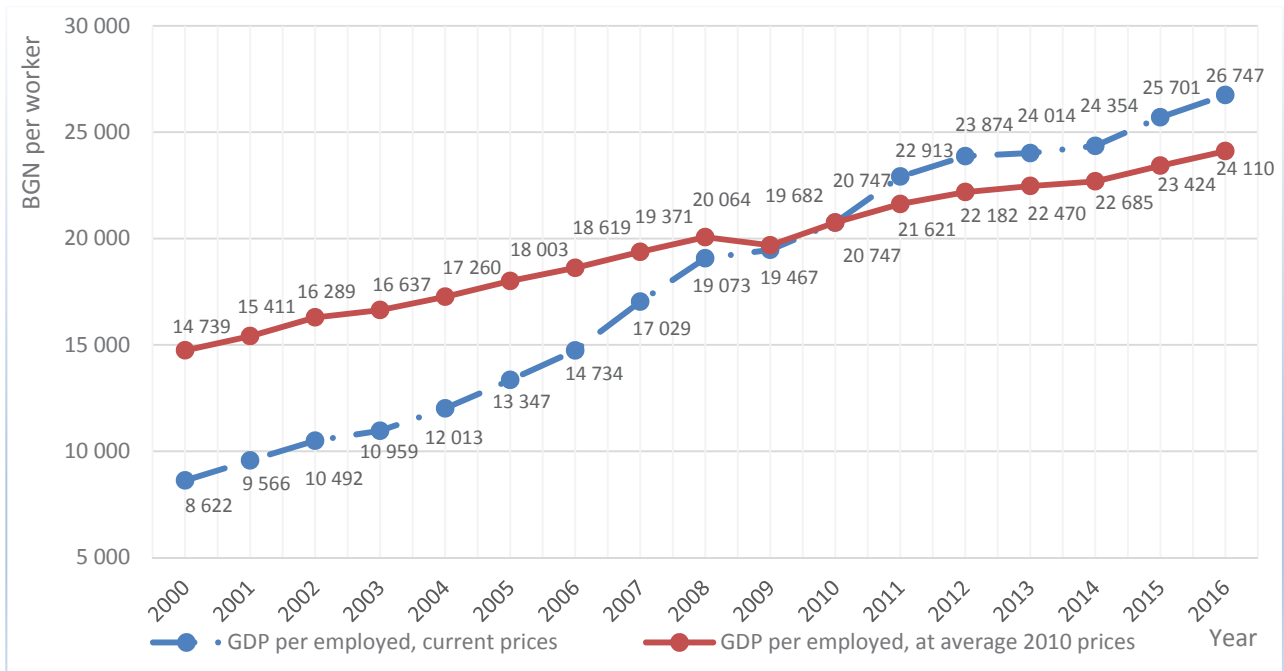


Fig. 2. Labour productivity in Bulgaria
Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=185.

In 2013 and 2014, labour productivity slowed down, but in 2015 and 2016 this delay was compensated and faster growth was reported. In 2016, the growth of labour productivity at constant prices was BGN 686 per employee, or by 2.93%, whereas at current prices it was BGN 1,046 per employee, or by 4.07%. It is important that this trend of labour productivity growth be maintained, since it leads to an increase in

competitiveness against the framework of shrinking labour supply and the presence of wage pressures.

Fig. 3 shows the change in labour productivity for Bulgaria, determined on the basis of GDP per hour worked at current prices and at constant prices as of 2010. The graph is made using *Infostat* data.

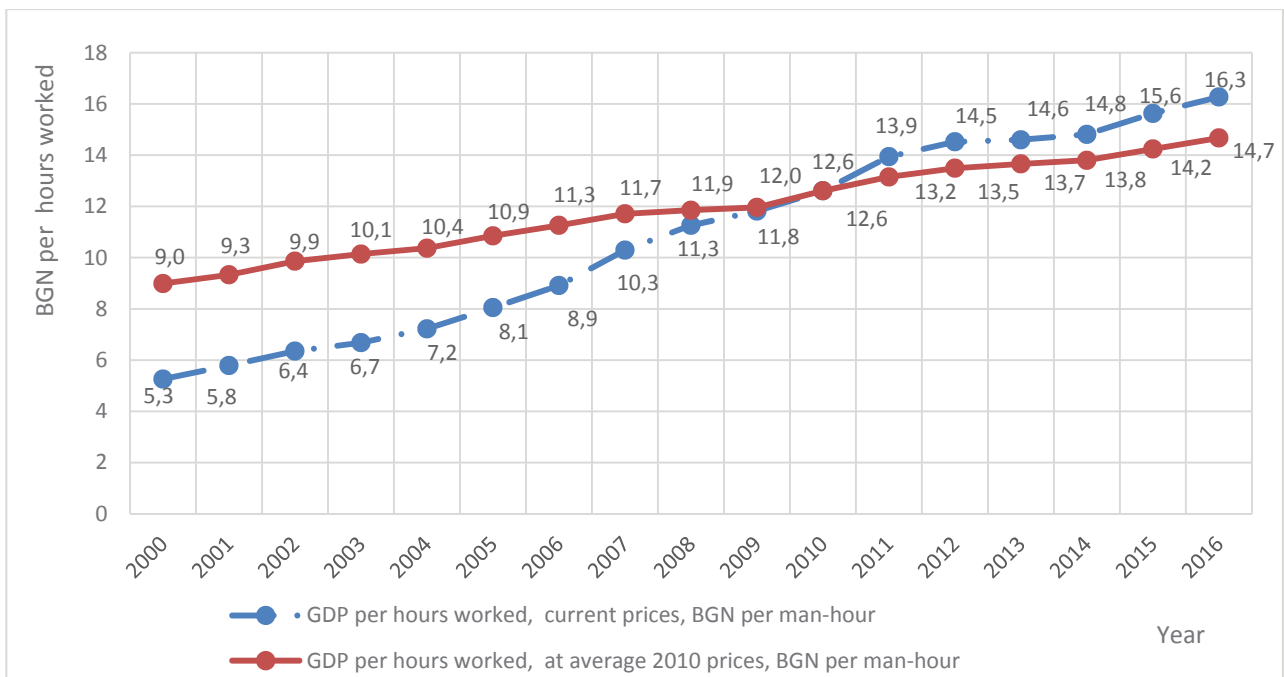


Fig. 3. Labour productivity in Bulgaria (GDP per hours worked)
Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=185.

The data in Fig. 3, it can be seen that the achieved labour productivity per hour worked at current prices and at constant

prices as of 2010 for the period 2000 ÷ 2016 shows moderate growth, with periods of faster and slower growth. Here, again,

the exception is the year 2009 when the constant price indicator as of 2010 decreased by BGN 0.1 per man-hour, or by 5.26%. Within the period 2000 ÷ 2016, the indicator achieved a growth at current prices of BGN 11.0 per man-hour, or by 207.55%, whereas the growth at constant prices was of BGN 5.7 per man-hour, or by 63.33%.

In 2013 and 2014, the achieved labour productivity slowed down, but 2015 and 2016 saw again a faster growth of the indicator. In 2016, the growth of labour productivity at constant prices was BGN 0.5 per man-hour or by 2.93%, and at current prices it was BGN 1,046 per employee, or by 3.52%.

In the period of rapid growth in labour productivity, work pay increased by 7% (double the labour productivity). Despite the disproportion observed, the low pay levels in the country are not a motivating factor for increasing labour productivity.

Labour Productivity in the "Industry" Sector of Bulgaria

Fig. 4 shows the dynamics of the labour productivity indicator in the "Industry" sector of the national economy of Bulgaria, determined on the basis of gross value added (GVA) per employee at current prices and at prices as of 2010 for the period between 2000 and 2016. The graph is made using *Infostat* data.

From the information in Fig. 4 it is evident that during the period 2000 ÷ 2016, the "Industry" sector maintained a steady growth of labour productivity at constant prices as of 2010. There was one exception, in 2008, when the indicator dropped by BGN 19 per employee, or by 0, 11%. Within the period analysed, the labour productivity of industrial production at constant prices rose by BGN 9959 per employee, or by 76.74%. The prominent dynamics of the current price indicator is due to the presence of periods with higher and lower inflation, as well as those of higher and lower employment in the sector.

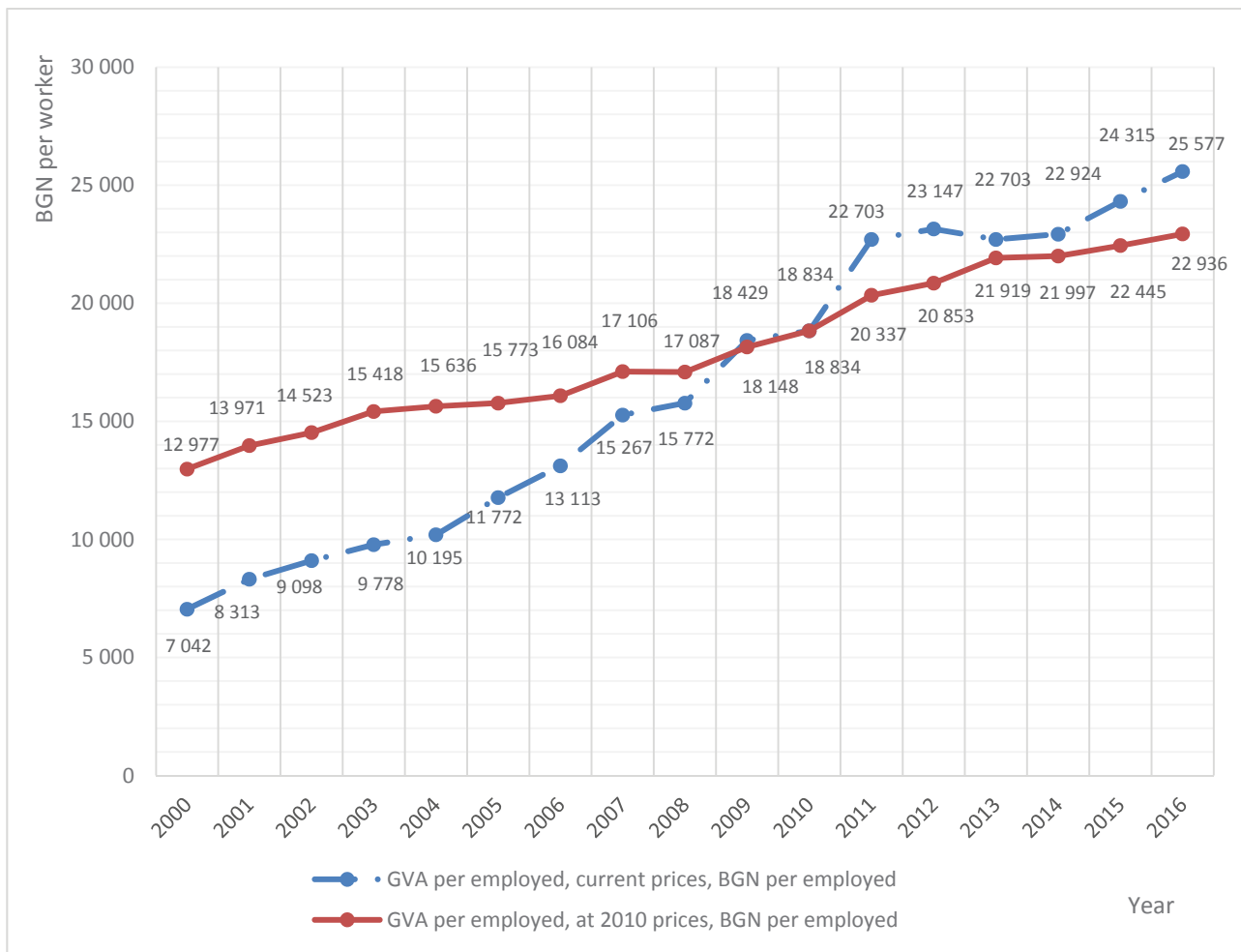


Fig. 4. Labour productivity in sector Industry at Bulgaria (GVA per employed)
 Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=185.

The Industry sector differs from other sectors in terms of an increase in investment and innovation in manufacturing. The orientation towards technologically new production results in a new outlook on the knowledge, skills and competences of the

employees, and the improvement of those brings about an increase in labour productivity.

Labour productivity in the “Mining and Quarrying” sub-sector in Bulgaria

Table 1 focuses on labour productivity in the “Mining and Quarrying” sub-sector for the period between 2008 and 2015. Two variants are calculated that are based on information concerning revenue produced by activity and by added value (VA). The latter is provided by *Infostat* sources and also by information as given by NSI concerning factor expenditures relating to the number of employees in the sub-sector.

Fig. 5 shows the change in labour productivity of the enterprises from the “Mining and Quarrying” sub-sector in Bulgaria for the period between 2008 and 2015. The graphs are made taking into consideration the data from Table 1.

Fig. 5 clearly shows the differences between the two variants of the labour productivity indicator based on operating income

and value added in terms of factor expenditures for the period (2008 ÷ 2015). The most obvious variations in the change in indicators are found in 2008, 2009, and 2015. These can be attributed to the variations in realised market volumes and in the realisation prices. The operating income in the “Mining and Quarrying” sub-sector per employee during the period 2008 ÷ 2015 came down and were most obvious in 2009 when the indicator for 2009 dropped by BGN 54,247 thousand per employee, or by 40.28%.

Within the period 2008 ÷ 2015, the indicator decreased by BGN 20,112 thousand per employee, or by 14.93%. In 2010, 2011, and 2012, the indicator achieved sustained significant growth, followed by a decline in 2013 and 2014. In 2015, labour productivity rose by BGN 3,987 thousand per employee or by 3,61%.

Table 1
Labour productivity in the “Mining and Quarrying” sub-sector

Indicator	Year							
	2008	2009	2010	2011	2012	2013	2014	2015
Production value, thousand BGN	4 020 688	2 122 084	2 502 713	3 108 505	3 177 390	2 745 745	2 648 808	2 848 348
Number of persons employed	29 854	26 384	24 788	24 932	24 916	24 498	23 954	24 862
Value added at factor cost, thousand BGN	918 262	904 969	1 205 737	1 584 789	1 659 949	1 299 009	1 151 675	1 155 233
Labour productivity (Production value per employed), thousand BGN per worker	134,678	80,431	100,965	124,679	127,524	112,080	110,579	114,566
Labour productivity (Value added at factor cost), thousand BGN per worker	30,708	34,039	48,316	63,227	66,318	52,730	47,855	46,267

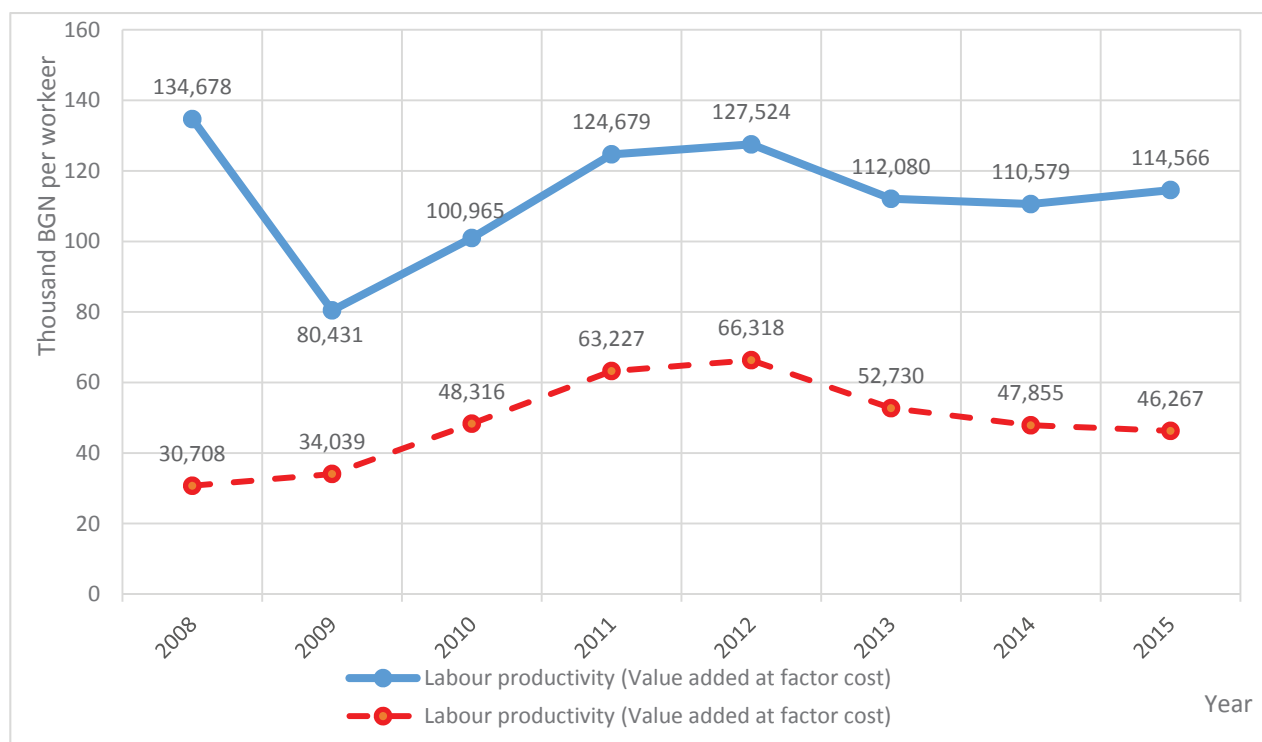


Fig. 5. Labour productivity in subsector Mining and Quarrying in Bulgaria, thousand BGN per worker
Source: INFOSTAT: https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=250.

The variation in the magnitudes involved during the different periods exerts impact on the change of the labour productivity indices determined either on the basis of operating income or on VA according to factor expenditures. In order to determine the individual factor impact of this variation, a determinate factor analysis can be carried out using the chain substitution method or the integrated method (Mitev, 2008), or, likewise, the index method (Donchev, 2004).

Conclusion

The world, American, European and Bulgarian economies have constantly been on the rise in terms of labour productivity for the period 2000 ÷ 2016. The ILO forecast until 2021 is for a continuous sustainable increase in the indicator. The provisional average annual growth rate for Bulgaria up until 2021 is 3.21% per year. Labour productivity in the Bulgarian economy as a whole and in the "Industry" sector in particular, for the period 2000 ÷ 2016 have achieved a steady growth per employee and per hour worked. This accounts for the favourable trends for the indicators within a medium-term range.

Within the period between 2008 and 2015, labour productivity in the Bulgarian "Mining and Quarrying" sector, determined on the basis of sales earnings per employee, was characterised by high dynamics, namely a sharp decline in

2009, a rise from 2010 to 2012, a slowdown in 2013 and 2014, and a low growth rate in 2015. Currently, we witness an increase of investment in this sub-sector, especially with relation to human capital. The increase in the qualification of the human resources brings about an increase of the overall labour productivity. Hence, our expectations are for a long-term growth of the economy.

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CHALLENGES OF EMPLOYEE SELECTION IN THE MINING INDUSTRY

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ABSTRACT. Bulgarian raw-mineral industry has expectations for price increasing of basic raw materials. This guarantees sustainable development of the mining industry which is related to technological and staff investments. Good decisions at staff selection create basis for more effective company performance. Some of the problems of staff selection in the mining industry are explored in this report. The aim is to establish what worries the jobseekers in this branch. The paper explores some opportunities how the mining companies can become more attractive for qualified staff.

Key words: mining industry, staff selection.

ПРОБЛЕМИ ПРИ ПОДБОРА НА КАДРИ В МИННО-ДОБИВНАТА ПРОМИШЛЕНОСТ

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РЕЗЮМЕ. Българската суровинно-минерална индустрия има очаквания за повишение на цените на основните суровини. Това гарантира устойчивото развитие на бранша, което е свързано с технологични и кадрови инвестиции. Добрите решения при подбора на кадри създават основата за по-ефективно функциониране на предприятията.

В доклада се изследват някои от проблемите при подбора на кадри в минно-добивната промишленост. Целта е да се установи от какво естество са притесненията на кандидатите за работа в тази промишленост. Посочени са възможности, как предприятията от минно-добивната промишленост да станат привлекателни за квалифицираните кадри.

Ключови думи: минно-добивна промишленост, подбор на кадри

Introduction

Employee selection is an important issue in Bulgaria, especially nowadays. Contemporary economics is characterized by new techniques and technology, permanent changes in normative basis, worsening labor market, negative demographic trend and fast growing old knowledge and skills of job applicants. Unlike material resources, which can easily be bought, human talent and "know-how" are hard to find. The most important and responsible management decisions are those related to staff selection. Without appropriate people in their right places, neither companies, nor industry or society as whole, could prosper and develop.

Problems at staff selection

Over the last years, there has been an imbalance between deficiency of qualified staff and registered unemployed in labor offices in Bulgaria. This problem is especially significant in industrial companies, where lack of competent specialists makes manufacturing processes far more difficult. That's why companies are obliged to hire young people currently graduating from their higher and secondary education and to rely on their professional preparation. At the same time, "fast technological developments give rise to the need of fast update

of existing competences and new professions with new skills, synchronized with the progress" (BMGK, 2013, p.5). All this predetermines the increasing cooperation between business, secondary professional and higher engineering educational institutions in solving problems. The Bulgarian Chamber of Mining and Geology trusts in good practices of creation and usage of active tools for collaboration between educational institutions and business. Some of these tools are: participation in development of material base at practices, paid internships and trainings for newcomers and periodic ones for already employed.

Another problem of staff selection in the mining industry is the low motivation for working in manufacturing companies. Motivating factors in bigger mining companies are high salaries, improved work conditions, periodic improvements of work methods, care for the people and environment. However, these are not announced to the wide audience. Media constantly focuses only on the occurring problems in the industry. All this creates the impression of persistent risk for health and environment, low salaries and bad work conditions. No attention is paid to main incentives for young people such as opportunities for development and career growth. A new concept is needed. A concept that will represent mining companies and will make them attractive for young people and will meet their needs.

Analisis of the survey

51 questionnaires were filled in by students in the 2nd and 3rd years of study from all majors at the University of Mining and Geology “St. Ivan Rilski” (UMG). Ten questions were distributed as follows:

- Personal questions – age, permanent place of work, tendency of moving to another place to work;
- Questions about reasons for choosing a job – attitudes to work in the industry, choice between the following motives: high salary, provided benefits, not physical labor, team work, good work conditions, other motives given by the respondents;
- Knowledge of mining sub-sector – whether respondents have ever worked in such a company, their preparation for that kind of profession, specifying actual company from the branch and what it is attractive with;
- Recommendations from respondents to companies.

Based on the analysis of the survey, some conclusions of the deficiency of work force in the mining industry can be made. The aim is to establish what worries jobseekers in this sub-sector and to expose some opportunities for mining companies to be more attractive to qualified staff.

Personal questions

- Age – 63% up to 25 years old, 20% between 25 and 30, 17% over 30 years old;
- Permanent place of work – 61% over 25 years old and less for up to 25. The same percentage of answers as in the first question;
- Tendency of moving to another place to work – 61% YES, 39% NO. Reasons for “YES” are better payment, better work conditions, and opportunities for realization and perspectives for professional development. The main reason for “NO” is family engagement.

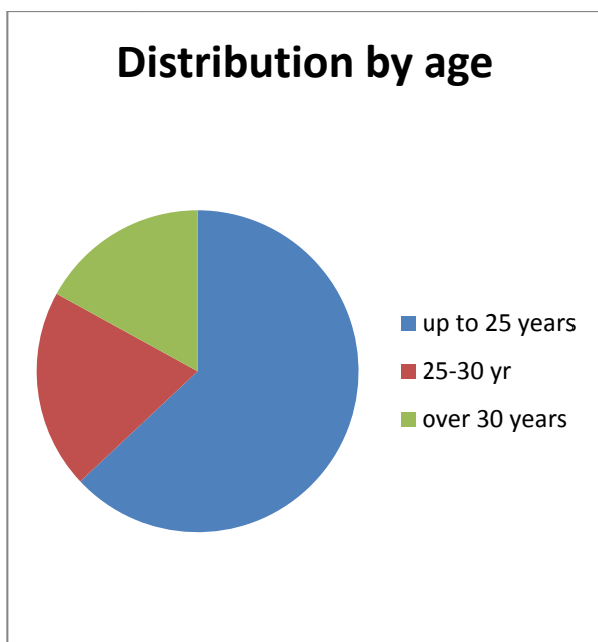


Fig.1. Distribution by age



Fig.2. Would I move to another job

REASONS FOR CHOOSING A JOB

- Are you willing to work in a mining company? – 70% YES (makes good impression), 30% NO. Motives for “YES” are: useful, interesting, profitable, good conditions, perspective, development opportunities, dream job, main livelihood in the living place of the student. Motives for “NO” are high health risk, polluted air, and physical difficulty.
- Reasons for choosing a job – 78% high salary and good work conditions, 48% team work, 29% provided benefits (accommodation, car, canteen) Other given motives are opportunities for trainings and developments, pleasure.

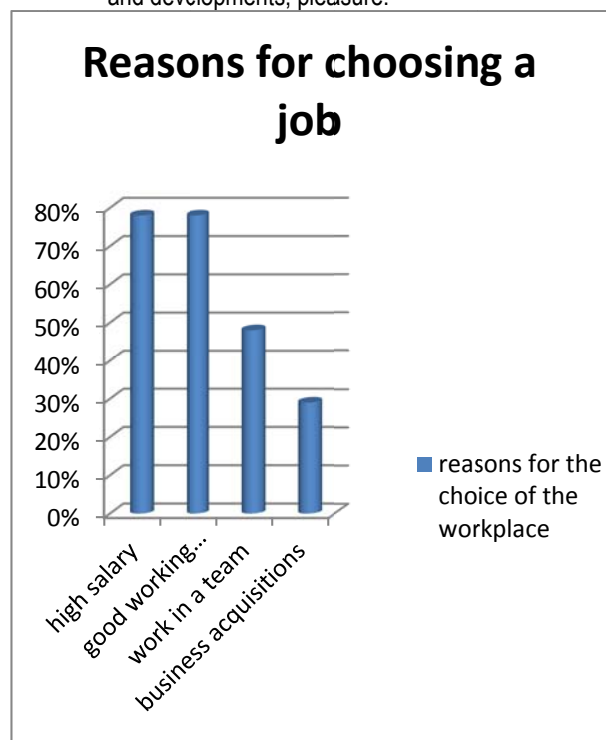


Fig.3. Reasons for choosing a job

Knowledge of the mining sub-sector

- Have you ever worked in a mining company? – 86% Never, 6% Several months (probably internship), 8% YES;

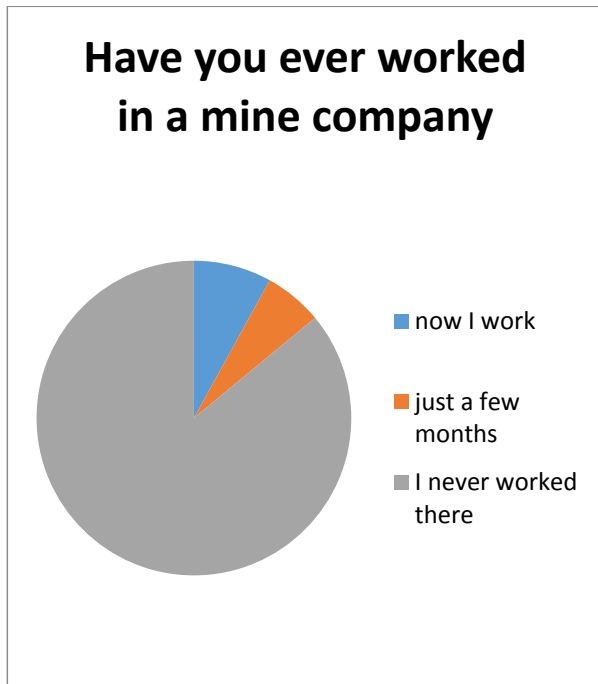


Fig.4. Have you ever worked in a mining company

- Do you feel ready to start working? – 65% NO, 35% YES. Main reasons for “NO” are limited practical trainings and short practices at the university;
- Specify a mine company, which according to you, responds most to the requirements of job applicants? More than 50% are blank answers. Asarel Medet has 12 remarks, Dundee Precious Metals – 9, Zlatna Panega Cement – 7, Mini Maritsa Iztok – 6, Elatzite Med – 4, Kaolin – 1, Aurubis – 1, Vagledobiv Bobov Dol – 1. They are attractive with good salaries and work conditions, modern techniques and technology, development opportunities, care for human safety and environment.

Recommendations to companies in the mining industry

Recommendations, that students give are: more accessible internships, care for the environment, trainings before starting work, advertising the professions, activity awareness campaigns, stimulating employees, attention to newcomers, hire without requiring previous experience. Important conclusion from the survey is that students do not know the real situation in the mining industry. Most of the companies in the branch organize permanent internships and “open doors” to introduce their main activities. However, that kind of information does not reach the students.

The main recommendation for companies is to give publicity to their initiatives such as internships, “open doors”

and events for corporate social responsibility. They should also consider students’ requirements for them.

Conclusion

Knowledge, skills and competences of work force are extremely important for the establishment of quality work places. There are good practices of collaboration between mining companies and professional educational institutions. The range of initiatives should be expanded by including participation in career guidance, in planning of admission of certain professions, in approval of university programs, in ensuring professional realization after graduation. Business should be active participant in the training process of qualified staff. Thus it can rely on employees’ skills long-term.

Another important thing is the establishment of positive presentation of companies in the mining industry through promotion events for corporate social responsibility. Changing public attitudes towards this branch will lead to influx of people willing to work and to develop in the mining industry.

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PROJECT MANAGEMENT AS AN INSTRUMENT FOR ORGANIZATIONAL DEVELOPMENT

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ABSTRACT. Project management is an open system of knowledge, skills and practices, which is widely used in the process of organizational development. In recent years, it has established itself as a good instrument for this purpose. Its application allows the organization to adapt to the environment and to achieve the expected economic results. Each project means a change in the desired direction. This change is purposeful, structured, organized and planned so that it suits the strategic development framework of the organization. Change management is an inevitable component of modern management process. The existence of any organization is directly related to its suitability and capacity to manage the change in all the life cycle. The implementation of project-oriented approach is appropriate and effective tool for management of change, and on this basis for organizational development.

Keywords: project management, management of change, organizational development, project

УПРАВЛЕНИЕТО НА ПРОЕКТИ КАТО ИНСТРУМЕНТ ЗА ОРГАНИЗАЦИОННО РАЗВИТИЕ

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РЕЗЮМЕ. Управлението на проекти е отворена система от знания, умения и добри практики, която намира широко приложение в процеса на организационно развитие. През последните години то се утвърждава като добър инструмент за целта, който позволява на организацията да се адаптира успешно към обкръжаващата я среда и да постига очакваните икономически резултати. Всеки проект означава промяна в желана посока. Тази промяна е целенасочена, структурирана, организирана и планирана, така че да се вписва в стратегическата рамка за организационно развитие. Управлението на промяната е неизбежен компонент на съвременния управленски процес. Функционирането на всяка организация се намира в пряка зависимост от пригодността ѝ да управлява правилно промяната. Прилагането на проектноориентирания подход е възможен способ за ефективното ѝ управление, а оттам и за растеж и развитие.

Ключови думи: управление на проекти, управление на промяната, организационно развитие, проект

Introduction

The boom of world economic and technological development we have witnessed during the past decades, makes the changes in the economy, politics and techniques an inevitable and objective necessity. Significant factors, among which the scientific and technological progress, globalization, integration and internationalization lead to an accelerated transformation of the social culture, values, attitudes and patterns established. Their divergent influence forces organizations to cope with complex challenges in order to survive and progress. Current economic prospects are drawn by increasingly fierce competition and the continuous technology improvement. As a result, it is particularly important for each organization to work more efficiently, with better quality and faster, not only to maintain its positions but also to achieve new ones. This is a difficult undertaking and requires the application of a special approach, which should focus on change and its management with a view to achieving organizational development. Finding appropriate mechanisms, techniques and methods for that purpose, in conformity with the new realities remains relevant for any organization which is focused on successfully overcoming the contemporary economic, technological and

social challenges. It continues to be the subject of scientific discussions in search of the best solution in current conditions.

The present study is based on a critical review of selected theoretical considerations. An analysis and a summary of some good practices in this field have been performed. Its purpose is to reveal the potential of project management as a good way of organizational development. This in principle new methodology allows the organization to adapt more successfully to the surrounding environment and to achieve the results expected.

Project and Project Management - Theoretical and Applied Aspects

From a theoretical point of view, the project is most often defined as an intention, concept for implementation, a plan, or a scheme for creating something. It is an activity of applying knowledge, skills, methods and techniques to satisfy the needs and expectations of the stakeholders (PMI, 2011). These knowledge, skills and methodological tools have been grounded and summarized in a comprehensive methodology. As a result, they are completely applicable to different

parameters of the project specification - economic, technical, technological, legal, social and environmental.

From a practical point of view, the project is a system process that is planned, organized, directed and controlled, i.e. managed. It is distinguished for its great dynamism, resulting from the internal organizational environment and its external environment. Its development from the start to the end point shall lead to the achievement of the final result. The examination of the project as a system process raises the question as regards its organization, administration and management. The creation of a specific product - a product or service whose marketing would lead to economic or other benefits secondary to the organization is usually indicated as a main purpose. The project undertaking supposes activity, initiative and entrepreneurial impulse in order to be launched. Its successful completion depends on the efforts on behalf of the main initiator (sponsor), the manager and the project team from the ideological concept to the achievement of the expected result.

The beginning and end of each project are clearly defined and developed within the defined framework of time, scope and quality. The limitations of this process result from the target set and the resources available to ensure its realization. The project implies a certain investment to be made related to investing time and funds for implementation. The resources invested are of a different nature - financial, technical and technological, energy, human, information, etc. They define the project parameters and establish the respective requirements and limitations. The opposite applies also, the parameters are directly dependent on the resources available. The analysis of good practices shows that the project is a good tool for their organization. That is why it is an undertaking suggesting a targeted approach. The project process requires structured, organized, planned, coordinated and controlled impact by the manager and active interaction between the members of the team constituted to fulfil the target set. This target must be clear, particular, measurable and realistic to the framework established.

The purpose of the implementation of any project is a positive change to be achieved. Entirely logical, performing such complex assignments in a specific organization leads to the development and improvement of its capacity to adapt successfully to the environment and to be highly effective. Such an approach provides an opportunity to economize the activity and increase the capacity of the organization to change pursuant to the current economic requirements and to keep pace with the leading trends.

The temporary nature and uniqueness of the project, as an independent subject of management, make it strongly different from routine operations and "ordinary" business (Dinsmore et al, 2005). The difference in principle between the current activities and tasks and the project ones requires the application of different management practices and approaches. The need to satisfy this necessity gradually transforms the project management into independent scientific and research field which is of substantial interest. Over the past sixty years, it has also become a working method for achieving strategic purposes and organizational development.

The project - as a comprehensive and complex undertaking - should be managed. The project management is an open and developing system of knowledge, skills and good practices accumulated up to now. The ideological concept of this methodology arises because of the pragmatic need to differentiate and reconcile the processes of management of the present activities of the organization, change management and innovation management (Andreev, 2006). Since the mid-fifties of the last century, it has been successfully used in the development of engineering projects. The success of this current methodology is not surprising. The reason is the proven practical benefits for the organization: providing flexibility, competitiveness, productivity, responsiveness and adaptability. The significant results achieved in its application lead to the fast spreading thereof and entry into practice in all fields of business activity.

Project management may be used in practice by any organization because it is a comprehensive system applicable to its current features and to the increased requirements of the external environment. It is a working and accessible mechanism for both small and large organizations realizing a wide range of purposes. Its usefulness in a different context makes it highly valued by the organization's management. Through its implementation sustainable organizational development is achieved, based on innovations, modernization and improvement on different structural hierarchical levels. However, the difficult transitions from one condition to other, which shall be performed in a timely manner, are easily performed namely by project's implementation and application of appropriate management methodology.

Change and Change Management – Theoretical and Applied Aspects

"There is nothing permanent except change." This Heraclitus maxim is of more than 2,500 years, but today it continues to be completely valid, especially in business. After years of fruitless efforts for organizational change, it is clear that the knowledge about this process is of critical importance to success. Many authors indicate in their works that the project and its management may be revised exactly as a process of organizational change. The issue of development and change continues to be a subject of serious research interest (Jones et al, 2005; Turner & Müller, 2005; Gilley et al, 2008; Standish Group, 2013).

In the literature, change is most often understood as moving to a desired condition and achieving the main purposes set in the strategic framework of the organization. It involves the implementation of new procedures, the introduction of current technologies and managerial approaches, modernization of work organization, raising the standards, the development of human capital, etc. According to Burnes (2004), the change is a constant characteristic of the organization existence, on operational and strategic level. It may be presented as acceptance of a new idea or behaviour. In summary, the change involves making improvements to influence the way individuals and groups work and interact with each other. Introducing new processes and technologies may change the way of work performance, redefine roles and responsibilities or improve the structure and organization of work. Often this

leads to other expectations, new operations, systems and tools, partnerships and relationships. In practice, however, the change is the only adequate response of the organization to the influences of the external environment, whether they have positive or negative influence of its functioning and results. It is usually caused by the dynamics of the environment of the organization. This is a response of the influence of factors on which the organization has no or has only limited control, such as legislation, the institutional framework, environmental requirements, competition, consumer attitudes, business and social environment, etc.

In order to be successful, any change must be targeted, planned in advance, organized and controlled. It should be part of the strategic framework and future prospects for development of the organization. Now, its survival, feasibility and progress are directly related to its capacity and suitability to make the right changes in time. Whether the change is operational and transitional or general and strategic, it is a prerequisite necessary for organizational development in the conditions of rapid progress of technology, integration and globalization.

In the contemporary theory of management, "change" and "project" are related concepts. One of the reasons for this is that the concept of good change is at the core of each project concept. Thus, the change management becomes an inevitable element of the management process. That is why, over the past decades, there has been an increasing interest in the use of the project approach as a method of organizational change realization (Crawford et Hassner-Nahmias, 2010). The existing practice of many organizations having high performance in different fields of activity shows that it may be successfully performed and on the grounds of the targeted projects realization. This contributes significantly to the synchronization of the internal and external environment and increases efficiency, productivity and competitiveness. As one of the most important parameters, the competitiveness is directly dependent on the responsiveness to change.

Current world statistics for international organizations having high performance indicates that:

- 89% of them evaluate project management as successfully working and effective mechanism for growth and development;
- 81% of them actively participate as project sponsors;
- 57% of them consider the implemented projects with their business strategy;
- 54% of them acknowledge that they understand the importance of the project management for increasing their chances of success in strategic initiatives;
- 60% of those applying the methodology achieve the results expected, while for those who do not apply it, the percentage is 51%;
- 59% of them already use the toolbox at one or more departments or throughout the entire organization (PMI, 2015).

A careful analysis of these data shows that the approach is already widespread. The successful experience of the large companies also gives reasons for the smaller ones to focus on its application. One of the reasons for this is that it is available and working method for organizational development.

Change management, as one of the most significant elements of development, represents a process of continuous adapting of the direction, structure and possibilities of the organization to respond to the constantly changing needs of current and potential customers (Moran & Brightman, 2001). This process requires flexibility and complexity that project management offers. In a dynamically developing economic environment, such type of management becomes an important part of the growth and sustainable progress strategy of a highly efficient organization.

In the contemporary social and economic conditions, the process of development requires continuous and targeted change. Typically, this change, in a similar way to the project itself, is preliminary planned, organized and formulated as a specific assignment. The need for change throughout the life cycle of the organization is objectively justified because it is the only adequate response to significant external environment dynamics. The change is due as a result of the influence of different factors - economic, political, legislative, institutional, social, environmental, technological, technical, information, etc. Each organization operates in a turbulent environment and experiences the influence of a set of factors. The external environment is characterized by many factors: unpredictability, uncertainty and risk, which seriously affect the activity. Therefore, the organization should change according to the signals received. Their influence is diverging and may be revised in two main approaches – as threats to be reacted against, or opportunities that can be utilized. Nevertheless, changes are needed at all hierarchical levels - both operational and strategic level.

Each project is a "carrier of change" and main agent thereof. According to Webster (2011), the project is perceived as efforts of society to achieve changes. Behind it there is a justified need for modification and improvement of the structure, organization, models, methods or products produced. The current economic practice shows that project management may be a flexible and effective tool for change management. Based exactly on the project-oriented approach, it leads to a number of positive effects for the organization, as increasing its stability and resistance to external negative influences and shocks. Through the change, it can mostly benefit from the opportunities of growth and progress provided by the environment. The capacity of the organization to change adequately would provide it with a number of competitive advantages and would enable it to maintain and expand its market positions, taking maximum advantage of the paths opened for development.

It is clear that one of the opportunities for adequate change management is by applying the project approach. It is confirmed to be a good alternative for the purpose. The reason for this may be found in the fact that each project represents a change. Deployment of innovations and modernization is impossible through routine operations. It is usually performed through projects implementation. Each organization shall change, in order to be successful and to remain in its field of activity and not to lag. The targeted implementation of different types of projects provide opportunity for that. One of the reasons the project management to be increasingly imposed in practice is in the potential of the approach to assist positive change implementation. However, organizational change is not

a one-time act, but a continuous iterative process related to improvements, innovation and adaptability to the external environment. Its diverging influence reflects on the activity and end results. That is why very often the response to the dynamically changing external conditions is in the realization of projects that will "bring" the organization in conformity with the requirements of the environment and to lead it to improvement and growth. In any case, the change must be sought and supported by the team manager in order to contribute to efficiency increase and to improve the activities and hence the performance.

From these considerations it is obvious that "change" and "project" are related concepts. In turn, change management and project management are also interconnected processes. The nature of project management is connected with change. In conditions of enhanced economic dynamics, the only unchanged element of the management process is exactly the organizational change. It comes as a consequence of the interaction of the organization with the environment in which it operates and to whose signals reacts.

Organizational development through project management - opportunities and prospects

The organizational development is a scientific trend focused on the change, the way of operation and the organization activity. This trend appears in the early 30s of the XX century as a result of research devoted to human relationships. It is found that the structure and processes significantly influence the behaviour and motivation of workers and employees. Consequently, they directly reflect on the performance of the works and the final results. The standards and values, together with the culture, establish change according to the influence of a set of different factors determining the status and dynamics of the external and internal environment.

In the course of scientific research, the old ones are expanding and new knowledge accumulates, whose practical application leads to organizational development achievement through modernization, innovations and growth. The development requires long-term efforts by the team members, which to contribute to providing opportunities to improve the capacity of the organization for solving problems and its ability to cope with changes in the external environment (French, 1972). This is a long-term process that assists the changes, and hence the achievement of better efficiency, financial results, customer satisfaction, and team work commitment (Thomas, 2008).

As contemporary practice, the organizational development is a process of implementing continuous effective modifications. It is also known as a field of applied science focused on the understanding for the need for continuous change and its proper and timely management. This is an interdisciplinary field that is related to sociology, economic psychology, motivational theories, business administration, management and economics. As the project management, the organizational development is a rapidly growing field of knowledge in which many new methods and approaches are gradually being approved. The concept, having foundations set by Lewin (1951), begins to assert itself in the mid 50s of the past century, but today continues to enrich and expand.

From a pragmatic point of view, the organizational development is associated with the successful organizational change. It aims to change people, processes and technologies (Lunenborg, 2010). The organizational development is a set of strategies for transforming beliefs, way of thinking, values and structures in the organizations aiming at their optimal adaptation to new technologies, markets and threats from the external environment (Bennis, 1969). In this sense, it should include: the possibilities for organization adaptation; the alternatives to improve the interaction between its system elements; planning processes and the internal economic analysis (Radev, 2007).

The stages the organization passes through during its evolution may be indicated by the organizational development. It is reformed during the different cycles of its life. For this purpose, modifications in structure, processes and human resources are necessary. Towards organizational development, better performance of the individual, then of the group and the whole organization by increasing its potential is pursued. A wide range of management techniques, including four basic steps are applied for this purpose:

- diagnostic / establishing the need of change;
- planning;
- implementation;
- assessment.

In short, it is about planned, organized and managed by the top effort that increases efficiency and maintains good health of the organization (Beckhard, 1969). It is inevitably linked to the implementation of the requirements of a rapidly developing external environment and approach for organizational change is possible (Mirvis, 2006; Burnes, 2007; Ramos & Rees, 2008; Boje et al, 2011;).

Now, one of the most important assets of the organization is its ability to "understand" and manage changes. It is obvious that if it does not undertake them, it will lag significantly behind its competitors and partners and will not be able to give the respective response to the external dynamics. The organizational development is related to planning, the organization's roadmap, the strategy development and follow-up, structure and processes improvement in order to improve the efficiency of the activity (Cumming and Worley, 1997). In this way, it is also linked to change and its management if they are based on the principle of the project approach.

The beneficial effects expected as a result of the organizational development process are most often related to:

- improving the organizational culture;
- profitability and competitiveness increasing.
- achieving health and well-being in the organization;
- resolving problems occurred and reducing potential future possibilities of their occurrence;
- improving the structure and processes of the organization, etc. (Egan, 2002).

The organizational development and project management are distinguished by their interdisciplinarity and their touch points to different scientific fields. The focus of project management as a scientific field and applied field of knowledge is mainly on the economic and technical aspects of change, while the focus on change management is primarily on its

social element and on human potential development. However, the common between them is their focus on change implemented through improvement. In practical terms, the processes of change management and project management are crossed during the implementation of a specific project assignment or initiative. Each of them has the necessary and critical structure to effectively achieve results. Through the implementation of project undertakings, the sustainable capacity increase of the organization is possible to be transformed, assessing the degree of objectives' achievement and its current manner of functioning and seeking ways for future progress. If we examine the organizational development as a planned, organized and controlled process of change at different hierarchical and structural levels, it is easy to be implemented and it is accessible through the application of the methodology and practice of the project-oriented approach.

Conclusion

The new realities face the organizations with serious challenges in current economic conditions. They must comply with higher and higher requirements in order to stay on the market and continue to develop. Many of them use the project-oriented approach for this purpose. These organizations decide to change through projects implementation. The reason for choosing exactly this approach is that it provides the necessary flexibility and adaptability, allowing the performance of different undertakings with equal success at the least possible cost for resources and time. The competitiveness of the organization is directly dependent on its capacity to change, to meet the needs of customers and partners, and to be competitive. The project management allows the targeted change to be achieved through implementation of assignments of different types and scopes, hence, organizational development. The application of this methodology creates the conditions necessary for the organization for quick adaptation to external requirements and potential opportunities through change. Performing only routines does not give an opportunity for change. Therefore, other approach is needed in practice. If the project management is implemented strategically and purposefully, it is a way of ensuring the necessary complexity, flexibility and adaptability. The transformation of negative external influences and shocks into real opportunities that can be utilized may be performed through organizational change and its management. Moreover, the use of the project-oriented approach improves the human potential and thus leads to organizational development, which aims at updating competences, knowledge and skills of the management and team. The catching up of new trends and entering them takes a lot of efforts, time and cost of the organizations. However, this is a prerequisite necessary for their success.

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REGIONAL IMAGE - A PREREQUISITE FOR ECONOMIC DEVELOPMENT

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ABSTRACT. The regional image is a set of properties created by interested subjects to create a certain image of a region. As a result of their activity, we are dealing with a set of associative ideas about the region. The regional image has a number of important features. It aims at meeting strategic objectives that are usually directly related to the economic development of a region. Typically, it takes into account the interests of the main economic players in a given region (internal and external). The regional image must take into account social expectations and related core values and regional economic interests. It should be understandable for the population inside and outside the region. The state image must be fully built up, without contradiction between historical, cultural, civilization and political-geographic factors. The image of the region should be professionally managed through international, commercial, open or latent communication channels and technology to influence public opinion and target users to a region or product. A number of quality products and services, often serving market niches, connect to certain regions. This geographic association proves to be important in influencing consumers' mentality, their behavior and hence the demand for such products. The positive or negative image of the region should be the mechanism between the social expectations, the existing behavior and the state of the region. For this reason, in the positive image, it is necessary to reflect these features of the region that correspond to the social expectations of its own population and the interested groups and allies of the other regions. The formation of the region's image by the mass media reflects its economic potential, the availability of infrastructure, the level of social and cultural development, the quality of life, the degree of economic and political stability.

Keywords: Regional image, regional development, economic development, regional economic interests

РЕГИОНАЛНИЯТ ИМИДЖ - ПРЕДПОСТАВКА ЗА ИКОНОМИЧЕСКО РАЗВИТИЕ

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РЕЗЮМЕ. Регионалният имидж представлява комплекс от свойства, създавани от заинтересувани субекти с цел създаване на определена представа за даден регион. В резултат на дейността им, ние се занимаваме с комплекс от асоциативни идеи относно региона. Регионалният имидж има редица важни черти. Той цели изпълнението на стратегически цели, които обикновено са пряко свързани с икономическото развитие на даден регион. Обикновено той отчита интересите на основните икономически играчи в даден регион (вътрешни и външни). Регионалният имидж трябва да отчита социалните очаквания и свързаните с тях основни ценности и регионални икономически интереси. Той трябва да бъде разбираем за населението в и извън региона. Държавният имидж трябва да бъде цялостно изграден, без противоречие между историческите, културните, цивилизационните и политико-географските фактори. Имиджа на региона трябва да бъде професионално управляван чрез международни, комерсиални, открити или латентни комуникационни канали и технологии с цел въздействие върху общественото мнение и насочване на потребителите към даден регион или продукт. Редица качествени продукти и услуги, често обслужващи пазарни ниши, се свързват с определени региони. Тази географска асоциация се оказва важна при влиянието върху манталитета на потребителите, тяхното поведение и следователно търсенето на такива продукти. Положителния или отрицателен имидж на региона трябва да бъде механизма между социалните очаквания, съществуващото поведение и състоянието на региона. Поради тази причина в положителния имидж е необходимо да се отразяват тези черти на региона, които да съответстват на изгодните за него социални очаквания на собственото му население и заинтересуваните групи и съюзници от другите региони. Формирането на имиджа на региона от средствата за масова информация отразява икономическия му потенциал, наличието на инфраструктура, нивото на социално-културно развитие, качеството на живот, степента на икономическа и политическа стабилност.

Ключови думи: Регионален имидж, регионално развитие, икономическо развитие, регионални икономически интереси

Introduction

Regional policy in its essence represents state regulation of regional development. These are the activities of the state authorities in managing the political, economic and social development of the country in a territorial (regional) aspect. Regional policy is an integral part of the national strategy for long-term socio-economic development. In principle, it has to be built on the principle of decentralization of power. Structurally, the elements of regional policy are economic, social and environmental policy. The basis for the implementation of the regional policy is the territorial-state

structure of the country and, on the other hand, its economic (economic-geographic) zoning. The regions (and their regional markets) are regional policy subjects. A region is generally understood to mean a part of the territory of a country that has common natural, socio-economic, national-cultural and other conditions. Different aspects of the relationship between the state and the territory - economic, financial, legal, national and others - are among the most pressing and complex problems. Their solution depends on the success of market reforms implemented in one territory. These relationships are largely disrupted when there is spatial disintegration of the economy. These relationships are broken by breaking the relationship

between economic interests and political action. One of the possibilities for getting out of this situation is the development of the regional image. The regional image is a complex of properties created by interested subjects to create a certain image of a region. As a result of their activity, we are dealing with a set of associative ideas about the region. The regional image has a number of important features. It aims at meeting strategic objectives that are usually directly related to the economic development of a region. Typically, it takes into account the interests of the main economic players in a given region (internal and external). The regional image must take into account social expectations and related core values and regional economic interests. It should be understandable for the population inside and outside the region. The state image must be fully built up, without contradiction between historical, cultural, civilization and political-geographic factors. The image of the region should be professionally managed through international, commercial, open or latent communication channels and technology to influence public opinion and target users to a region or product. A number of quality products and services, often serving market niches, connect to certain regions. This geographic association proves to be important in influencing consumers' mentality, their behavior and hence the demand for such products. Considering that the purpose of geographical promotion is to change the image of geographical entities like cities and regions, it is evident that its chances of success partially depend on the extent to which such images are subject to change. (Pellenberg P. H., W.J. Meester, 2009)

Regional image

The regional image is shaped as the strategic goal of the region's development. It must be realistic and contain features that are unambiguous. The regional image is varied. It may contain several subdimensions depending on which users are targeted and depending on specific regional interests. We can claim that the formation and management of the regional image is done in the following standard procedure: (Supplemented and adapted - Kapitonov, E. A., A. E. Kapitonov, 2003)

- Developing and explaining the region - its advantages and differences from the competitive regions;
- Identification and fixation of the resources for the development of the image (budget and material-technical);
- Developing a concept of company standards and their assessment (including verbal and visual aspects);
- Taking into account the economic interests and the socio-psychological and subconscious sides of investors with the help of experts, psychologists, focus groups, etc.;
- Constructing several images that are interrelated and identifying the highlights in view of the peculiarities of potential investors;
- Creation of background, context and details that provide and reinforce the perception of the regional image;
- Studying and processing the image in the context of emergency and crisis situations that could threaten it, and testing the readiness to engage in effective counter-advertising;

- Implementation of the plans (strategic and operational) or transition from a constructed to a real-life model for the functioning of the regional image;
- Monitoring the way the regional image works and making (if necessary) a correction of the plans, actions and highlights.

Identifying target markets to apply the regional image includes the following steps:

- Develop a strategic plan that takes into account global and sectoral visions;
- Defining objectives and shared and integrated regional and local development policies;
- Defining structural programs and projects;
- Determination of responsibilities and clarification;
- Definition of Integrated Communication Policy;
- Tools for evaluation and modeling.

The main features of the region's image (in economic terms) are:

- Nominal - the image designates, differentiates the region, demonstrates and highlights its merits and distinctive qualities;
- Aesthetic - the image is designed to enliven the impression that the region creates in the potential investors;
- Address - the image links the region and the target stakeholders, responds to the demand for the business;
- Communicative - perhaps the most important and constant function of the image.

The communicative properties of the image are an advertising component that provides information efficiency, facilitates its perception by investors, and prepares the ground for shaping the attitude of choosing this investment region.

There are several criteria for assessing a region's image:

1. History of the region. Survey of the region's history and its socio-economic development.
2. Geographical location of the region (including reporting of natural resources)
3. Exploring the popularity of local authorities - are there any key figures contributing to the development of the region at national and supranational level - Deputies, European deputies, etc.?
4. Demographic indicators
5. Tourist attractiveness of the region.
6. International Economic Relations of the Region. Trade with neighboring regions, incl. And international
7. The investment attractiveness of the region.

The positive or negative image of the region should be the mechanism between the social expectations, the existing behavior and the state of the region. For this reason, in the positive image, it is necessary to reflect those features of the region that are in line with the benefits for the region. They also have to match the social expectations of a region's population and interested groups and allies from other regions. In the case of negative features, it should be taken into account that there are relatively fewer opportunities for impact on them. As a rule, they appear on inaccessible planes on the regional field. Along with the positive expectations between the rival competitors and opponents, there will be negative expectations. Competitors and opponents of the regions exist

both in it (economic competitors, separatists, etc.) and beyond. It is important to distinguish between competitors and opponents. For competitors, the image contains a "hint" on the way of co-operation in dispute resolution. For the opponents a version of the image aimed at destroying the opponents is being developed. An example of this is the national documents of a country related to its fight against terrorism.

The regional image as part of territorial marketing is an essential element from the point of view of the interregional competition for attracting investments. Also in terms of adding local distinctive elements to global production systems.

An important feature of the regional image is social expectation. It has to be very precise. This happens in the processes of socio-psychological and sociological monitoring related to certain basic values and regional interests (sympathy, antipathy, expectation, fear, etc.). This is a very important stage in the formation of a positive and the neutralization of a negative image. In order to expand the attractive regional image, it is necessary to understand correctly what the needs and expectations of the general public are. This understanding will allow the territory to know what its core values should be - which are the specific products the area can offer (residential buildings, tourism, labor, the environment, heritage, etc.)? In addition, monitoring provides information on the main threats facing the territory and for which prevention and mitigation tools should be built. As a rule, monitoring is done on a proposal from regional authorities as well as by independent commercial organizations. The main development of the territory is the adoption of procedures for control and evaluation and systematic monitoring of the marketing information system. The results are taken into account in the region's orientation to the political and / or economic (internal and external) course of the region. The preliminary stage of designing the positive or the beginning of neutralization of the negative image starts with the formation of the positive expectation regarding the positions, interests or behavior of the regional authorities. In this situation, positive expectations are intensified and maintained, and negative ones will fade, weaken and dispel.

It is of the utmost importance for the region's regional image to be simplified and to contain a limited number of characteristics or parameters. It must be sufficiently accessible for most residents and neighboring regions. The positive image of the region is formed purposefully through the "main corridors" of positive regional information. The stigma of developing a regional image can make it ineffective. Combating the negative image is also conducted purposefully and relatively coordinated, as instinctive uncoordinated actions make the fight ineffective.

The image of the region is formed on the basis of: population, economy, education, science, culture, media, public health, sport, politics, power structures, regional leaders, regulatory framework, transport sector, architecture, geographic features, historical past. (Rassadina, T. A., 2015) The formation of the region's image by the mass media reflects its economic potential, the availability of infrastructure, the level

of social and cultural development, the quality of life, the degree of economic and political stability.

There are image-building technologies that clearly differentiate the region from competitors.

- highlighting those characteristics that make the region accepted into the notion of investor system as "its own";
- selecting these region characteristics that match investors' perceptions of the ideal location for their business;
- Using other channels of perception, the main one of which is visual, as a more influential and memorable;
- Active use of accompanying symbolism in particular to the creation of a visual feature of the region (branding, flags, events, etc.);
- Active management of the mass communication processes;
- Fighting autonomous information flows (such as rumors, for example).

The tools for building the regional image are many and varied, and we will look at some of them. One of the instruments is the emphasis on information about the region. It aims to give priority to the important features of the region and to downplay its shortcomings. It is also rarely used the technique related to binary positions. Examples are "own-strangers," "America for the White," "Germany for the Germans," etc. The verbalization of information related to the region is crucial to the success of his image. The precise selection of words for constructing and recreating regional processes is key to the better performance of the region. Verbalizing often also serves as a fake representation of the region. Also important is the visualization of the region's information. Very often, specialists use old font for letters. Gothic for France and Germany, Old Slavic for Russia, hieroglyphs for China and Japan, Kufic and Naskh for the Arab countries. All this aims to show and highlight the antiquity of the region and its cultural traditions. Another interesting technique is the use of visual information in the name of the region. Examples are Slave Coast and Ivory Coast. In the world practice, the technique associated with the name of a particular historical person has also been used very often. Examples are Alexandria, Washington, St. Petersburg, and so on. An important element of the visualization is the use of regional flags, coats of arms, emblems, etc. The Nepal National Flag is the only national flag that is not rectangular. It is one of two such unconventional flags - the other is in Ohio, USA. The National Flag of Paraguay is borrowed from the French tricolor and symbolizes freedom. The unusual flag is that the emblem is different from both sides. The symbol of the sun is present in many flags, but the most famous is the flag of Japan. It depicts both the "Country of the Rising Sun" and the fact that the Emperor's family starts from the sun. The US flag has the most stars and has been changed many times. The largest animal is the Sri Lankan flag, a lion. Butan's flag has a giant black and white dragon. The biggest bird is the flag of Albania - the two-headed eagle. And with Canada's largest plant - maple leaf. Some flags depict religious beliefs and philosophies. In many of the old European flags was the cross, the flag of Israel - the hexagonal star of David, the Islamic

countries - star and crescent, the flag of India - Wheel of the Dharma. The flag of South Korea, also known as the Taegukgi, has three parts: a white rectangular background, a red and blue Taeguk, symbolizing balance, in its center, and four black trigrams selected from the original eight, one toward each corner. Interesting is the flag of Mozambique, depicted by its capercaillie - the only banner in the world with modern weapons. The only flag with inscription is that of Saudi Arabia. Coat of arms is also interesting - we will give a regional example from Bulgaria. The main part of the coat of arms is a shield - the classical symbol of a fortress or any fortified place. In the upper part of the shield is an architectural element kobilitsa (a yoke-shaped ornament) - very popular during the Bulgarian National Revival. The shield is purple - a color symbolizing the glory of Bulgarian kings and sovereignty. In the middle of the shield is a sheaf of wheat ears - a symbol of the unity and glory of the Bulgarian people. Here, in Dobrudzha, 1,300 years ago, Khan Asparuh established the first Bulgarian settlements. The ears also symbolize the fecundity and generosity of the Dobrudzha plains. Above the sheaf is the name of the town written in an old calligraphic Bulgarian font type. The sheaf, the name, and the shield contour are gold, which symbolizes the welfare of the townspeople.



Coat of arms of Dobrich

When it comes to passing certain stereotypes into the minds of investors, the term "implementing a model of regional information" is used. Communication is at the heart of promoting the image of the region in the minds of investors. Changing the content and intensity of communication can lead to a change in the perception of the region in the mass consciousness. This, in turn, can lead to social change. The best environment for advertising and building a region's image is visual. In this environment, the most widely used television and the Internet. It should not be forgotten that, in addition to providing information, these communication channels may also hide such channels.

Conclusion

In order to build a successful regional image and to achieve economic development in a given region it is important to bear in mind that investors will be based not on the real qualities of the region but on those who are imputed to them. From this point of view, even the pictures of the regions are crucial for the success of the measures taken to stimulate economic development. While spatial and organisational measures are aimed at improving the actual situation in the place or region, the primary goal of geographical promotion is to change its image. (Pellenberg P. H., W.J. Meester, 2009) The regional image is considered as one of the marketing techniques and concepts used for the purpose of strong economic development and popularization of territory. It takes into account the regional economic base, its capabilities and occupations in order to attract labor and potential investors. The Strategic Marketing Plan gives the territory the tools and capabilities to address this challenge. Territorial marketing offers the necessary tools to "sell" the image of the territory to reach the pre-selected target audience, using advertising, direct and web marketing, sales promotion, and so on.

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PECULIARITIES IN THE SOCIO-ECONOMIC DEVELOPMENT OF THE REGIONS IN BULGARIA

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ABSTRACT. The socio-economic development of the regions in Bulgaria is strongly dependent on strategic planning at national level and on the definition and formation of policies and priorities for economic development and the establishment of areas for impact by the central government. A particular influence on the degree of development of the individual regions in the country plays the presence of large cities in which production, services, education, science and cultural life are concentrated. On the one hand, the uneven distribution of large cities has a direct impact on the socio-economic development of the individual regions, on the other hand the demographic processes are important and have an impact on the development of the regions in the country. Special importance with regard to the socio-economic development of the regions should be given to the autonomy of regional authorities as well as the availability of financial and managerial independence of local authorities, which can be considered as additional factors in promoting interregional cooperation and integration processes in individual countries and regions. Additional attention and efforts should be directed towards improving interregional cooperation that is emerging and functioning in response to community-recognized socio-economic needs, legislative measures and financial incentives, which will create prerequisites for the use of interregional cooperation as an effective tool for regionalization of public governance.

Keywords: regional economy, strategic planning, regional development, regional economic growth, regional policy

ОСОБЕНОСТИ В СОЦИАЛНО-ИКОНОМИЧЕСКОТО РАЗВИТИЕ НА РЕГИОНИТЕ В БЪЛГАРИЯ

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РЕЗЮМЕ. Социално-икономическото развитие на регионите в България е силно зависимо от стратегическото планиране на национално ниво и от определянето и формирането на политики и приоритети за икономическо развитие и обособяването на зони за въздействие от централната изпълнителна власт. Особено влияние върху степента на развитие на отделните региони оказва наличието на големи градове, в които са концентрирани производството, услугите, образованието, науката и културният живот. От една страна неравномерно разпределение на големи градове се отразява пряко върху социално-икономическото развитие на отделните региони, от друга страна демографските процеси притежават важно значение и оказват влияние върху развитието на регионите в страната. Особено значение по отношение на социално-икономическото развитие на регионите трябва да се отдаде и на самостоятелността на регионалните органи, както и наличието на финансова-управленската независимост на местните органи, което може да се приеме като допълнителни фактори за насърчаване на междурегионалното сътрудничество и интеграционните процеси в отделните страни и региони. Допълнително внимание и усилия трябва да бъдат насочени към подобряване на междурегионалното сътрудничество, което се заражда и функционира в отговор на осъзнати от общността социално-икономически потребности, предприети законодателни мерки и предоставени финансови стимули, което създава предпоставки за използването на междурегионалното сътрудничество като ефективен инструмент за регионализация на публичното управление.

Ключови думи: регионална икономика, стратегическо планиране, регионално развитие, регионален икономически растеж, регионална политика

Introduction

In a socio-economic perspective, our country is gradually overcoming the consequences of the economic crisis as there is an increase in aggregate production at levels higher than the pre-crisis indicators, but we should note that the recovery of most of the regions in Bulgaria is still ahead. This assertion is confirmed by the fact that in 19 areas the gross domestic product (GDP) in real terms has not yet reached its pre-crisis level, taking as a basis data from 2008. The distribution of the 19 districts is in all regions of the country, with the exception of the Northwest Planning Region, where all areas GDP levels are below pre-crisis levels, i.e. the districts of Vidin, Vratsa, Montana, Pleven and Lovech. The real picture regarding the North Central Planning Region and the Northeast Planning Region is also similar, only the area of Veliko Tarnovo and Razgrad in the North Central Region and, respectively, Varna

and Dobrich in the North-East region are close to their pre-crisis indicators. In the South Central Planning Region, in the Plovdiv region, through large investments over the last few years, aggregate production is 8.5% higher in real terms than reported in 2008. While real production in the Southwest and Southeastern Planning Region is 2-3% higher than the pre-crisis year (2008), overall the positive trends are mainly attributed to Sofia (the capital) and the large Sofia region in the Southwest region, as well as to Stara Zagora and Yambol for the Southeastern Planning Region. On the other hand, it has to be taken into account that there is economic recovery in most areas of the country, especially if the labor market processes and income dynamics are observed. Again at the bottom of the ranking are the districts of Vratsa, Montana and Silistra, where the process of restoration has either not started or is not convincing. For example, in the Silistra District, less than half of the working-age population is employed. Although there is a downward trend in unemployment, the causes should be

explored and the responsible institutions should carefully examine what are the reasons for this situation, as the fall in unemployment may be due to the passage of some of the unemployed to the ranks of the economically inactive people, including because of the discouragement that they can't find a job. An example in this regard is the Montana region, where unemployment is doubled in 2015, but this is due to the fact that economic activity is collapsing. At this moment, we cannot identify a clear link between decisions to do business or to live in a given territory and the determination of local tax and levy levels as it is apparent that the setting of local tax rates is arbitrary and conjectural rather than strategically oriented. We can definitely say that there is even a lack of comprehensive local fiscal policy, as well as a strategic vision for the development of individual local communities. On the other hand, in the last five years, the world economy has been trapped by low growth, which has an impact on expectations, which is why spending (especially investment) is limited, and this directly affects potential growth. Meanwhile, weak levels of global trade and investment limit opportunities for increased factor productivity and, respectively, income growth, resulting in a decline in growth based on domestic demand. In order to influence the low growth trap, fiscal policy instruments can be used, there should be no doubt, that when used the correct and timely fiscal instruments, they can catalyze economic activity in the private sector and thus accelerate growth, when properly and timely used. But if protectionist measures are used by large economies such as the US, for example, the benefits of fiscal initiatives will be blunted. This is why a global plan for action has to be coordinated between leading economic centers. This is the reason why adequate support for monetary policy should be provided through the use of fiscal and structural policies as well as the denial of all forms of protectionism in foreign trade. Looking at Bulgaria, it is clear that the economic outlook is rather positive, but the risks remain relatively high, as, in addition to the traditional external environment risks and changes in external demand, account needs to be taken of the internal ones related to the formation of a stable government to finish a full mandate. But above all, the Bulgarian economy is open and heavily dependent on external demand and financing. However, given the observed trend of world trade decline as well as the European orientation of foreign trade flows, the importance of exports as a factor of growth should not be considered as significant over the past two years, and for the next two years. Looking at the share of foreign direct investment, it appears that the levels are much lower than the levels achieved in the years before the global financial crisis. For this reason, we must once again, as a major source of external financing, look at the funds under the European programs, especially as the programming period progresses. At international level, especially with regard to the formation of a common European budget, the risk of the impact of the UK's coming out of the European Union remains significant. These are the two factors that we can expect in both short and medium term, to influence the growth to remain rather low and unstable and below what is necessary to achieve accelerated development. Especially in view of the fact that for 2017, the growth of our country will be around 3% and the dynamics of economic activity will be determined by domestic demand and especially private consumption, which will be a consequence of the increase in disposable income

and a result of the moderate improvement of the labor market situation, which may slightly change the picture over the next two, three years, and especially at the end of the current programming period. As can be seen from the presented data, the absorption of the funds in the European programs in the past 2016 was weak, which is typical of the beginning of the programming period. Expectations are for a gradual acceleration of absorption, which will increase government investment, and an increase in gross fixed capital formation in both nominal and real terms should be expected. In 2017 inflation is expected to remain around 2% on average per the year, but we can expect that the trade balance will deteriorate in the coming years, on the one hand, due to the retention of export rates and on the other hand, due to the expected increase of imports because of the increased internal search. Ultimately, net exports in the coming years are expected to have a negative contribution to GDP growth. Regarding the development of the private sector, which should be expected to be cautious when opening new jobs, especially under conditions of pressure to raise wages, employment growth is likely to be the same as the previous year.

Demographic situation and opportunities of development

The population in Bulgaria is decreasing and aging, and regional imbalances in the distribution of inhabitants are getting worse. By 2015 only Sofia-city increased its population compared to the previous year. This increase, however, is mainly due to the mechanical growth, i.e. people from other areas move to the capital, mainly for studying and finding a job. This continues to exacerbate depopulation in rural and peripheral areas. Namely, the observed demographic picture should be the main reason for the development of a Targeted Investment Program in support of the development of Northwest Bulgaria, the Rhodope Mountains, Strandzha-Sakar Mountains, the bordering areas, mountainous and semi-mountainous, the less developed areas, as well as in all areas of the country, which have socio-economic problems except Sofia area (capital). The main objective of the Targeted Investments Program is precisely defined to be the reduction of the inter-regional and intra-regional differences in the economic, social and territorial development, accompanied by the provision of conditions for accelerated economic growth and a high level of employment. The need for the development and implementation of the targeted investment program is reinforced by the population data by districts in the country, where with the smallest population is Vidin area, with permanent residents of 1.3% of the country's population, while the largest permanent residents are in the Sofia city region (capital) - 18.4% of the country's population. The distribution of the population by districts for the country is the following: less than 200 thousand people live in 16 districts, 200 thousand to 300 thousand people live in six districts that cover 20.4% of the country's population and six are the districts with population of over 300 thousand, and in three of them - Sofia (capital), Plovdiv and Varna, lives more than one third of the country's population (34.5%). The regions of Kyustendil, Pernik and Gabrovo have a demographic state characterized by a deteriorated age structure of the population, threatened

opportunities for reproduction of the labor force and very low levels of natural growth, and in these regions the birth rate is the lowest in the country. In Gabrovo, the ratio of the population aged 65 and over to the population aged 0-14 is deteriorating in the district and is already 65% higher than the average for the country. When reviewing the labor market situation in 2016, we can note that there is a significant contraction of the economically active persons, which led to both a drop in the number of employed by 0.5% and a drop in the unemployment rate to 7.6%. In the medium term, a smooth recovery of the labor market and an increase in employment should be expected at rates close to 0.5%, while the unemployment rate will decrease to 6.3% in 2019. Naturally, the average wage will continue to grow at about 8%. In total, the number of unemployed in the country between 15 and 64 years dropped by 57.2 thousand in 2016. According to the socio-economic characteristics of the unemployed, age and education are again the social prerequisites for getting out of unemployment, leaving the problem of long-term unemployed who find it difficult to make a transition to employment. Their relative share of the total unemployed remained at around 60% for the period 2012-2015 and for 2016 it is 59.1%. The workforce, i.e. persons aged 15-64, decrease their number by 76.4 thousand and are already 3199.6 thousands. Considering the aging population, we should not be surprised at the fact that people aged 55-64 years are 3.6 times more active than those aged 15-24 years or we can conclude, that activities will increasingly depend on the labor market participation of people in high age groups especially the people between 55 – 64 years of age. Naturally, the realization of the labor market depends not only on professional qualification and working conditions, but also on a set of other social prerequisites that determine life expectancy in good health. Of significant interest is also the increase in the number of inactive persons in 2016, which is 21.1 thousand more, especially considering that this is the second largest in the period 2010-2016. The most likely causes are the long-term unemployed leaving the national labor market, as it is assumed that after two years of absence from work, these people easily make a transition to inactivity and / or move to labor markets in other countries.

Economic situation and opportunities for development of planning regions

In socio-economic terms Sofia (capital) region is the most developed and differs from other regions in terms of income and volume of investments, and has the best overall demographic situation and the strongest labor market, mainly due to the fact, that it is an attractive center for economically active people, the unemployed and young people seeking educational services. Naturally, for these reasons, Sofia district (capital) is the populated area with the highest GDP per capita, the highest average annual household income, the highest average salary and the lowest poverty level, as a result of which the capital is in the best situation on the labor market and is leading the size of the investments - both domestic and foreign. The primary importance of Sofia (capital) region in comparative terms is further outlined by comparing the average salary in the capital, which is about 35% higher than the average salary in the second area of this indicator, namely

Stara Zagora, and has reached a difference of about 2 times with the last region of Vidin. Naturally, as an attractive center, our capital has the worst indicators of security and justice in the country. Secondly, the regions of Bourgas, Varna, Stara Zagora, Plovdiv and Rousse are growing in the overall socio-economic development of the country, characterized by relatively good economy and labor market, relatively high local taxes and fees, comparatively good condition of education and healthcare, of course, in terms of order and security, the indicators are also negative, but better than Sofia (capital). These areas are characterized by a negative natural population growth and a relatively good age structure, with even some of them having a positive mechanical growth as they are local attractiveness center. Naturally, with regard to local taxes and fees, we should not be surprised that these are higher than the average for the country, especially given that these are the areas at the top of the population's ranking. At the bottom of the socio-economic development list are the Vidin, Pleven, Montana and Vratsa districts, characterized by a deteriorated demographic situation, a weak economy and relatively low levels of investment. These areas constitute the Northwest Planning Region, which further reinforces the extremely poor socio-economic situation of North-West Bulgaria. Exactly, the region of Vidin is with the lowest average annual gross salary of the employees under labor and official legal relations in the country and the Montana region had for 2015 the lowest household income. The two areas rank third and fourth in terms of poverty. As expected, all four areas have a negative mechanical growth, with extremely low levels of natural growth and poor age structure.

Of course, other areas in the country also have significant labor and labor market problems, namely Kardzhali, Silistra, Razgrad and Targovishte. In these areas, the level of income and the level of investment per capita is well below the national average. The four areas mentioned are also placed at the bottom of the employment-level ranking of persons aged 15-64.

According to the forecasts for this year, an increase in the contribution of domestic demand should be expected, especially given that consumption dynamics will be driven by wage growth, moderate employment growth, and positive credit growth in the country. The amount of investments made will be in a fairly proportional relationship with the pace of absorption of EU funds as well as with the higher internal and external demand. Expectations in the medium term are that economic growth in Bulgaria will remain around 3 - 3.5% per annum and the increase in the amount of investment will be mainly determined by the progress of the 2014-2020 programming period and the expectations for accelerated absorption of European funds in Bulgaria. The gradual acceleration of domestic demand will lead to an annual average inflation rate of around 2-2.5%, with a larger increase in consumer prices this year due to a nearly 30% increase in the price of gas and subsequent increases in electricity and heat, and of the water. This means that a large increase in prices of other goods and services from the consumer basket is to be expected.

From the current picture of the situation in the country, we can draw the conclusion that, in the first place, the capital is emerging from the socio-economic point of view, while the socio-economic situation of more and more areas in the country deteriorates. In particular, this can be said for the socio-economic situation of North-West Bulgaria, and at the same time it can be seen for the districts constituting the North Central Planning Region, which follow and are coming closer to the socio-economic development in the Northwest Planning Region. This shows that, as a whole, the regional policy in Bulgaria does not produce results, which means that it is necessary to rethink it as well as to take adequate measures in order to achieve in the first place the levels of indicators for socio-economic development, and secondly, to look for opportunities to improve them. Exactly, the deepening of interregional disparities and the lack of effectiveness of the implemented measures and the implemented plans and strategies in the areas, impose, even oblige to make a large-scale expert discussion to improve and update the concepts and technology of regional policy, as well as the organization of a new redistribution of the necessary means for its implementation.

Opportunities to use a targeted investment program for the development of the region.

The identification of problem areas requires the adoption of adequate measures in order to have a positive impact on the achievement of social and economic development of the individual administrative and territorial units in the country, namely the districts and the municipalities, even in individual settlements. In this regard, particular attention should be paid to the targeted investment program, which is to be seen as a specific instrument for the implementation of the National Spatial Development Concept for the period 2013-2025 (SCRCP), as well as a tool for impact and implementing an active regional policy in the areas. In the National Concept for Spatial Development for the period 2013 - 2025, there are specific territories that need stimulation of development. It is up to them to implement targeted and integrated policies to preserve and exploit specific local resources and overcome the accumulated problems. By its very nature, the targeted investment program should also be seen as an upgrade of the existing planning documents for the regions concerned, spilling additional resources and "energy" to directly achieve the main objective - "revived economy - new stable jobs - retained / attracted human resources" (Atanasova, M., Naydenov, Kl., 2016). Problem areas need more than a classic targeting program even if it has significant resources. To ensure the success of a program, it must be developed and implemented on the basis of an integrated multisectoral approach. The implementation of the principle of integration of natural, cultural, organizational, intellectual, financial and time resources, strategic goals and priorities, ideas and projects, representatives of all stakeholders from public, private and non-governmental sectors, sources of funding, creates prerequisites for successful implementation of the program and for achieving the desired synergic effect (Atanasova, M., Naydenov, Kl., 2016). In chronological plan, Bulgarian experience shows a number of unsuccessful attempts of

targeted support for achieving regional cohesion and overcoming interregional disparities. The main conclusions that can be made and suggested as recommendations for future planning to influence the development of planning regions can be linked to the need to build a vision for development for a longer period, not to limit the duration of programs outsourced within 5 or 7 years, i.e. in order to obtain a lasting result, it is necessary to apply a coherent policy that guarantees simultaneous continuity, but also allows timely updating during the implementation of short-term plans and strategies. Moreover, it is necessary to apply direct management and implementation of directly targeted state intervention in individual territorial communities to avoid the formation of numerous inapplicable planning documents and strategies that are highly overrated in the analyzes and reflect or rather show simulation of the support for overcoming interregional disparities. It must be made clear that, in order to achieve lasting, tangible and irreversible processes in the right and desired direction, targeted planning actions are needed to provide permanent and lasting support for decades.

Conclusion

Reconsideration and use of the targeted investment program will create an opportunity to overcome the economic backwardness, attract investment and increase employment in the different territorial units in the country. The implementation of a Targeted Investment Program must be carried out simultaneously with the implementation of the strategic goals set for the stimulation of the socio-economic development of the underdeveloped regions of the country, using the possibilities for absorption of funds from the European Social and Structural Funds. One of the important tasks of the targeted investment program should be to achieve a real impact on the economy of the lagging regions in the long run, to support the development of human capital and, at the same time, to create conditions for more effective territorial coordination of investments in the regions. For this reason, it is imperative that the targeted investment program includes a package of measures such as reduced tax rates for firms opening new jobs in the underdeveloped region, creating opportunities to subsidize 50% of the value of interest rates on investment loans, as well as providing opportunities for the renting of land and buildings in industrial areas/parks/ by enterprises operating on the territory of the underdeveloped region. In order to have a lasting and visible effect, it is vital to adopt such an approach for creating an economically attractive area through targeted state action and by applying a package of business preferences by the local administrative structures, which must be guaranteed for a period of at least 10 years. Naturally, significant efforts should be made by state institutions to provide opportunities for qualification and re-qualification of the population, especially in backward areas, where „unfortunately, the collaboration between the educational institutions and the private sector is far from satisfactory. The appropriate link between theory and practice has not been established yet. Many employers are not satisfied with the practical skills that the graduates have. It is especially important to increase investment in human capital with the state employers, local authorities and regional communities

sharing the burden without ruling out individual responsibility. Concrete tools for implementing the policy of continuing vocational training and life-long learning could be: the establishment of sectoral funds for improving the qualification of the employed and setting up individual training accounts (Naydenov, Kl., 2017)".

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SOFTWARE TOOLS FOR BUSINESS INTELLIGENCE

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ABSTRACT. Nowadays we are witnessing a new industrial revolution, driving forces of which are digital data, computing technologies/ computers and automation. The mining industry is no exception to this trend.

In recent years, large mining companies have massively implemented different information systems to manage individual processes or modules of ERP systems. With the development and integration of technologies, the volume of gathered information increases. Large and complex arrays of data appear. They are usually difficult to process and analyze.

Solution to these problems offers Business Intelligence (BI). BI is a collection of methods for extracting, processing, analyzing and visualizing of data. Its purpose is the retrieving of meaningful and business-friendly information.

An important feature of BI systems is their ability to process large amounts of data in real time, making them especially useful in managing the dynamics of conditions and processes in the mining industry.

Keywords: Business Intelligence, Software tools, Mining Industry

СОФТУЕРНИ ИНСТРУМЕНТИ ЗА БИЗНЕС ИНТЕЛИДЖЪНС

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РЕЗЮМЕ: В днешно време сме свидетели на нова промишлена революция, чиито движещи сили са цифровите данни, изчислителните технологии и автоматизацията.

В последните години големите минни предприятия масово внедряват различни информационни системи за управление на отделни процеси или модули от ERP системи. С развитието и интегрирането на технологиите нараства и обемът на събраната информация. Получават се големи и сложни масиви от данни, които са трудни за обработване и анализ.

Решение на тези проблеми предлага Бизнес Интелигентността. ВІ представлява съвкупност от методи за придобиване, обработване, анализ и визуализация на данни с цел извличане на смислена и полезна за бизнеса информация.

Важна характеристика на ВІ системите е способността им да обработват големи количества данни в реално време, което ги прави особено полезни при управление динамиката на условия и процеси в минната индустрия.

Ключови думи: Бизнес интеледженс, софтуерни инструменти, минна индустрия

Introduction

Nowadays we are witnessing a new industrial revolution, driving forces of which are digital data, computing technologies and automation. The human activity, the industrial processes and the scientific research are invariably related to data collection, data processing and data visualization. This stimulates the emergence of new products and services as well as new business processes and scientific methodologies. The trend is global and covers various areas of the human activity like healthcare, security, climate and resource efficiency, energy, intelligent transport systems and smart cities, digitization of public services and others.

This also applies to the mining industry. The mine enterprises are usually located on vast areas. Special intranet networks are built in order to make information resources

accessible from each point of the enterprise. The information process is dynamic. The data obtained from one source is supplemented by new elements. The results are large volumes of data, which makes it difficult to use the classical analytical methods for solving many of the tasks in the modern mining industry. With the development of the IT and particularly data processing and data analyzing, now it is possible to resolve the task more quickly and easily. The main purpose of the modern data processing and analysis systems is to extract knowledge. This knowledge is used to support decision-making. The decisions are based on the provided analyses.

For companies, the strategic decisions are directly related to achieving significant results in the future. They concern the management policy, the business areas, the financial management, the products and the services. The companies need flexibility in decision-making. The flexible decisions allow

dynamic change in the business processes of a company. They must be also effective decisions. For today's dynamic world improving efficiency is crucial for the organizations. They must function properly and remain competitive on the market. To achieve a good performance for the business means to achieve better results investing less funds. This could be achieved by optimizing the business processes.

Here comes the Business Intelligence or BI. BI includes analytical models, technologies, information and practices for making better and safer management decisions. The need for timely analysis of the generated data is at the core of the BI systems. By obtaining information and regularities, the BI system is capable of evaluating the received information and based on it to make forecasts for the company's development.

Business Intelligence

BI is a collection of methods for extracting, processing, analyzing and visualizing of data. Its purpose is the retrieving of meaningful and business-friendly information. The most important feature of the BI systems is the ability to process large amounts of data in real time. This enables rapid analysis and dynamic reporting to meet the business needs, helping to build more effective strategies, optimize and manage more accurately the production processes, reduce company costs and improve planning and forecasting. By extracting regularities and causal links from the data processing, the BI system evaluates and analyzes the retrieved information, which improves planning and makes forecasts for the company's development. The main objective of Business Intelligence is to provide useful and high quality information for the managers, when necessary undertake effective management actions. BI helps companies discover new opportunities for business growth.

Globally the mining industry today faces many operational and regulatory challenges. With the price of precious metals on the rise, these companies must position themselves accordingly to be ready for a rapid expansion into new regions, while at the same time they must find new and innovative ways of keeping their costs low. Along with the rapid growth, the mining companies also face a complex and diverse set of regulatory and legal standards that they must agree with. In order to overcome these industry challenges and stay ahead, many mining executives have already been leveraging the power of BI tools. BI tools provide them with efficiency, as well as, the right insights and agility to maintain performance while reducing costs. BI systems help mining executives make better and faster business decisions, when it comes to HR planning, legal compliance, industry standards, trend analysis, logistics and strategic planning. According to Jaques Du Preez (MD and founder of BI-Blue Consulting), BI provides new insight to the business: „With this tool, you can transform your view of the business using sophisticated visual representations of your performance and processes.“ [Miningweekly.com]

The BI solutions enable companies to find new business directions. This happened to Pulse Mining Systems, an ERP provider for the mining industry. Since the ERP back-end

database used relatively old technology, it was a challenge for the company to retrieve and visualize data. Using Tableau BI they successfully created clearer and better visualizations of the extracted data. Rob Parvin, Manager of Visualization and Analytics claims that thanks to Business Intelligence, Pulse Mining Systems managed to create a new business line for the organization. Using Tableau BI they provided the CIO with a quick win, allowing delivery of a single reporting solution for the water quality across the organization. This stimulates the emergence of further initiatives for which the company is being funded.

BI architecture

The basic functionality of the BI system involves the availability of structured data like relational databases, NoSQL, Data Warehouse, Big Data and so on.

The trends in using databases make the BI developers find new ways to accelerate the analytical processes through a more efficient collaboration between hardware and software. Today the relational databases are not flexible enough to meet the Big Data's challenge. The new architectures are also associated with relational databases, but they are designed to serve large volumes of data. There are also BI manufacturers, who offer database management systems that do not rely on relational models.

The BI solution's architecture would have the following structure:

- At the bottom of the corporate IT there are standard ERP, CRM and other transaction systems;
- On the next level the integration of the collected data is performed by ETL (Extract, Transform and Load) tools, which clear the data and maintain the data quality;
- The next level is occupied by data storage systems – Data Warehouse, Big Data and so on;
- Next are the SQL applications, which provide access to the data;
- The following level is occupied by BI tools for statistics, data mining and operational analysis;
- At the top there are the platforms for collaboration and sharing of the received information.

In general, BI relies on interactive dashboards, which provide good graphical interfaces. The dashboards are easy to use and quickly meet the business needs. They provide general information online. The BI dashboards also provide detailed graphical visualization of the data, which reveal the data regularities. They also ensure a high level (context-sensitive) monitoring of the large amounts of data. Thus, when deviation from key performance metrics (KPIs) happens, BI allows going deeper into the corresponding BI report (so called *drill down*). In this way, only the data, whose timing parameters are currently relevant, is observed. One of the most specific features of Business Intelligence tools is the ability to shift the data categories in order to group data by different dimensions and convert the report according to the business needs.

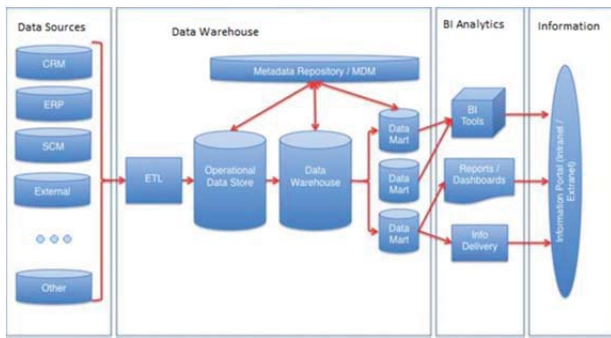


Fig 1. Architecture of BI

BI software

Gartner is a world leading research and consulting company in the field of IT. Each year, Gartner evaluates 24 of the leading Business Intelligence software solutions on multiple metrics such as system infrastructure, data management, analytics and visualization, information sharing and collaboration, and others. The Gartner's Magic Quadrant focuses on products that are currently popular on the market and meet the criteria of today's BI platform.

The BI platforms are evaluated on fifteen critical capabilities across five main sections.

I. Infrastructure.

1. BI Platform Administration, Security and Architecture. Capabilities that enable platform security, administering users, auditing platform access and utilization, optimizing performance and ensuring high availability and disaster recovery.
2. Cloud BI. Platform-as-a-service and analytic-application-as-a-service capabilities for building, deploying and managing analytics and analytic applications in the cloud, based on data both in the cloud and on-premises.
3. Data Source Connectivity. Capabilities that allow users to connect to data contained within various types of storage platforms, both on-premises and in the cloud.

II. Data Management.

4. Metadata Management.
5. Self-Contained Extraction, Transformation and Loading (ETL) and Data Storage.
6. Self-Service Data Preparation. capabilities include user-driven data combination of different sources, and the creation of analytic models such as user-defined measures, sets, groups and hierarchies. Advanced capabilities include machine-learning-enabled semantic autodiscovery, intelligent joins, hierarchy generation, data blending on varied data sources, including multistructured data.

III. Analysis and Content Creation.

7. Embedded Advanced Analytics. Enables users to easily access advanced analytics capabilities that are self-contained within the platform itself or through the import and integration of externally developed models.
8. Analytic Dashboards.
9. Interactive Visual Exploration.

10. Smart Data Discovery: Automatically finds, visualizes and narrates important findings such as correlations, exceptions, clusters, links and predictions in data that are relevant to users without requiring them to build models or write algorithms. Users explore data via visualizations, natural-language-generated narration, search and NLP technologies.

11. Mobile Exploration and Authoring.

IV. Sharing.

12. Embedding Analytic Content.

13. Publish, Share and Collaborate on Analytic Content.

V. Overall platform capabilities.

14. Platform Capabilities and Workflow.

15. Ease of use and interface.

The Magic Quadrant helps in choosing the right product. It classifies the BI solutions in four smaller quadrants – Niche Players, Challengers, Visionaries и Leaders (Fig. 2).



Fig. 2. Gartner's Magic Quadrant

Niche Players do well in a specific segment of the BI and analytic platform. They have a limited capability to innovate or outperform other vendors. They may focus on a specific domain or aspect of BI, but are likely to lack depth of functionality elsewhere. They also have a limited implementation and support capabilities. In addition, they may not have achieved the necessary scale to solidify their market positions yet.

Challengers are well-positioned to succeed in the market. However, they may be limited to specific use cases, technical environments or application domains. Their vision may be hampered by the lack of a coordinated strategy across the various products in their platform portfolios, or they may lack the marketing efforts and awareness of the vendors in the Leaders quadrant.

Visionaries have a strong and unique vision for delivering a modern BI and analytics platform. They offer depth of functionality in the areas they address. Visionaries are thought

leaders and innovators, but they may be more expensive and are more complex to maintain.

Leaders are vendors that demonstrate a solid understanding of the product capabilities and commitment to customer success, extend their products' capabilities to meet the customer needs, and offer an attractive pricing model. The platforms they offer are easy to use and easy to buy. Their BI solutions offer powerful analytics and detailed visualizations. They are characterized by being considerably easier to use. In some cases, IT specialist intervention is not even necessary.

Tableau

Tableau Software is a US company based in Seattle, Washington, USA. It offers interactive data visualization products in the BI sphere. The company was established at Stanford University's Department of Computer Science between 1997 and 2002. Tableau Business Analytics is one of the leaders in Business Intelligence business, according to this year's Gartner Magic Quadrant. In fact, the product is a market leader for the fifth consecutive year.

Tableau is also one of the most dynamically evolving BI solutions. The company's ambition to improve existing and add new functionalities in recent years has led to a significant growth in the number of customers, therefore, to its leadership position in this fast-growing technology sub-segment.

The company offers the following BI products: Tableau Desktop, Tableau Server и Tableau Online.

Tableau Desktop is a data visualization software. It provides a fast creation of interactive dashboards, beautiful graphics and reports.

Tableau Server is a platform for Business Intelligence that offers powerful tools for analyzing and visualizing data. It is easily scalable and supports multiprocessor processing. It also provides high availability and security. Tableau Server can work on both physical and virtual machines. Tableau Server also provides an online multiuser platform designed to share and collaborate with reports and visualizations created in Tableau Desktop.

Tableau Online is a Cloud-based BI solution. It provides flexibility and ease to the powerful data visualization application. As a cloud-based platform, there is no need for special server hardware, expensive software and IT support. Tableau Online can be expanded to suit the users' needs.

Tableau has an extremely scalable client-server architecture (Figure 3) that handles mobile, web and desktop clients.

This architecture supports fast and flexible expansion. It could be divided into several layers.

Data Layer - One of the main features of Tableau is that it works with a variety of data from different sources. For example, in a mining enterprise, the data environment is heterogeneous. The data is stored in Data Warehouse, Big

Data structures, Relational Databases, Spreadsheets (Excel), and more. To optimize data processing and visualization, Tableau uses a specially developed In Memory Data Engine technology.

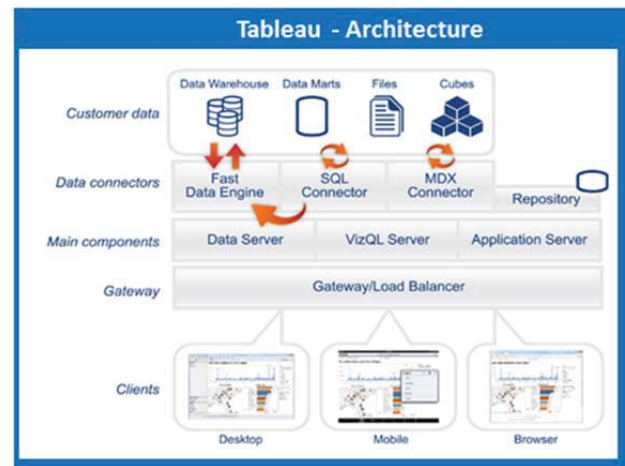


Fig 3. Tableau Architecture

Data Connectors - Tableau has multiple optimized data connectors for connections to various data sources such as Microsoft SQL Server, Microsoft Excel, Hadoop, MySQL, ORACLE and others. The system also has a general ODBC connector for data source systems that do not have one.

There are two methods for linking and retrieving data - Live and In-memory. Users decide which method to use. Live connection is used when data is retrieved from databases. The data itself remains in the output system, and only the summary results of the request are sent to Tableau. In practice, Tableau can efficiently handle unlimited amounts of data. The performance of the information system and the server that manages the database have a great importance for the work of Tableau. According to the manufacturers Tableau is a front-end solution for analyzing some of the world's largest databases.

In-memory is a technology that optimizes the analysis and visualization of data. Once a connection has been established between the BI and the data source, the data can be retrieved in the Tableau memory. The technology uses disk, RAM and Cache memory. In the first case, the data is extracted into files with a special extension called Data Extracts. The Data Engine module is designed to make full utilization of system resources to provide fast processing and visualization of large volumes of data.

Power BI

Power BI is a cloud-based Microsoft product that provides business analytics services. According to Garner's Magic Quadrant, along with Tableau, Power BI is a leader in the BI sphere. The product is a collection of powerful intuitive tools and functionalities for statistical analysis and visualization of large data sets. Power BI service is a part of Azure, which is Microsoft's cloud service platform. The Power BI architecture is based on two clusters - the WFE (Web Front End) Cluster and

the Back End Cluster. WFE takes care of the initial connection and authentication, and then the Back End processes all subsequent user interactions. Power BI uses Azure Active Directory (AAD) to manage users as well as manage the data storage and metadata process via Azure BLOB and Azure SQL Database.

The WFE cluster manages the initial connection and authentication process through Azure Active Directory. Users use their email address to create their own Power BI Account. This email account serves as a credential name that provides access to the other resources. The Authentication Name is converted into a User Principal Name that associates with a corresponding Windows Account (Windows Active Directory) domain. UPN is a format that defines the "Internet" name. For example, if we have the following email `UserName@example.com`, UPN splits the entire string as follows: `username` `UserName`; Separator `@` and UPN suffix or domain `example.com`. For greater security, AAD provides additional settings.

Power BI uses Azure Traffic Management to direct user traffic to the nearest datacenter determined by the DNS record of the client attempting to connect, for the authentication process and to download static content and files. Power BI uses the **Azure Content Delivery Network** (CDN) to efficiently distribute the necessary static content and files to users based on geographical locale.

The **Back End** cluster is how authenticated clients interact with the Power BI service. The Back End cluster manages visualizations, user dashboards, datasets, reports, data storage, data connections, data refresh, and other aspects of interacting with the Power BI service. The **Gateway Role** acts as a gateway between user requests and the Power BI service and is handled by Azure API Management. Only **Azure API Management** (APIM) and **Gateway** (GW) roles are accessible through the public Internet. They provide authentication, authorization, DDoS protection, Throttling, Load Balancing, Routing, and other capabilities.

Power BI uses two primary repositories for storing and managing data. Data that is uploaded from users is typically sent to Azure BLOB storage, and all metadata as well as system data are stored in Azure SQL Database.

When an authenticated user connects to the Power BI Service, the connection and any request by the client is accepted and managed by the Gateway Role, which then interacts on the user's behalf with the rest of the Power BI services. For example, when a client attempts to view a dashboard, the Gateway Role accepts that request then separately sends a request to the Presentation Role to retrieve the data needed by the browser to render the dashboard.

It is important to note that users are responsible for the data they share: if a user connects to data sources using her credentials, then shares a report (or dashboard, or dataset) based on that data, users, with whom the dashboard is shared, are not authenticated against the original data source, and will be granted access to the report

Using the On-premises Data Gateway resolves this problem. The dashboards are cached in Power BI, but access to underlying reports or datasets initiate authentication for the user attempting to access the report (or dataset). The access will only be granted if the user has sufficient credentials to access the data..

Power BI also offers a version suitable for embedding - Power BI Embedded. It makes it possible to integrate dynamic reports into web systems or mobile applications.

Comparison between Tableau и Power BI

Tableau and Power BI provide powerful tools for extracting, processing, and visualizing data. Both products offer a wide variety of connectors to different data sources such as relational databases (MS SQL Server, MySQL, PostgreSQL, Oracle, etc.), spreadsheets (MS Excel), Web analytics services, data warehouses, Big Data Solutions. Loading fresh data can take place automatically at a time when servers and information systems are not heavily loaded to avoid delays or interruptions in the workflow. In their latest versions, both products add the automatic email notification option when certain data or manually defined calculations reach specific values.

Tableau and Power BI have predefined aggregate functions that make calculations very fast. These are SUM (), COUNT (), MAX (), MIN (), AVG (), median and trend finding, percentage, and so on. When extracted data is loaded, BI systems automatically determine the type of data and structure them in fields, if necessary (for example, when using JSON files as data sources). Both systems enable the user to convert the data type before it is rendered. The STRING fields can be trimmed.

Both products support programming languages by which users can create their own graphics or apply specific methods for deeper statistical analysis of data in order to retrieve business-friendly information. These are the R and the Python (Tableau only) languages.

Tableau Desktop and Power BI interfaces are intuitive and easy to use. And through cloud services, users can access their reports from different devices at any time.

They are available for Android OS, iOS, Windows OS.

Advantages of Tableau:

- More convenient interface;
- On-premises service that significantly reduces the possibility of leakage of valuable information;
- Can handle extremely large data;
- Provides better visuals;
- Story mode that draws attention to critical data values or anomalies;
- It has many and varied connectors for extracting data.

Advantages of Power BI:

- It has a free version that has limitations on the amount of data extracted, sharing and collaboration, automatic data update, and more. It is suitable for small companies with a limited budget;
- Great compatibility with other Microsoft products.
- Integrated in Microsoft Dynamics 365 (integrated in ERP Navision and CRM) business management, customer and marketing platform.

Conclusion

Nowadays, the information technologies are dynamically developing. New and new sources of raw data are constantly emerging increasing the need this data to be processed. Mining companies integrate high-tech systems for managing, allocating resources, and providing high security standards. All of these systems generate huge amounts of data.

BI gives us the opportunity to understand what data is "talking to us" through beautiful, detailed and interactive visualizations. The information we receive helps us in making decisions related to production, finance, optimal allocation of resources, and more. At a glance, we can compare past and present results with the past as well as make predictions about the future.

The choice of BI product depends on the specifics of work and the security policies. If the analyzed data is strictly confidential, then the user should choose Tableau's BI solution. Although the initial costs are relatively high because Tableau Server and Tableau Desktop are sold with separate licenses, the data is stored locally in the company and the security level is higher. The reports and dynamic boards can be displayed via Tableau Reader.

On the other hand, if the company uses Microsoft products and platforms, the more optimal choice would be Power BI. As it became clear, one of the key benefits of Power BI is that it integrates easily into Microsoft's ERP and CRM systems. This enables users to see real-time dynamic reports and boards with fresh data inside the system itself. This is extremely useful for directors, managers and financiers. It assists in making quick decisions that can be critical to business.

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DEVELOPING AN INTERNET APPLICATION FOR THE PUBLISHING HOUSE "ST. IVAN RILSKI"

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ABSTRACT: The article describes the design and creation of an Internet application which provides Web based access to specialized mining literature, reference books and guides, and more.

The developed information system allows the addition, editing, selective search and extraction of specialized mining materials from the database.

Its technical functionalities are based on open-source software. The server language used is PHP, and the MySQL relational database was used to implement the database of printed publications.

Keywords: Internet application, Web-based access to printed publications.

РАЗРАБОТВАНЕ НА ИНТЕРНЕТ ПРИЛОЖЕНИЕ ЗА ИЗДАТЕЛСКА КЪЩА "СВ.ИВАН РИЛСКИ"

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РЕЗЮМЕ: Статията описва проектирането и създаването на Интернет приложение, което предоставя Web базиран достъп до специализирана минна литература, справочници, ръководства и др.

Разработената информационна система позволява добавяне, редактиране, селективно търсене и извличане от базата данни на специализирани учебни материали с минна насоченост.

Техническите й функционалности са реализирани на основата на софтуер със свободен достъп (open-source). Използваният сървърен език е PHP, а за реализацията на самата база от печатни издания е използвана релационна база данни MySQL.

Ключови думи: Интернет приложение, Web базиран достъп до печатни издания.

Introduction

Modern education requires continuity and responsibility for everyone, it is a major factor for social and cultural integration. Accessibility of information is one of the most important conditions in developing and cultivating of the new educational trends, providing feedback at all levels in the education system.

The main purpose of the Internet application that presents Web-based access to specialized mining literature, manuals, guides, etc. is precisely to provide easier access to information that students at the University of Mining and Geology "St. Ivan Rilski" (UMG) and interested professionals could use in a variety of situations in their present and future professional activities.

Providing such better access to specialized information would contribute to better awareness, would enhance the quality of training students and will be a valuable tool for the work of specialists in the field of mining and moreover it has contemporary relevance in today's world of high technologies.

Basic functional blocks of the system

The proposed information system is implemented with functional blocks such as:

- ✓ Portal that provides entry access to a remote data base for a distributed search;
- ✓ Allows database search;

- ✓ Dynamic generation, processing and retrieval of textbooks, study manuals, monographs, and real-time mining guides.

The developed system also allows:

- ✓ Working with distributed databases – i.e. providing the possibility to work with databases located on a server.
- ✓ Differentiation of access - the system allows access for users with different authorities;
- ✓ Verification and control - the system is required to be able to collect statistics on user inquiries;
- ✓ Simplicity in service - the system provides users with easy access interfaces to the information;
- ✓ The services provided by the publishing house of the UMG "St. Ivan Rilski" are provided in the appropriate electronic form;
- ✓ Allows users online access to information about the updates of the application.

System architecture

Figure 1 illustrates the architecture of the application, which has three separate logical hierarchical levels.

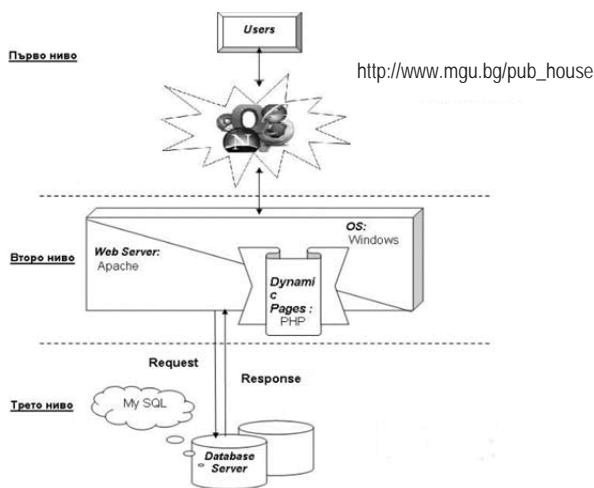


Fig. 1. Application architecture

For realization of the first function level – the customer (in the figure it is indicated as Users) – is used as an ordinary web browser (such as Internet Explorer or Google Chrome, Mozilla), which connects to the main server-part of the application. In this part of the information system the communication is done by http protocol.

The second level is developed on the Windows operating system and is implemented through the web server that serves the information system that dynamically generates and provides information. Upon a user request, the server starts a processing program (PHP) that generates an HTML page in real time. The Apache webserver is selected and as a processing program is used PHP interpreter for programming modules on the part of the server.

The third level is the database level. It is implemented through MySQL database. The MySQL server is very fast, powerful and easy to use. It is designed to manage and maintain large database much faster than existing solutions and has recently been used very successfully in environments with high productivity requirements. The specific database contains six separate tables. They contain detailed information about the users and administrators of the information system, as well as detailed data about the authors and the scientific literature, published by UMG "St. Ivan Rilski".

Modules of the information system

The information system allows users to perform a selective search on certain criteria and administrators to add and edit, process and retrieve information on mining guides, reference books and textbooks.

The logical links in the information system are implemented through the php, javascript, jquery and html programming languages and are presented in Figure 2 (Hristov, 2014).

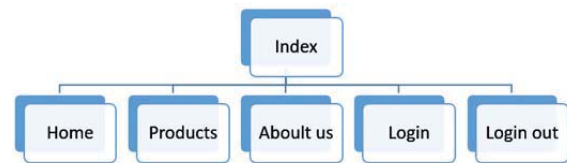


Fig. 2. Logical links of the information system

The records of the database information system of UMG Sv. Ivan Rilski's Publishing house are stored in six tables, which are: authors, authors' books, books, users, lib, genre in database lib. Figure 3 shows a table scheme of the database.

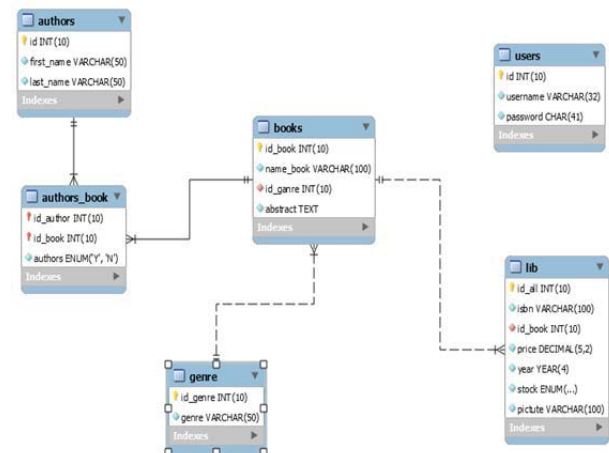


Fig. 3. Scheme of database tables

Figure 4 shows the main page of the application that contains links to all submenus Home, Products, About Us, Contacts, Login, LogOut. A web page has been created that allows interactive entry of new literature and new authors, but there is no set field, it is only for administrators because of security measures.



Fig. 4. Cover page of the application

Figure 5 shows the Products web page, which shows the most searched materials in the information system.

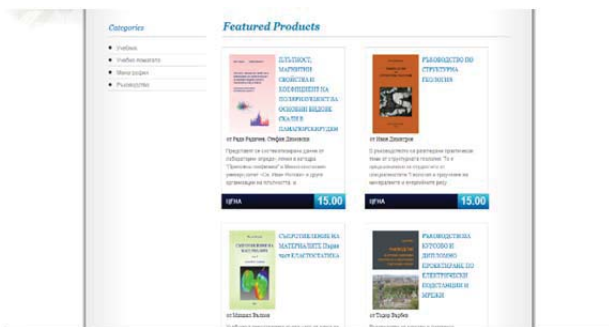


Fig. 5. Products Page

Figure 6 shows About Us web page, which provides detailed information about the Publishing house of UMG "Sv. Ivan Rilski", about the activities, capabilities and benefits of using our services.



Fig. 6. Web page About Us

In Fig. 7 is presented the Contacts page which presents all possible ways of contacting the Publishing house at the University of Mining and Geology

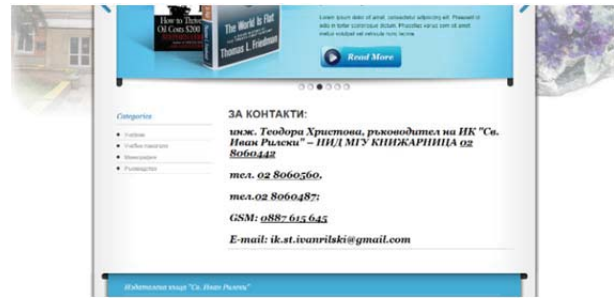


Fig. 7. Web Page Contact

Figure 8 presents a log-in form for users and administrators of the information system. It contains two fields for username, password, and login button.



Fig. 8. Login form

In Fig. 9 is represented the Insert web page which contains an interactive form for implementation of new materials from system administrators. It should be noted that it is hidden from users due to security measures.



Fig. 9. Form for implementation of new materials

Conclusion

One of the most important features of Web based access to specialized mining literature, manuals, guides, etc., is the provision of easy access to sources related to the specific subject of mining. The aim of this application is to raise the level of awareness, respectively the quality of knowledge of specialists, trained or already working in this field, to familiarize them with the most up-to-date studies and developments related to the earth sciences.

Ultimately, the effectiveness of an educational or informational technology is proven in the process of practice. It is necessary to use the application to determine its efficacy and applicability in a real educational or scientific environment. An eventual screening of opinions and attitudes among specialists would contribute to optimizing the application and would give a very good feedback on its implementation in practice.

We believe that Web-based access to specialized mining literature, manuals, guides and more is a useful product that could be applied well in practice and would increase the level of awareness and qualification of the specialists. Its great advantage is its focus on young people due to its electronic positioning, as well as its uniqueness in terms of specialized mining application.

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AN ADDITION TO MS EXCEL AIMED AT SOLVING OF PROBLEMS IN THE FIELD OF MECHANICS

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ABSTRACT. MS Excel is one of most popular products used for saving, processing and graphic representation of information in the form of tables. MS Excel offers opportunities for easy solving of engineering problems by its set of about 500 built-in functions and great number of additions in the form of add-ins. But in spite of its rich functionality MS Excel doesn't offer built-in instruments for direct application in the field of mechanics and more precisely - statics. The present report represents add-ins *Mechanics* for MS Excel, developed by the authors, which could be used for modeling of some mechanical constructions.

Keywords: MS Excel, lattice girder, stiffness matrix, mechanical constructions, modeling, add-ins.

ЕДНО ДОПЪЛНЕНИЕ КЪМ MS EXCEL ЗА РЕШАВАНЕ НА ЗАДАЧИ ОТ ОБЛАСТТА НА МЕХАНИКАТА

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РЕЗЮМЕ. MS Excel е един от най-популярните продукти за съхраняване, обработка и графично представяне на информация в табличен вид. Със своя набор от около 500 вградени функции и множество надстройки под форма на add-ins, MS Excel предоставя възможности за лесно решаване на разнообразни инженерни задачи. Независимо от богатата функционалност на продукта, обектният модел на MS Excel не предоставя вградени инструменти за директно приложение в областта на механиката и по-конкретно статиката. Настоящият доклад представя разработки от авторите add-ins *Mechanics* за MS Excel, който би могъл да се използва за моделиране на някои видове механични конструкции.

Ключови думи: MS Excel, ферма, матрици на коравина, механични конструкции, моделиране, add-ins.

Introduction

MS Excel is one of most popular products used for saving, processing and graphic representation of information in the form of tables. MS Excel offers opportunities for easy solving of engineering problems by its set of about 500 built-in functions and great number of additions in the form of add-ins. But, so far, the product has not incorporated an officially developed module for strength calculations based on the Finite Element Method. Usually, such kind of problems are solved using specialized software like ANSYS, COSMOS and others. Taking into consideration the wide use of MS Excel including in the education field, the authors of the report have developed add-ins *Mechanics* that can be applied for modeling of some kinds of mechanical constructions. This module have been created on the base of Visual Basic for Application language and can be applied to the solving of some problems in mechanics education. It encompasses 3 classes with more than 20 methods. Loading methods and dialogue are analogical to other add-ins in MS Excel.

The add-ins *Mechanics* encompasses two sub modules: strength calculation for rod structures and lattice girders.

Mathematical basics of the problem

Rod structures

A rod as a finite element has two nodes. When we study the problem within the local system of coordinates of the rod each of its nodes has just one degree of freedom - displacement alongside the rod axis. A force directed alongside rod axis corresponds to this degree of freedom. The approximation of the displacement between the two nodes is linear. In the case of two-dimensional constructions the relation between nodes' displacement and the forces applied to the nodes within the local system of coordinates is as follows:

$$\begin{Bmatrix} \bar{u}_1 \\ \bar{u}_2 \end{Bmatrix} = \frac{AE}{L} \begin{Bmatrix} 1 & -1 \\ -1 & 1 \end{Bmatrix} \begin{Bmatrix} \bar{F}_1 \\ \bar{F}_2 \end{Bmatrix} \quad (1)$$

The expression

$$[k] = \frac{AE}{L} \begin{Bmatrix} 1 & -1 \\ -1 & 1 \end{Bmatrix} \quad (2)$$

represents rod stiffness matrix where

L – rod's length (it's calculated automatically using nodes coordinates);
 A – rod cross section's area;
 E – module of elasticity.

If we treat the rod in a global system of coordinates Oxy, then the degrees of freedom will be the displacements alongside x and y in each node and the rod stiffness matrix will be as follows:

$$K = \frac{AE}{L} \begin{Bmatrix} \cos^2 \alpha & \cos \alpha \sin \alpha & -\cos^2 \alpha & -\cos \alpha \sin \alpha \\ & \sin^2 \alpha & \cos \alpha \sin \alpha & -\sin^2 \alpha \\ & & \cos^2 \alpha & \cos \alpha \sin \alpha \\ & & & \sin^2 \alpha \end{Bmatrix}$$

where α is the angle between the rod and the positive direction of abscissa (Fig. 1). The stiffness matrix is symmetric, that's why its upper triangular part is shown here only.

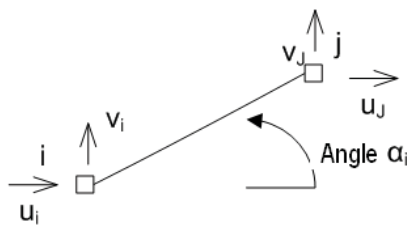


Fig. 1.

The results of Finite Element Method application are displacements against global system of coordinates as well as internal forces and stresses in the elements.

2D lattice girders

If a sample node "i" of a construction is the junction point of elements "K", "L" and "M" (Fig. 2), the balance conditions in this node are as follows:

$$\begin{aligned} \sum N_j \cos \alpha_j &= 0 \\ \sum N_j \sin \alpha_j &= 0 \end{aligned} \quad (3)$$

where α_j is the angle between the corresponding rod and the positive direction of abscissa.

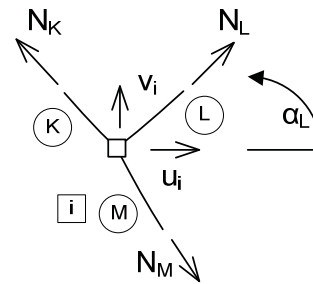


Fig.2

The following data are given in text files:

- coordinates of the nodes (representative points of the construction);
- construction sampling (description of rods);
- material characteristics of construction, fixing and loads.

The program generates a matrix of coefficients in front of the unknown quantities of the system of linear equations of construction on the basis of the balance conditions. MS Excel functions MINVERSE and MMULT are called automatically for calculation of this system.

Numerical example

The girder shown on Fig. 3 is to be examined. It encompasses 6 nodes, i.e. the number of balance equations is 12. Rods' number is 9.

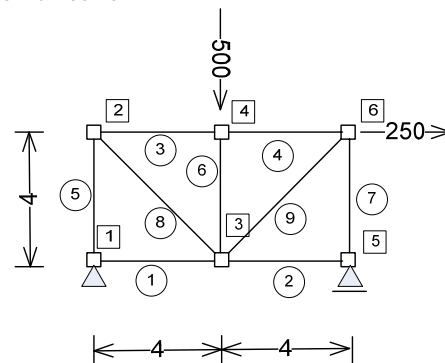


Fig. 3

The result is the following system of 12 equations and 12 unknown quantities. The first 9 of them represent rods' forces:

1.0000	0	0	0	0	0.0000	0	0	0	0	0	0	1.0000	0.0000	0	Z1	0
0.0000	0	0	0	0	1.0000	0	0	0	0	0	0	0.0000	1.0000	0	Z2	0
0	0	1.0000	0	0	0.0000	0	0	0.7071	0	0	0	0	0	0	Z3	0
0	0	0.0000	0	0	-1.0000	0	0	-0.7071	0	0	0	0	0	0	Z4	0
-1.0000	1.0000	0	0	0	0	0.0000	0	-0.7071	0.7071	0	0	0	0	0	Z5	0
0.0000	0.0000	0	0	0	0	1.0000	0	0.7071	0.7071	0	0	0	0	0	Z6	0
0	0	0	-1.0000	1.0000	0	0.0000	0	0	0	0	0	0	0	0	Z7	0
0	0	0.0000	0.0000	0	0	-1.0000	0	0	0	0	0	0	0	0	Z8	500
0	-1.0000	0	0	0	0	0	0.0000	0	0	0	0	0	0	0.0000	Z9	0
0	0.0000	0	0	0	0	0	1.0000	0	0	0	0	0	0	1.0000	Z10	0
0	0	0	0	-1.0000	0	0	0.0000	0	-0.7071	0	0	0	0	0	Z11	-250
0	0	0	0.0000	0	0	0	-1.0000	0	-0.7071	0	0	0	0	0	Z12	0

This system is created automatically in a new sheet. According to the customer's will intermediate steps can be shown in order to visualize the calculation course.

The result of calculation of the system shown above is as follows:

250.00, 0.00, -125.00, -125.00, -125.00, -500.00, -375.00, 176.78, 530.33, -250.00, 125.00, 375.00

The same problem has been calculated using SAP. Maximal deviation has been 0.0023% at rod No 8.

Conclusion

An addition to MS Excel allowing strength analysis of rod constructions has been developed. The product can be used in mechanics education.

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THEORETICAL AND METHODOLOGICAL ASPECTS OF THE TEST AS AN INSTRUMENT FOR MEASUREMENT AND EVALUATION OF KNOWLEDGE AND SKILLS

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ABSTRACT An important and essential question, related to the test as an instrument for measurement and evaluation of knowledge and skill of the tested persons is discussed in the paper. The items directly concerned with the theme of the material, namely: measurement, estimation, test and didactical test are clarified. Concrete examples are used in order to attain more clarity and profoundness with regard to their specifics and application. The paper stresses on evaluation, various types of assessment, tests, and more specifically didactic test. The following types of assessments are considered: selective, "in situ", diagnostic, the final evaluation, and their specifics are clarified. After clarifying the measurement and assessment, the attention is focused on the test. Various definitions of its meaning are presented. Short historical knowledge of the origin and development of the didactical test in our country and abroad, including Europe, is also introduced. This issue is discussed in more detail about Bulgaria.

Key words: measurement, estimation, test, didactical test

ТЕОРЕТИКО-МЕТОДИЧЕСКИ АСПЕКТИ НА ТЕСТА КАТО ИНСТРУМЕНТ ЗА ИЗМЕРВАНЕ И ОЦЕНКА НА ЗНАНИЯ И УМЕНИЯ

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РЕЗЮМЕ. В настоящия материал се разглежда един значим и важен въпрос, свързан с теста като инструмент за измерване и оценка на знанията и уменията на тестираните лица. В тази връзка се изяснява същността на понятия, пряко свързани с темата на разработката, а именно: измерване, оценка, тест, дидактически тест. При изясняването им са използвани и конкретни примери с оглед по-голяма яснота и пълнота относно тяхната специфика и приложение. В материала се акцентира върху оценяването, видовете оценки, тест, в частност-дидактически тест. От различните видове оценки са разгледани: селективна, текуща диагностична, заключителна и е изяснена тяхната специфика. След изясняване на измерването и оценяването, вниманието се фокусира върху теста. Представени са различни дефиниции на това понятие. Представят се кратки исторически сведения за възникването и развитието на дидактическия тест у нас и в други страни, както в Европа, така и извън нея. По-подробно този въпрос е разгледан за България. Ключови думи: измерване, оценяване, тест, дидактически тест

Introduction

For better clarification of the test, at first we would deal with the items that have direct connection with that measuring instrument.

Measurement

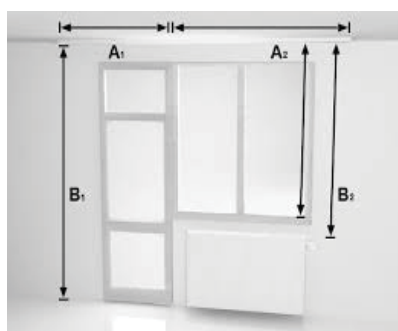


Fig.1. An example of a measuring representation

Before making an evaluation of concrete knowledge and skills, first we need to measure them. In that connection we will present a definition of measurement, which is more common and more frequently cited (S. Stevens). *The measurement is a conformation between the objects and figures, when for every object a digit is disposed by an appropriate rule.* Depending on what and how is measured, we can attach various numbers to an object. For instance, when measuring a square – m^2 , dm^2 (Stoyanova, 1996). This means that in measurement the big estimation has not only the result (*digit*), but also the measurement unit (*measure*) that is used. The various measuring units lead to various results. When we are measuring, we measure *the characteristics of the object*, not the object alone (an unique characteristics: for example, knowledge, if the object is the student).

The measurement can be **direct or indirect**. In **direct measurement**, the items that is measured, is measured directly: length, temperature, etc. For instance, direct measurement is when we measure with a tape-measuring device the length and the width of a room, which has a rectangular shape. If a

quadrature or cubature of the room must be found, then the measurement is **indirect**. This is because at first we are measuring directly the length, width and height of the room, then by the corresponding formula we obtain its quadrature and cubature (Stoyanova, 1996).

Indirect measurement refers to the measuring of other items, which are related to the measured object. By the result of their measurement, the appropriate conclusions are made (for instance – quadrature, cubature, as above).

The higher the reliability of the instrument by which we are measuring is, the more precise and exact the measurement would be. In this moment it is necessary to point out what exactly is a reliability of the measurement. This is one of the criteria for quality of the measurement. More often the **reliability** represents the *exactitude, trustworthiness, correctness, precision, certainty*. Remember how important is the measurement, as we connect it with the proverb „Measure twice, cut once!“.

Except reliability, another characteristic of the measurement is **validity**, which is a relative concept. Usually by validity we understand the degree of correspondence between the goals of the measurement and the goals for which this instrument were made (Stoyanova, 1996).

Estimation



Fig.2. The role of evaluation

Essence of evaluation

The problem with the evaluation in the school will always be an one of interest and significance. The evaluation is a necessity, that not only has a stimulating function, but provides a possibility to make important decisions for refinement of the educational process.

Another widely known definition of evaluation is related to comparing the results from the measurement with previously defined standards (criteria). At first, we need something to measure and then to evaluate. In other words, the evaluation is a process of comparing the real achievements of the students with previously defined requirements (criteria) (Visokalijska, 2015).

Assessment

The assessment in the school is expressed by a digit. In Bulgaria the six-grade system of evaluation is still operating. Actually, the evaluation of knowledge and skills is expressed in digits. This evaluation is a means for achieving a definite goal and for decision making. There is no fully objective assessment, because there are many factors which are relevant. For instance, the standards that are picked up, subjects that are making the evaluation, etc. The adequacy of the evaluation depends a lot on the standards chosen (criteria) with which we compare the results from the measurement.

It is worth to say the following: *The measurement is made with the goal to obtain the necessary information, but the evaluation of that information is needed to make adequate decisions.*

Types of assessments

In this paper we present some basic assessments, based on various indications.

Depending on the goals of decision-making and the steps of the evaluation in the education process, the assessments are:

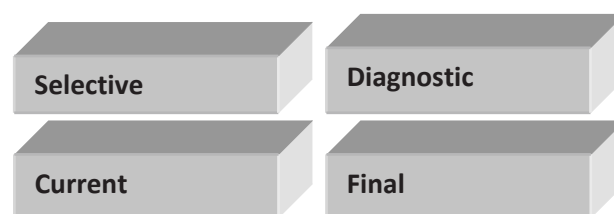


Fig.3. Types of assessments according to the goal of decision making and stage of assessments

Selective assessment

It is used when it is necessary to make decisions for the purpose of future development (training) of the pupil (child, student), i.e. **estimation of his/her potential skills and preliminary training**. It may be made on the basis of *criteria approach* (readiness, level of foreign language knowledge, etc.) and *normative approach* (when choosing a candidate among many others).

Current assessment

It is directed at the achievements of the students. It accompanies the process of studying and provides the feedback for its quality. It is based more often on the criteria approach, i.e. – how often the goals are achieved.

Diagnostic assessment

With this type of assessment, the goal is to establish **the reasons** for attaining the concrete learning goal; for instance – systematic lag of the students, etc.

Final evaluation

As with the current assessment, its goal is to establish **to what extent the concrete educational goals have been achieved, but at the end of the school year, course, educational degree**. It is also based on the criteria approach (Stoyanova, 1996).

Test



Fig.4. Test solution

The test is a multipurpose concept, which means a *testing, probing, testing, inquiring, method* in the pedagogic, psychology, medicine, sport, etc. According to the English dictionary, "test" means testing or probing something, in order to define its quality, value, composition, etc. In *the education, test* means measuring of the knowledge, skill, intelligence or possibilities of an individual or group of individuals (Tujarov, 2009).

The term test is also used in a broad and narrow sense. The broad meaning includes probe, test, testing, as well as all other means required for this purpose.

In narrow sense, test is "...short, technical simple testing, whose solution may be attained by a quality approach and is used as an indicator for the stage in the development of a specific measured subject.

According to Ebel the test is a common term, which is used in every project or procedure for measurement of the possibilities, interests and other characteristics (Siderova, 2008)

L.R.Guy defines the test as measurement of the knowledge, skills, feelings, intelligence or skillfulness of a person or a group (Siderova, 2008). According to A. Reber – test (the more common word is procedure) is used for the measurement of a specific factor or for evaluation of a skill (Siderova, 2008).

One of the main characteristics of didactical tests, which make them suitable for pedagogical practice is the higher objectiveness as a method for measurement and evaluation of the pupil's achievements (Siderova, 2008).

On this basis it may be said, that **the didactical test is a method for measurement of the pupils' achievements** (the learning ones) according to the common and specific goals of a defined educational topic, or a defined methodical unit. Contrary to the traditional control and classworks, the test is made according to **strictly defined methodical item**.

The didactical tests measure the results related to the acquisition of certain knowledge, included in the specific scholar activity and aimed at certain goals and problems. In the specialised psychology-pedagogical literature, Gentcho Pirvov defines as pedagogical texts the ones that measure the results of education by means of adopted knowledge and skill (Siderova, 2008).

One definition of a didactical text, adopted by most of the specialists in the area of testing, is that **didactical text is an instrument for measuring and evaluating the results from the learning and educational process (LEP)** according to the defined goal and objective (Bijkov, 1992).

The specifics of the **didactical test** will be presented in this article.

A short historical overview of didactical tests

In the specialized literature there is no uniform opinion regarding the history and development of the didactical tests. Some of the authors believe that tests could have existed four thousand years ago. The opinion of other authors is that we may speak about tests as of the beginning of XX century, more exactly from 1920s. Why are these discrepancies? They result from the different interpretations of the essence of the test. For instance, if we mean that the test is an instrument for checking and evaluation of some properties, peculiarities, or skills of the peoples, the origin of the tests may be traced even to the antiquity.

There is information in the specialized literature that the didactical test originated in the second half of XIX century aiming at overcoming some of the weaknesses of the traditional system for checking and assessing the knowledge and skills of the students. After the Second World War, the application of tests increased in the Western countries, not only for various research in a number of areas, but also in the educational practice itself.

The creator of the first standard didactical test is the English teacher Fisher in 1864, but no attention was paid to his product because of the slowdown of scientific thought at that time. The beginning of the movement for objective didactical tests was made by the American Rike in the same year.

Nowadays, didactical tests, which are refined more and more, are widely used in education.

Short information about the creation and implementation of tests in **Europe** (Byjkov, 1982) is presented hereinafter.

In **Germany** – the creation and application of tests began in XX century and was connected with the experimental pedagogy of W. Lay & E. Moiman.

In **Sweden** the implementation of tests is regulated in the educational documentation, self-made and standard tests are applied, mainly in the area of diagnostic (for scholar maturity, on native and foreign language, when choosing the school, etc.).

In **Belgium** there are strong traditions connected with the creation and use of tests, mainly with the pedagogic consulting and directing of tests, related mainly with the pedagogic consulting and directing of the students.

In **Switzerland**, tests are applied in school activities (psychological and didactic) and in the professional orientation of students as well when choosing profession.

In **Japan** from the 1920s till the beginning of the WW2, various tests were developed, which were standardized. There is broad application of tests in the professional appointment of

the students, entry exams in the higher degree and at national level for evaluation of the knowledge and skills of students.

In **Poland**, the studies in the area of tests are provided mainly by the Research Institute for pedagogic studies at the Ministry of Education.

In **Bulgaria** the creation and implementation of didactic tests does not have great traditions. More merits in this area belong to prof. D. Katzarov and his assistant and later – to the professor and corresponding member of the Bulgarian Academy of Science – Gentcho Piriyov.

Papers and developments of didactical tests started to be published in the 1970s. The so called “first white swallow” was developed by prof. Encho Gerganov, who elaborated the first Bulgarian didactical test in Bulgarian language for the IVth classes of the UMPS (unified middle polytechnical school). In the 1980s some researchers from the Central Institute for In-Service Training of Teachers and Leaders “Vela Blagoeva”, now DIUU - Department for Information and In-Service Training of Teachers, started the development and application of didactic texts aiming at supporting the qualification of Bulgarian teachers.

Later, in 1989 and 1990, various tests were developed by the group of Scientific and Research Laboratory (NIL) on pedagogic diagnostic. The evaluation and diagnostic activities were provided on the results of apprehension of new school content in the I-VIII classes, which are not standardized and because of that are not widely applied by the teachers in the of education process.

Today tests are an intrinsic part in the process of education. They are used in various phases of this process and most of them are automatized.

Internal structure of a didactical test

Every didactic test has three main structural elements:

- 1) **Information about the person tested** (exit data, instructions, direction for a mode of operation, etc.). This information aims to relax the person tested and direct him to the proper and unique solution of the defined task.
- 2) **Question or/and task** (formulated as a question and/or task, related to the information which is checked; it is possible to make an instruction what exactly is asked from the person tested, i.e. –prescriptions are made what exactly to be done).
- 3) **Response** (depending on the kind of a question and/or the task, the tested person is required to formulate his/her own answer (to reach the goal of the task, the result that is searched/ or to pick up the correct answer from the given options) (Bijkov, 1992).

Theories of tests

First, let's focus on the meaning of test theories. This is a defined system of judgments for the relations and dependencies between the phenomena and processes measured by tests. In the specialized literature there are two main theories for tests (psychological and didactical ones), which are based upon:

- The dependence of theoretic (ideal) value of the measurement by testing and the error of that measurement;
- The dependence of the approaches by which this relation and dependence are defined (Bijkov, 1992).

The two theories are:

- **Classic (normative);**
- **Probability (stochastic).**

It may be said, that the two theories are interconnected and are not opposed, irrespectively of their difference (Siderova, 2008).

Main characteristics of didactical tests

In the measurement we should mention reliability and validity. In this context every didactic test, which is composed according to certain requirements, must possess the following base characteristics: **objectivity, reliability, validity, comparability, cost-efficiency, relevance**, etc.

A) Objectivity (*value of independence from the measurement*)

It is not correct the person creating the test, to evaluate himself. It should be clarified that so far the teachers have been developing tests in the subject they teach. The same tests are applied to confirm the level of knowledge and skills acquired by the students at a certain level of education (usually for a given time). Outer assessment has been introduced, but it is in the “output” of the whole process of education of student (for instance, in the state exam on theory and practice in the profession and the specialty). A test may be wholly objective if various researchers reach the same results in relation to the person given (Bijkov, 1992). We may conclude that the objectivity of a test has a great importance for its quality.

B) Reliability – this is the main criteria for quality; this means exactness, precision of the measurement. This is one of the most important characteristics of the test, because it is directly related to the error from the measurement. The smaller the error, the more reliable the test is (Stoyanova, 1996).

C) Validity (correspondence with the goals of measurement and goals for which the instrument is created) - the validity of a test shows the degree of exactness with which it is measuring the object in question. For that purpose the results obtained are compared with the previously defined external criteria, which may be a normative requirement, scholar program, results of an investigation, etc.

In the specialized literature on testology various **types of validity are known**, such as **content, criteria and construct**.

- **The content validity** shows the degree to which a test is checking the school content.
- **The criteria validity** shows the extent to which the test corresponds to the concrete goal (predictive validity). This correspondence is defined through the method of expert evaluation, or comparing the pupils' achievements with their previous ones.

- **The construct validity** permits to show which are the defining factors on the basis of the test results obtained (Tujarov, 2009).

D) Comparability (comparing the results); shows that the results of a given test, obtained in various places, may be compared and on that basis valuable conclusions with regard to content to be made. Thus, adequate control decisions can be made (Tujarov, 2009).

E) Cost-efficiency (it is related mainly to the possibility to make a test for testing many students for a short period of time). It permits mass examinations with the participation of many people. On basis of the tests' results it is possible to take important decisions on various levels (school, regional, national). Recently, the newest information and communication technologies have made possible the en masse testing of knowledge and possibilities of scholars and students, as well as other persons. This may be achieved any time, when such test is necessary. In testing on line, there are no expenditures on multiplication and copying of tests and that leads to economy of this resource (Tujarov, 2009).

F) Relevancy of the test.

This characteristic of the test is directly related with the definition of goals. The more strictly and properly defined the tests are, the higher the relevance of the test is. The test must be constructed in such a way, so as to measure the necessary school results, and that will be happen when the goals are clearly and exactly defined (Tujarov, 2009).

Although this list is not exhaustive of the test characteristics, these are the main ones which must be taken into account when constructing tests for knowledge and skills.

Classification of didactic tests

In the specialized literature, directly connected with didactic tests, there isn't unique classification because of various points of view and various criteria for differentiation. The more common types can be represented as follows:

- **Standardized** (made by professionals on the basis of existing theory and fixed procedures);
- **Non-standardized** (made by teachers for direct application in the area of one school; lower objectivity – the person who created the tests, will evaluate them);
- **Normative** (they establish the individual status of the person tested compared with the achievements of others, which are used as etalon, norm for comparison);
- **Criteria** (they measure and evaluate the achievement of students according to the goals and tasks of UVP, the criteria defined by the state educational documents (state educational requirements (standards) (SED), scholar programs, etc.);
- **Overall tests for achievements** (measure achievement of a student for a certain time);
- **Diagnostic tests** (establish the errors and cause of their origin);
- **Preliminary /sorting/** (they are introduced in the beginning of education);
- **Processing /formatting/** (they are applied after apprehension of part of the material – section, theme,

methodic unit; no evaluation is made, but the errors in the knowledge and skill are checked);

- **Final** (for "final" at the end of the term, end of the school year, at the end of the educational degree; to check the achievement of the goals and what the efficiency of the scholar-pedagogic process is (SPP);
- **Tests for diagnostic of practice skills** (check a degree of apprehension of basic skills: details, models, drafts, etc. are manufactured).

In the educational process diagnostic tests are often applied. The teacher uses them to test the level of adoption of basic knowledge and skills in the definite stage of education in the object(s) given. Thus, the necessary adequate measures can be taken for overcoming errors and ignorance of students, as well to establish this ignorance at the moment of testing of students.

Advantages of didactic tests

Didactic tests have various **advantages** and in the following text we will present some of them, which in our opinion are more essential, namely:

- **Cost-efficiency** (for short time are checked many people); objectivity, reliability, validity, permits individual and group checking; a degree of achievement may be obtained; norm of achievement may be exposed; computer-aided check of the results may be performed;
- There are strictly defined requirements for **objectivity, reliability and validity**;
- They may be used in a more prolonged time;
- When standardized, *they give more objective assessment and clear presentation of the achievement of students*, compared with the traditional methods of checking the educational process (Iliev).

Shortcoming of didactical tests

- They do not present the causes for one or another result; they do not enlist every personal characteristic of students, but only part of it; there is an element of randomly checking the answers; they have short prognostic life;
- The tests, which are not standardized and are used often in the practice, are not objective and reliable and in such a way, they cannot measure with accuracy the achievement of the students (tested persons).

Conclusion

In the material presented, the inherence of measurement, evaluation and on that basis – the didactical test are explained. Basic questions concerning the specifics of tests and more precisely, the specifics of didactical tests, are clarified.

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WEB-BASED SYSTEM FOR NAVIGATION FOR STUDENTS AT THE UNIVERSITY OF MINING AND GEOLOGY

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ABSTRACT. Nowadays telephones are used as a means of orientation in unfamiliar environments, using mobile applications. It is important to help newcoming students adapt and get oriented for the educational process. In the current report, the term orientation will be examined as a way of optimizing point-to-point movement. An algorithm is proposed for the orientation and movement of students from one place to another as quickly as possible. For this purpose, an interactive web application for navigation across the material basis of the University of Mining and Geology "St. Ivan Rilski" is provided. For the creation of this app, the latest trends in the construction of dynamic sites are used. The project was created for the needs of the students and the guests of the university. A survey was held among students from different years and various courses of study.

Keywords: web-based, application, responsive design, dynamic site

WEB-БАЗИРАНА СИСТЕМА ЗА НАВИГАЦИЯ НА СТУДЕНТИТЕ ОТ МГУ

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РЕЗЮМЕ. В днешно време телефоните се използват като средство за ориентирване в непозната обстановка посредством мобилните приложения. Особено е важно, за да се помогне на новодошлите студенти да се адаптират и ориентират бързо за започване на учебния процес. В настоящия доклад понятието за ориентация ще бъде разгледано като начин за оптимизиране придвижването от точка до точка.

Предложен е алгоритъм за максимално бързо ориентирване и придвижване на студентите от едно занятие в друго, като за целта е представено интерактивно web приложение за навигация на материалната база на Минно-геоложки университет „Св. Иван Рилски“.

За създаването на приложението са използвани най-новите тенденции за изграждане на динамични сайтове.

Проектът е създаден за нуждите на студентите и гостите на университета. Проведена е анкета сред студентите от различни курсове и специалности.

Ключови думи: веб-базиран, приложение, адаптивен дизайн, динамичен сайт.

Introduction

Navigation is the science and technique for establishing the position of a moving object relative to a coordinate system. It can also be used to calculate the path that has to be traversed to reach another point with known coordinates. In the past navigation was mainly done by compass. Nowadays, mobile applications for navigation (GPS) based on geostationary satellites are increasingly used.

In the report, navigation is considered in terms of a manner for a faster guidance and quicker adaptation in an unfamiliar environment. For this purpose, a method is described for creating a web-based application for the premises of the University of Mining and Geology "St. Ivan Rilski".

WEB- Based information System

A web-based information system is the information system

which employs Internet web technology to deliver information and services to consumers or other information systems/applications. This is a software system whose primary purpose is to publish and maintain data using hypertext-based principles. An information web system usually consists of one or more web applications, specific functions, component oriented, along with information elements and other non-web components. A web browser is mostly used as front-end, while databases are back-end (Ivanov I.,2015).

Several important issues have to be considered when formatting each application:

1. Why it is necessary to create it
2. For whom it is intended.

In our case, creating such an application is prompted by the need to get newly admitted students oriented in the university environment and, to a large extent, to improve the quality of the educational process. It can be used by students and lecturers, as well as by university guests.

Application architecture and instruments for its development

To describe the contents of "Navigation for students at the University Of Mining and Geology", the HTML markup language is use. Styling is achieved through CSS, the JavaScript scripting language, and the jQuery and Bootstrap libraries. To create the database, SQL is used, and PHP is used for the server part.

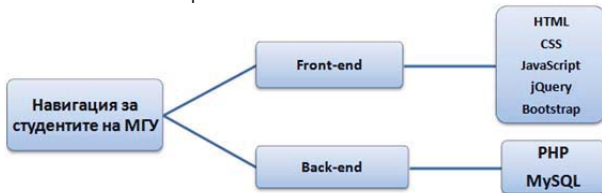


Fig.1 Architecture of "Navigation for students at the University of Mining and Geology"

Front-end is this application with which the user interacts directly. Front-end is the interface between user and back-end.

- HTML (or Hyper Text Markup Language) is the primary language for describing a web page. HTML elements (tags) are the basic units of the webpage. Using the tags from the latest version so far (HTML 5), the page structuring is achieved, as well as clear distinction among the various sections of the page, namely:



Fig.2. Structure of a web page (HTML 5).

- For a web site to look in exactly the same way with different screen widths and on various platforms, the so-called adaptive design (responsive design) is used. The technology behind it is CSS(Cascading Style Sheets). This is a language for describing styles. Through the style of the site, the size and arrangement of the elements in it are determined: background, font style and color, etc. A handy tool is CSS Media Queries, where it is recorded and determined at what resolution and how exactly the site is going to look. The latest version is CSS 3.

```

@media only screen and ( max-width: 62.5em ) /* 1000 */
{
    #nav
    {
        width: 100%;
        position: static;
        margin: 0;
    }
}
    
```

Fig.3. Page styling at 1000px screen width (CSS Media Queries).

- **JavaScript, jQuery, Bootstrap**

JavaScript is a programming language that allows dynamic performance of the browser within a given HTML page. This is the most widely used programming language on the Internet.

Bootstrap is the most common HTML, CSS, and JavaScript framework for the development of responsive web design for sites.

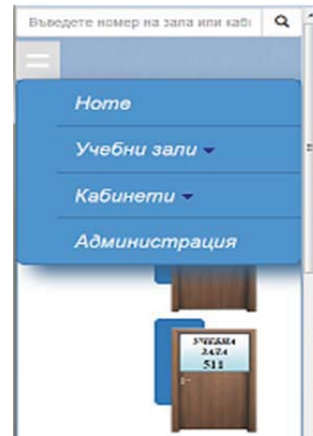


Fig.4 Hamburger menu with Bootstrap (with a minimum screen width)

jQuery is a widespread alternative to JavaScript. It offers a powerful toolbox for selecting items in a document.

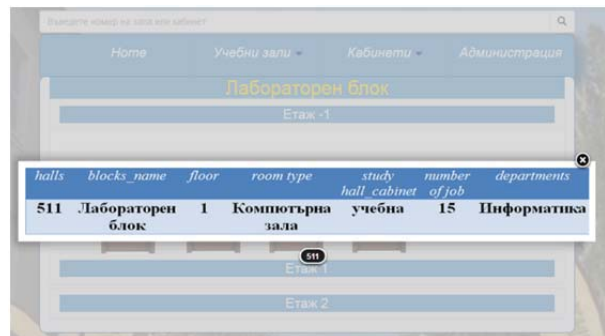


Fig.5. Sideshow gallery with jQuery

Back-end – the application serves as a support for front-end services. It can interact directly with the front-end application or, which is more common, with a program called intermediate program, which mediates between front and back-end applications.

- The database is created with help of MySQL, the most common open code program. This program presents information in the form of tables (relations).

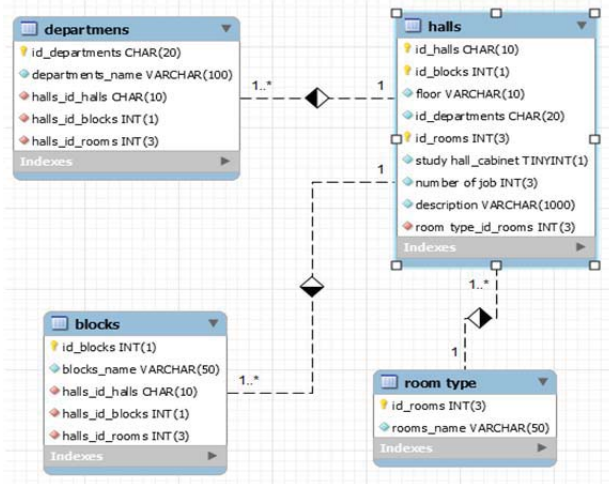


Fig.6. The relationship among tables in the database

So far, 4 tables have been created:

- The **blocks** table – it contains the numbers and full names of faculties, laboratories, the sports complex and the Rectorate;
- The **departments** table –it contains the abbreviations and the full names of all departments at the university;
- In the **room type** table, the types of study with their numbers are extracted;
- The **halls** is the combining table. It combines all the information about a hall, accompanied by a brief description.

```
CREATE TABLE `halls` (
  `id_halls` char(10) COLLATE utf8_unicode_ci NOT NULL,
  `id_blocks` int(1) NOT NULL,
  `floor` varchar(10) COLLATE utf8_unicode_ci NOT NULL,
  `id_departments` char(20) COLLATE utf8_unicode_ci NOT NULL,
  `id_rooms` int(3) NOT NULL,
  `study hall_cabinet` tinyint(1) NOT NULL,
  `number of job` int(3) NOT NULL,
  `description` varchar(1000) COLLATE utf8_unicode_ci NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8 COLLATE=utf8_unicode_ci;

INSERT INTO `halls` (`id_halls`, `id_blocks`, `floor`, `id_departments`, `id_rooms`, `study hall_cabinet`, `number of job`, `description`) VALUES
('400', 4, '1', '', 104, 0, 400, 'АУЛА \"/>

```

Fig.7. SQL code for generating and inserting information in the **halls** table.

- To turn the application from static (i.e. one which can be viewed on only one device) into dynamic, the PHP script language (Hypertext Preprocessor) is used. Upon request, the code, which is written on PHP, is

interpreted by the webserver to which it is uploaded, and the result is transferred back to the web browser. The user can not clearly see the PHP code without having access to the very file where it was saved. This is how security is taken into consideration. PHP files can contain text, HTML, CSS, JavaScript, and PHP code. PHP files have a .php extension.

- As for a text in a real environment, an Apache virtual server.

```
<?php
if(isset($_GET['id'])) {
    $id=$_GET['id'];
    if($id==24) {
        echo (
            <div class="container">
            <h2>Лабораторен блок</h2>
            .....
        );
    }
}
?>
```

Fig.8. Part of the PHP code for opening the “Laboratory block” panel.

Conclusion

The functions of the navigation system are to inform, guide and direct people in an spatially unfamiliar environment. It is essential that the guiding information be positioned in such a manner as to be effective. The proposed web application meets these requirements.

The web-based information system “Navigation for students at the University of Mining and Geology” is currently being developed. Concurrently, a fully mobile application for internal spatial navigation is also being developed.

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ENHANCING STUDENTS' SKILLS TO WORK WITH TEXTS IN FLT FOR SPECIAL PURPOSES AT THE UNIVERSITY OF MINING AND GEOLOGY "ST. IVAN RILSKI" – WORK DONE TO DATE

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ABSTRACT. The current project we are working on is with a pronounced practical orientation towards the student side in the educational process. It is aimed at a more active involvement of students from all courses of studies offered at the University of Mining and Geology "St. Ivan Rilski" in the retrieval of terms from original scientific texts in the respective foreign language and in the identification of the exact Bulgarian terminological equivalent in various scientific areas: mining production, computer technologies, geology, ecology, electrical energy, etc. The aim of the team of authors is to further raise the level of students' obtaining knowledge in the module of special purpose foreign language. The students participating in this project are faced with the following tasks: retrieval of terms from strictly specialized scientific texts for the various courses of studies; selecting the precise Bulgarian equivalents to the retrieved terms in accordance with the context of the respective term; production of lists of fixed phrases where the retrieved terms participate; establishing the etymology of the respective term. The expected results are: enhanced skills to identify the technical terms in the foreign language, as well as their respective equivalent meanings in Bulgarian; improved communication skills of the students; enhanced capacity to work with scientific literature and with special purpose educational materials; determining the current trends and the degree of influence of foreign language terminology on the Bulgarian terminology. Five benefits for students with regards to their involvement in the project are outlined.

Keywords: FLT, terminology, terms

ПОВИШАВАНЕ НА УМЕНИЯТА НА СТУДЕНТИТЕ ЗА РАБОТА СЪС СПЕЦИАЛИЗИРАНИ НАУЧНИ ТЕКСТОВЕ НА ЧУЖД ЕЗИК В МГУ „СВ. ИВАН РИЛСКИ“ - ПОСТИГНАТОТО КЪМ МОМЕНТА

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РЕЗЮМЕ. Настоящият проект, по който работим, е с определена практическа насоченост към студентската страна в процеса на обучение. Насочен е към по-активното включване на студентите от всички специалности в МГУ „Св. Иван Рилски“ при извличането на термини от оригинални научни текстове на съответния език и идентифицирането на точния български еквивалент на термини от различните области – минно производство, компютърни технологии, геология, екология, електроенергетика и т.н. Целта на авторския колектив е да издигне на качествено по-високо ниво усвояването на терминологични знания на студентите в модула по специализиран чужд език. Задачите към студентите-участници в проекта включват: извличане на термини от подбрани тясно специализирани научни текстове за различните специалности; намиране на точния български еквивалент на извлечените термини съобразно контекста на съответния научен текст; изготвяне на списък с устойчиви словосъчетания, в които участват извлечените термини; установяване на етимологията на съответния термин. Очакваните резултати са: подобрени умения за идентифициране на технически термини на чужд език и на съответните еквивалентни значения на български език; подобрени комуникативни умения на обучаемите; развит капацитет за работа с техническа литература и за работа със специализирани материали; определяне на актуалните тенденции и степента на влияние на чуждата върху българската терминология. Обсъждат се пет ползи за студентите от работата им по проекта. Анализира се работата по проекта до настоящия момент.

Ключови думи: ЧЕО, терминология, термини

Introduction

The current project of the Department of Foreign Languages is within the Philological scientific field, in the area of the

Humanitarian Sciences, and more specifically within the foreign language teaching (FLT) methodology related to foreign language for specific purposes. Its implementation started in April 2017.

The project is a logical continuation of former in-depth research of 2/3 of the project team, while 1/3 of the research team is new colleagues who enthusiastically joined the work on the project activities. There is continuity in our approach which we also applied in our previous scientific activities. We started with creating conditions for applying contemporary methods for FLT (2005), we set up the beginning of a multimedia language laboratory (2008), introduced new information and communication technologies in FLT (2011) and specifically for the FLT for specific purposes we developed, tested and started to use new training materials, developing the presentation skills of our students at the University of Mining and Geology "St. Ivan Rilski" (2014). Our current project is targeting the practical training of the students. It is aimed at the more active involvement of the students from all courses of study in UMG "St. Ivan Rilski" in the retrieval of scientific terms from original scientific texts in the respective language and the identification of the precise Bulgarian terminological equivalent from different areas – mining, computer technologies, geology, ecology, electrical engineering, etc.

Existing needs and constraints addressed by the project

All students at the UMG "St. Ivan Rilski" in the full-time courses of the Bachelor degree, study a foreign language, and most of the curricula give a choice between English, French, Spanish, German and Russian languages. The curricula for two of the courses of study: Computer Technologies in the Engineering Activities (KTID) and Geology and Geoinformatics (GGI) foresee training only in English. The syllabi for all courses of study include studying of technical terminology as part of the overall FLT. The technical terminology is extremely important as most of the materials the students use during their university training and further during their professional careers, include between 30 and 80% of terms, i.e. the terminology is a major means for transmitting facts and knowledge. Knowing the precise terms reduces the ambiguity and increases the clarity of the speech and writing - in other words, the quality of communication of the engineers – specialists in different fields depends to a large extent on the quality of the terminology.

Over the last two decades the world has been becoming more and more globalized and quite often the mining and production of raw materials, the creation and distribution of different products, including scientific research, include both multidisciplinary teams and specialists from different countries. The quick technological development and the appearance of new industries and productions lead to the necessity of quick and effective communication which is facilitated by the modern computer and telecommunication technologies. In the contemporary world the information is one of the most significant factors together with the capital, ownership and workforce. That is why, the acquiring of knowledge about terminological concepts in a foreign language in the respective courses of study at the UMG "St. Ivan Rilski" is quite important for the successive training and professional development of the Bachelor degree students.

The object of our study are the students from all courses of study at the UMG "St. Ivan Rilski" and their work on retrieving terms from original scientific texts in the respective language.

The reason for our interest is related to the fact that the communication of specialized knowledge and information, especially in foreign language environment, is inevitably connected with the creation and distribution of terminological resources and the management of the terms in the most general sense. The terminology allows the creation and distribution of scientific products, effective presentation of different achievements and know-how. The work with engineering terminological texts includes the usage of different methods and approaches related to the identification, retrieval, arrangement, translation and storage of the terms. The present project is aimed at the more active involvement of students from all courses of study at the UMG "St. Ivan Rilski" in the extraction of terms from original scientific texts in the respective language and identifying the precise Bulgarian terminological equivalents from different fields – exploration, geology, ecology, mining, mining production, electrical energy, computer technologies, etc.

Objectives

The project objectives are as follows:

- The students should retrieve terms from selected specialized scientific texts for the different courses of study;
- The students, supported by the lecturers, should try and identify the etymology of the respective term;
- The students should try to find by themselves the Bulgarian terminological equivalent of the extracted terms according to the context of the respective scientific text;
 - The students should prepare a list with stable collocations with the retrieved terms;
 - On the basis of the independent work of the students a comparative study will be carried out focusing on the difficulties which the students encounter in their work with specialized texts in the respective languages. The study will try to define the contemporary trends and the level of impact of the foreign terminology on the Bulgarian one.

Implemented activities

So far we have implemented the following *project activities*:

The lecturers who participate in the project selected technical texts in English, German, French, Spanish and Russian. The main criteria for the selection of the texts included the topicality of the materials and the difficulty level of the texts. The second criterion is of significant importance having in mind both the different English classes depending on the level of knowledge of the language, the mixed groups studying the other languages and the English groups which are not part of the combined groups in the three faculties.

The active work with students is implemented both in the combined groups in the three faculties of UMG (since April 2017) and the KTID and GGI groups (in May and June 2017).

88 students participated in the project during the summer semester of the 2016/2017 academic year:

- English language groups, II level (from the Faculty of Mining Technology (MTF) – 8 students from Mine Surveying and Geodesy (MiG); from the Faculty of Geology (GPF) – 6 students from the courses in Geology and Exploration of Mineral and Energy Resources (GPMER), Drilling, Extraction and Transport of Oil and Gas (SDTNG), Ecology and Environmental Protection (EOOS) and Biotechnology (BT); and the Faculty of Mining and Electrical Mechanics (MEMF) – 5 students from the courses in Gassy, Combustion, and Purifying Equipment and Technologies (GGPTT) and Electrical Power Engineering and Electrical Equipment (EEEE) and III level (MEMF – 5 students from the courses in EEEO and Automation, Information, and Controlling Equipment (AIUT), and from GPF – 9 students from the courses in GPMER, SDTNG, EOOS, BT, Applied Geophysics (PG) and Hydrogeology and Engineering Geology (HIG);
- German language groups (from MTF – 7 students from Underground Construction (PS) and MiG, from MEMF – 3 students from EEEO and AIUT);
- French language groups (from MTF – students doing MiG, from GPF – students doing SDTNG);
- Spanish language groups (from MTF – students doing MiG, from MEMF – students doing EEEO, and from GPF – students doing SDTNG;
- Russian language groups (from MEMF – 4 students, from GPF – 7 students);
- the groups which are not part of the combined groups (from MEMF – 10 students from KTID, 1st year: 3 students from the lower level and 7 students from the higher level English group; 2 students from KTID, 2nd year; 3 students from KTID, 3rd year,

11 students from KTID, 4th year; from GPF – 1 student from GGI , 1st year, and 2 students from GGI, 2nd year).

Since the syllabus for this semester foresees the studying of specialized terminology (related to the courses of study in the three faculties) in the respective foreign language, the lecturers selected scientific texts which corresponded to the students' level of knowledge of the respective language. Our starting point was the set of knowledge expected from the students in the respective course of study at this stage of their studies. The texts were selected according to the following criteria:

- complexity;
- number of terms;
- length.

The students had to extract terms from specialized scientific texts for the different courses of study, to try to identify the etymology of the respective term, to find the precise Bulgarian terminological equivalent according to the context of the text and to prepare a list of the stable collocations with the respective term.

The format for the collection of the retrieved terminological data was pre-defined: a table with information about the main terms, their definitions, noun and verb collocations, Bulgarian terminological equivalents, etymology. The project team prepared and provided to the students the table in electronic form with an example of an analysed term to help the students in their work.

The table is presented further on:

Table 1.
Sample table

TERM	DEFINITION	BULGARIAN EQUIVALENT TERM	MEANING IN EVERYDAY LANGUAGE	DERIVED WORDS	COLLOCATIONS (VERB, NOUN, PREPOSITION, ETC.)	ETYMOLOGY
oil	a naturally occurring, yellow-to-black liquid found in geological formations beneath the Earth's surface	нефт	олио	oily (в общия англ.ез.)	Noun collocations with "oil" - heavy light crude refined offshore engine, fuel, heating, lubricating, motor linseed, paraffin Verb collocations with "oil" - extract, obtain, produce drill for	word oil comes from Old French oile, from Latin oleum,[2] which in turn comes from the Greek ἔλαιον (elaion)

Some of the students preferred to work during the seminar classes, while others preferred to complete the task at home. The students worked on their own using library resources,

terminological dictionary and general language dictionary (either in printed or electronic form) and electronic sources of information.

Analysis of the participating students' work

It is worth noting the large number of students from the different language groups who were willing to take part in the project and showed diligence in performing the tasks – we currently have 88 participating Bachelors. For most of them, the participation in the project was voluntary, with the exception of the KTID students in the 4th year of study who performed the task as part of their exam - since they had already completed their semester at the time when the project started. Herewith, we present a general summary of the results from the individual work of the students with technical texts for the special purposes FLT module.

The students from the three faculties, studying English in the II level group, were provided with original texts with average to low difficulty in correspondence with their level of knowledge of the language. Their task was to get acquainted with the text and to find words defined as technical terms. As a whole, the texts for this level do not include many terms which have different meanings in the technical and general Bulgarian language. In the texts with average level of difficulty the terms which were expected to be retrieved were 15 and 5 in the text with low level of difficulty. The students from MTF received a text related to mine surveying and geodesy. All students from the group managed to find words which are technical terms, to provide a definition for the term and to translate it in Bulgarian. Most of the students succeeded in identifying the etymology of the term. The students from GPF managed to identify the technical terms, their definition and translation to Bulgarian. They encountered no difficulties in identifying the etymology of the words. The students from MEMF worked with a text related to the production of oil and gas. They managed to identify some of the technical terms and most of them succeeded to write the definitions and their translation in Bulgarian.

The students studying English in the III level group were provided with original texts with average to high difficulty in correspondence with their level of knowledge of the language. The students from MEMF received a text with more than 30 terms related to electronics and electrical equipment. This group has lower English language proficiency and hadn't worked very diligently during the semesters, so the students identified between 2 and 4 terms from the text. They encountered difficulties in completing the information in the table. The students from GPF were offered the text "What are minerals?" with more than 35 geological terms. This group managed to complete the task much better in view of the better English language proficiency and the knowledge they gained during their active work during the semester. They identified between 4 and 13 terms from the text.

The students from the German language groups in the two faculties were provided with the following original texts: for the students from MTF the text was related to mineralogy and earth structure (*Das Baumaterial der Kruste. Die Minerale*) from the "Reader" by Senior Lecturer Maria Ketibova, and the students from MEMF worked on the text "Electricity and how to save it" (*Energiesparung*) taken from the Internet site <https://de.wikipedia.org/wiki/Energiesparung>. Three of the students from MTF successfully completed the first 3 to 4

columns from the table. The other 4 students included information in all columns but it was not complete. The analysis of the results shows both very good and not so good knowledge of the terminology. The results of the MEMF students are similar. The student doing AIUT showed the best knowledge.

The students in the French and Spanish language groups in the three faculties were provided with texts with preliminary selected identical number of terms. The project participants identified most of the terms, provided correct definition, and found the Bulgarian equivalent term. One of the students gave a definition in Bulgarian, while the rest of them gave the definitions in Spanish. It was not difficult for all participants to provide the general meaning of the word. One of the students studying French managed to complete the information about the etymology of the terms. It can be concluded that the students from the Spanish and French groups successfully identify terms from the specialized texts.

The students who study Russian language in combined groups from MEMF and GPF also identified terms from specialized texts in Russian and defined their characteristics. They were provided two texts with different difficulty because of the different level of Russian language proficiency. The text "Organisation and implementation of mining saving works in shafts", G. G. Sobolev, ("Организация и ведение горно-спасательных работ в шахтах") was easier and it was given to the group from MEMF. The overall number of terms in the text was 20. The group from GPF was offered the text "Water sewage" ("Канализация") by S. V. Yakovlev with 15 terms to be identified and a higher level of difficulty. In each group all students presented identical tables both in terms of content and formatting. They identified the maximum number of terms and identical information in the columns. This might be attributed to the similarity and kinship between the Russian and the Bulgarian languages. The best results were displayed in the identification of the Bulgarian equivalent terms and the worst – in the general meaning and the etymology. The students managed relatively well to give definitions and derived words. As a whole, the results are very good. To a large extent the correct answers are close to the maximum which is an indication of the sufficient proficiency in Russian language and capability to apply the knowledge in situations closely related to their professional training.

All groups of students who do not study English in the combined groups were also included in the project. The groups included were from the KTID course of study from MEMF (5 groups) and one group from the GGI course of study from GPF. Having in mind that their syllabi include longer term study of English, the terminology training is much more serious and in-depth and starts from the second semester of the first year. For the first time ever the KTID group, 1st year, was divided into two subgroups according to the level of knowledge of English language. Both subgroups worked on three computer texts with different length, complexity and number of terms. The topics were: "Computers in Everyday Life", "Types of Computer", and "Computer Components" for the group with lower level of English language competence and "What is the Computer?" /shorter and extended version/ and "History of

Personal Computing" for the group with higher level of English language proficiency. The two groups did not have any trouble giving the definitions, the translation of the terms, providing derived words and collocations. It is worth noting that all of the students had read a number of electronic sources to provide data for the etymology of the terms. The work of the 2nd year students from KTID was identical. They worked on 5 texts on the following topics: "Computer Technologies", "Operating Systems", "Digital Transmission", "Programming Languages", and "Programming in C++". The students from the 3rd year of study were provided with six texts related to digital data, programming languages, computer networks and network topologies, computer viruses. The participants have very good English language proficiency but they did not take the task seriously and concentrated only on the definition and translation of the terms. The undergraduates from the course of study in KTID worked individually on terms from one-page texts selected among the 30 pages which they had to prepare for the English language exam. Thus, it was not possible for the students to work together on one and the same table, or to multiply the table their colleague had prepared, moreover that each student worked on a different text. Here, the objectivity of the sample was the highest. Notwithstanding the fact that the texts were with a higher or lower number of terms, the students recognized them and, with small exceptions, filled in all cells in the table. It is worth noting however, and this is evident in all computer groups, that the students did not make any difference between the meaning of the term and the meaning of the word in general English. The reason probably is that to those students the computer is part of their everyday life and they perceive computer vocabulary as their daily language, not as a set of linguistic terms. The achievements of the students from the GGI group are more diverse since the students are at very different levels of knowledge of the English language. They worked on topics related to geology: "Rocks on the Earth's Surface", "Mechanical Sediments", and "Weathering of Rocks". Two of the students managed to identify all geological terms and to find complete information about them, while the others managed only to give definitions, Bulgarian equivalent terms and collocations.

Expected results

After the project implementation, *we expect to achieve the following results:*

- improved skills for identifying technical terms in a foreign language and the respective Bulgarian terminological equivalents;
- enhanced communication skills of the trainees;
- developed capacity to work with technical literature and specialized materials;
- the FLT to be compliant with the students' needs and interests and to be consistent with the contemporary trends in the field of education;
- definition of the contemporary trends and the level of influence of the foreign terminology on the Bulgarian one.

The benefits for the students from their work on the project are the following:

- through their participation in the project the students will have the possibility to take direct part in the documentation process of the correct Bulgarian meanings of the technical terms from the respective languages;
- the students, participants in the project, will be able to create banks of terms (including word etymology, synonyms, antonyms, abbreviations, hyponyms);
- thus, the students will be encouraged to actively participate in the education process instead of being only passive listeners;
- the individual research work will contribute to the more sustainable mastering of the technical terminology;
- the individual research work will also contribute to the easier use of specialized foreign texts in their further studies;
- in the long term, the acquired knowledge and skills of the students for individual terminological selection, analysis, systematization and usage will give them a possibility for better professional development in the future.

The benefits for the lecturers from their work on the project are the following:

- the comparison of the results from the students' work in the different language groups (English, French, Spanish, German and Russian) will give the lecturers a possibility to identify the common difficulties in the technical translations from the different languages;
- the comparative research is a possibility to look into examples of the influence of the respective foreign languages on the Bulgarian terminology in the field of mining and geology.

Conclusion

These are the results from the first part of the research. Our aim is to show the long term development of the students' level of foreign language proficiency with regard to the technical terminology and we will continue with the second part of the research in the next year of study.

The students from the three faculties show capacity to work with unfamiliar technical text which is consistent with their level of knowledge of the respective language. They can identify words which are defined as technical terms. They can formulate definitions of the terms in the respective language. They can also translate the term into Bulgarian and to identify the etymology of the term. The analysed works are a reference point for highlighting the etymology of the terms.

The lecturers from the Foreign Language Department will continue with the project implementation and the final results from our work will be published at the end of the year in the annual publication of the Department of the Humanities (HD), "Proceedings of the HD", which is planned within the project's budget.

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THE POSITIVE EFFECT OF BEACH VOLLEYBALL ON THE PHYSICAL DEVELOPMENT OF STUDENTS – VOLLEYBALL PLAYERS

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ABSTRACT. The changes in the levels of the basic physical qualities, following beach volleyball training, are studied. Nine specialized volleyball tests and two anthropometric tests were used – reaching high authenticity statistic results. It was proven that beach volleyball actively affects speed and speed-power qualities of the students, and the circuit training used is highly effective.

Keywords: students, beach volleyball, tests

ПОЛОЖИТЕЛНИЯТ ЕФЕКТ ОТ ПЛАЖНИЯ ВОЛЕЙБОЛ ВЪРХУ ФИЗИЧЕСКОТО РАЗВИТИЕ НА СТУДЕНТИТЕ - ВОЛЕЙБОЛИСТИ

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РЕЗЮМЕ. Изследвани са промените в нивото на основните физически качества, вследствие тренировка по плажен волейбол. Използвани са 9 специализирани волейболни теста и два антропометрични, при висока статистическа достоверност. Доказва се, че плажният волейбол въздейства особено активно на скоростните и скоростно-силовите качества на студентите, а използваната кръгова тренировка е с голяма ефективност.

Ключови думи: студенти, плажен волейбол, тестове

Introduction

Beach volleyball is a relatively new sport in the country, although Bulgaria can boast of some women participants in the Olympic Games.

The court surface to play on, sand, requires additional efforts on the part of the players, who have difficulty moving along the court; additional efforts in pushing back, net jumping or initial serving. High motor efficiency is possible due to the physical qualities being developed to a higher level as compared to indoor volleyball players [2, 3, 5, 4].

The game is played on a court which is 16/8 m. in size and the height of the net for men is 243 cm. The players are two in number, with no right to backups and substitutions during the game. It is played in two of three sets which end when the score reaches 21 points, with a difference of two points from the opposing team. In the third set the game is played up to 15 points, with two points difference too. Teams switch court ends and serving every seven points (every five points in the third set). Three touches of the ball are allowed, plus the first touch after the block [1, 6].

The first references to beach volleyball being played date back to the '20s of the past century and the first tournament in beach volleyball was held in 1947 in Santa Monica (USA). The sport was late to come to Europe (in 1960) and a professional

volleyball association (WPVA) was founded in 1986. In 1996 the sport was accepted in the family of the Olympic Games in Atlanta (USA). There is a Bulgarian National Commission for Beach Volleyball in the country and the first Balkan tournaments for youths and men were held in 2002 in the town of *Bansko*.

The new conditions (outdoor competitions and effect of the environment) as well as the demands on the physical qualities have led us to study the effect of beach volleyball on the level of the UMG students' physical performance.

The **OBJECTIVE** of the study is to identify the changes caused at the level of some physical qualities in case of systematic exercise of this sport.

The **SUBJECT** of the study are the changes at the level of the students' physical qualities while the **OBJECT** is the activity of the students – volleyball players.

Organization of the study

Two groups of beach volleyball competitors were formed by us in 2016 from among the students training in that sport at UMG, Sofia. The groups were made up of 4 players each, so we had in fact four teams available. The training sessions were held twice a week on the courts of the University. The experiment continued for three months, with a total of 24 training sessions conducted.

The training sessions of the experimental group (EG) were carried out according to a developed training program, which included circuit running workout – “snake”, hops, jumping hurdles, spiking and receiving the ball, overhead serve, digs, vertical hops, sprints at 10 m., lateral runs at 5 m to left and right, as well as shuttle runs at 64 g, two times “shuttle” of the playground from line to line, return etc. These exercises were arranged in the form of “stations” and they were repeated 2 – 3 times as decided by the coach. The control group (CG) was trained for separate development of physical and technical skills. One training was focused on speed, agility and technique, another one – on stamina, speed, strength and flexibility. The workouts alternated one after another.

Results and analysis

At the beginning and the end of the study we carried out tests of the eight players, using the control indicators shown on Table 1.

The results obtained were processed with the help of the variation analysis.

As expected, the two anthropometric indicators for height and weight did not change substantially. Weight in the EG even increased by 0,200 kg.

In both groups we found improvement in the three indicators for speed (No.3, 4 and 5). Most affected were the indicators of specific nature (No.4 and No. 5) where the changes were almost twice higher than in the CG.

Regarding the indicator for special stamina the result of the EG in the “figure of eight” between two cones placed 4 meters apart, in which eight laps are made of a total length of 32 m., was better by 0.4 sec. than in the CG, or the improvement in the first one was 8.04% and that in the second one – 3.37%.

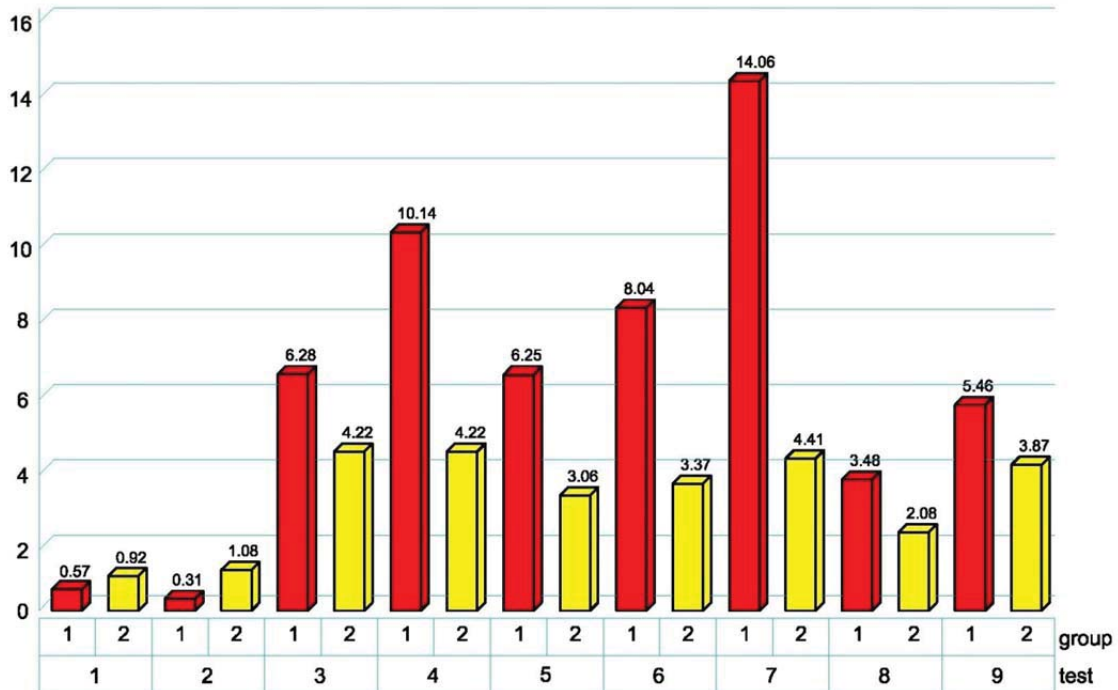
In the only test to measure the strength of forearm grip and muscles the “hand dynamometer” showed significant change in EG (by 3.5 kg), or 14.11%. Positive growth was also found in CG – by 1.1 kg, i.e. 4.1% in relative values. That was most probably the effect of the workouts for strength used in the EG with the help of weights for both arms and legs.

The bounce measured with the help of a standing long jump with arms swinging improved by 8.3 cm in EG and 1.1 in CG. That was definitely influenced by the different jump workouts included in the circuit plan of EG and their increased total volume.

Note: The test names are shown on Table 1

Table 1
Changes in the control indicators in the two groups of beach volleyball students

№	Control indicators	1 st group										2 nd group									
		Beginning					End					Beginning					End				
		Min	Max	X	s	v	Min	Max	X	s	v	Min	Max	X	s	v	Min	Max	X	s	v
1.	Height (cm)	158	179	173.1	3.2	1,84	158	180	174,1	3,5	2,01	159	180	173,6	3	1,72	159	180	160	180	175,2
2.	Weight (kg)	54,2	72,7	63,6	1,8	2,83	54,9	72,9	63,8	5,8	9,09	55	73,7	64,3	2	3,14	55	73,7	53,7	74,6	63,6
3.	20 m high start (sec.)	3,77	4,19	3,66	0,3	8,19	3,81	4,1	3,43	0,2	5,83	3,82	4,21	3,79	0,4	10,55	3,82	4,21	3,88	4,33	3,63
4.	Defensive basketball movement (sec.) - sideways	12	16,6	13,8	2,2	15,9	11,9	16,4	12,4	0,9	7,25	12,6	17,4	14,2	2,1	14,8	12,6	17,4	12,1	17,1	13,6
5.	Special volleyball test with sideways movement front-to-back (in sand)	8,8	10,2	9,6	0,9	9,37	8,3	9,6	9	1,2	13,3	9	10,1	9,8	0,8	8,16	9	10,1	8,7	9,7	9,5
6.	„8-figure“ movement in sand (sec.)	9,1	11,6	8,7	0,6	6,89	8,8	10,7	8	0,5	6,25	9	11,8	8,9	0,5	5,61	9	11,8	9,6	10,9	8,6
7.	Forearm strength (kg)	21,4	26,9	24,8	1,1	4,43	22,8	30,7	28,3	0,9	3,18	22,3	26,7	24,9	1,2	4,82	22,3	26,7	25,3	31,6	26
8.	Long jump, standing start (cm)	210	243	238,4	7,8	3,27	214	251	246,7	8,1	3,34	212	245	239,3	7,1	2,97	212	245	216	244,3	240,4
9.	Agility test (running, weaving, jumping, slalom, receiving and passing a ball) (sec.)	35,8	40,6	38,4	1,09	2,83	33,7	39,1	36,3	2,5	6,88	36,1	40,9	38,7	1,1	2,84	35	38,2	37,2	2,2	5,91



Note: Test names are shown in Table 1

Figure 1 - Relative growth of indicators in the two groups of volleyball players

The specialized test for agility (No.9) in which different exercises are done (See Table 1, p. 9) showed that the differences between the two groups were minimal (0.6 sec.).

The relative changes in the indicators (in %) in the two groups of students are presented on Fig.1. The advantage of EG, trained in accordance with a previously developed training program including complex development of the physical and technical qualities of the volleyball players, is clearly visible. The height test with a negative sign in EG due to reduced body weight in the second test, is an exception. The highest increase is that of forearm strength of the convenient hand (14.06%) and defensive/side "basketball" movement – 10.14%. In all other tests EG has a pronounced advantage in the indicators.

Conclusions

1. Practicing beach volleyball as a means to improve the students' physical condition proves to be sufficiently effective and it can be used successfully to develop the motor skills of the volleyball players.

2. The indicators standing for speed and strength qualities show highest increase in the EG. - to 10.14% and 14.11% respectively.
3. When carried out in accordance with the interval-repetition method, the efficiency of circuit workout including exercises for speed, strength and stamina proves to be significantly higher.

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OPPORTUNITIES FOR ACQUIRING A TEACHING QUALIFICATION FOR PHYSICAL EDUCATION AND FOR CONTINUING EDUCATION

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ABSTRACT. Due to the importance and social significance of the problem in this publication, we set out to look in more detail at the opportunities for acquiring a teacher's qualification in physical education as well as for further continuing education. As per analytical review of the current regulatory base in this direction as well as of the practice at the National Sports Academy "Vassil Levski" the two main options for acquiring the professional qualification "Teacher of Physical Education" are outlined - according to the conditions of Bachelor's degree and the conditions of the Postgraduate Qualification Center. The possibilities for acquiring a master's degree in the subject "Physical Education" are also considered. For all three types, the structure of the curriculum is indicated. At the end of the article, the basic requirements for the acquisition of Vocational-qualification degrees by teachers as a result of the attained level of qualification and their participation in continuing education are also stated.

Keywords: physical education, teacher training, training, continuing education, professional qualification degrees, curriculum and programs.

ВЪЗМОЖНОСТИ ЗА ПРИДОБИВАНЕ НА УЧИТЕЛСКА КВАЛИФИКАЦИЯ ПО ФИЗИЧЕСКО ВЪЗПИТАНИЕ И ЗА ПРОДЪЛЖАВАЩО ОБУЧЕНИЕ

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РЕЗЮМЕ. Поради важноста и социалната значимост на проблема в настоящата публикация си поставихме за цел да разгледаме по-подробно възможностите за придобиването на учителска квалификация по физическо възпитание, както и за продължаващо обучение. Чрез аналитичен преглед на действащата нормативна база в тази посока, както и на практиката в Национална спортна академия „Васил Левски“ са посочени двете основни възможности за придобиване на професионална квалификация „Учител по физическо възпитание“ – в условията на ОКС „Бакалавър“ и в условията на Центъра за следдипломна квалификация. Разгледани са също и възможностите за придобиване на магистърска степен по специалността „Физическо възпитание“. И при трите вида обучения е посочена структурата на учебния план.

В края на статията са посочени и основните изисквания за придобиване на професионално-квалификационни степени от учителите като резултат от достигнатото равнище на квалификация и участието им в продължаващо обучение.

Ключови думи: физическо възпитание, учителска квалификация, обучение, продължаващо обучение, професионално квалификационни степени, учебен план и програми.

Introduction

In previous publications (Tzolov and Tzolova, 2016; Tzolov, Gavrilov and Tzolova, 2017) we looked at the opportunities for obtaining bachelor's and post graduate degree in sport. One of the aspects of the analysis, however, which was discussed very briefly, was the possibility of acquiring a teacher's qualification in physical education.

Because of the importance and social significance of the problem, we have set our sights here to look more closely at the opportunities for acquiring professional qualifications in this profession as well as on continuing education. In this connection, we analyzed in more detail the practice at the National Sports Academy "Vassil Levski" (NSA), which is one of the leaders in training of physical education teachers.

Teacher training in physical education is well regulated. There are several normative acts that are directly relevant to it. These are the Higher Education Act, the Pre-school and High School Education Act, the Ordinance on the State

Requirements for Acquiring the Professional Qualification "Teacher" and the Regulation №12 on the Status and Professional Development of Teachers, Principals and Other Pedagogical Specialists. Teacher training in physical education, as known, is for people with higher education. In the Bachelor's degree it can be acquired at the NSA "V. Levski" and at the pedagogical faculties in the following universities: "St. Cyril and St. Methodius" University of Veliko Turnovo, South-West University "Neofit Rilski", Plovdiv University "Paisij Hilendarski", "Konstantin Preslavsky" University of Shumen and Sofia University "St. Kliment Ohridski". The training is based on accredited curricula and programs in the professional field 1.3. Pedagogy of training on... (Physical Education) with ETCS 240 hours. The duration of the training is 4 years for full-time and 5 for part-time students. The structure of the curriculum includes two groups of compulsory disciplines - general theoretical and special, two groups of electives - theoretical and sport-pedagogical, facultative disciplines, pedagogical practice and training courses. A highly indicative of the interdisciplinary nature of the training is the curriculum

for acquiring the qualification at the NSA "V. Levski". The structure of its content is shown in Fig. 1.

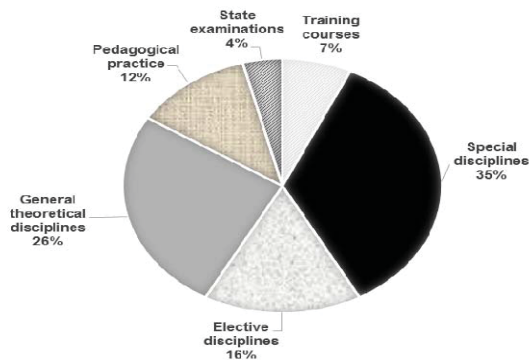


Fig. 1. Structure of the curriculum in Educational qualification degree "Bachelor", NSA "V. Levski" (in %), total 240 ECTS

Teachers' qualifications for persons with higher education can also be acquired in these schools through postgraduate training. Those wishing to acquire an additional (or new) „Teacher of Physical Education" qualification at the Postgraduate Qualification Center at the NSA "V. Levski" are trained in 18-month part-time specialization following a specialized curriculum and curricula. The training corresponds to the current ordinance, reflecting the requirements for acquiring a teacher's qualification. It includes a 60 ECTS course (1620 academic hours plus hours for the state exams - theory and practice, Fig. 2).

The students who have acquired the professional qualification "Teacher of physical education" have the opportunity to study also in the higher educational-qualification degree „Master", major "Physical education". There are 12 majors in this Master's program: "Sports in School and Leisure Time", "Physical Education and Sport in Basic Education", "Physical Education and Sport in Secondary Education", "Physical Education and Sports in Ministry of Interior and BA", "Athletics in the Educational System", "Gymnastics in the Educational System", "Basketball in the Educational System", "Volleyball in the Educational System", "Handball in the Educational System", "Swimming in the Educational System", "Prevention and Correction of spinal distortions" and "Physical education in preschool". The structure of the curriculum is shown in Fig. 3.

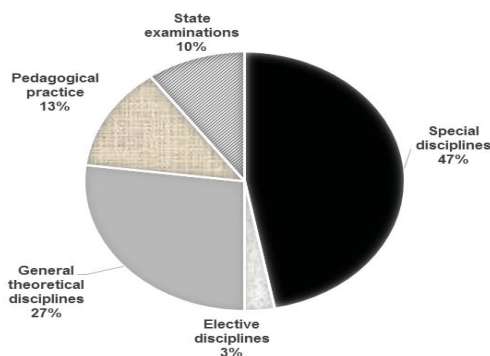


Fig. 2. Structure of the curriculum in Postgraduate Qualification Center of the NSA "V. Levski" (in %), total 60 ECTS

The training qualification includes prioritization of knowledge and development of skills for the application of different scientific approaches for organizing and conducting the educational process according to the specifics of the child, school and youth age.

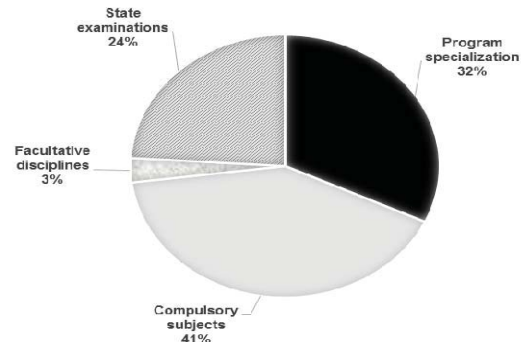


Fig. 3. Structure of the curriculum in Educational qualification degree "Master", Specialty of Physical Education, NSA "V. Levski" (in %), total 62 ECTS

Master's degree graduates are given the opportunity to study in the educational and scientific degree "doctor".

An important element in the qualification process of physical education teachers is their continuing education. This is regulated by the Pre-school and High School Education Act, as well as by Regulation №12 on the status and professional development of teachers, principals and other pedagogical specialists. In Art. 221 (3) of the Act is mentioned that the pedagogical specialists are obliged to increase their qualification on a yearly basis in order to improve the quality of their work and the quality of the students' preparation. The following Art. 222 (3) states that this must be done for a minimum of 48 academic hours (3 qualifying credits) for each appraisal period, that is, four years. Considering these requirements, the Postgraduate Qualification Center at the NSA "V. Levski" has developed and endorsed a number of curricula with a workload of 1 and 2 qualification credits for physical education teachers. The theme of these trainings, which started at the beginning of this year, is quite varied – "Innovative Approaches to Physical Education and Sport", "Scientific Applied Studies in Physical Education and Sport", "Olympism and Olympic Principles in the Educational System", "Operational Psychoactivity and Psychic Impacts", "Pedagogical Communication in Sports Activity", "Management of Sports Activity in the Educational System", "Kinesiotherapy in Common Diseases in Children's Adolescence", "Methodological Approaches in School Basketball Training", "Children's Athletics in School", "Bulgarian Folk People and Dances in Physical Education Lessons", "Innovative Approaches in Training in Activity Games" and others.

In addition to the training, it should be clarified that, based on the level of qualification attained, pedagogical specialists can acquire Vocational-qualification degrees (VQD) for each of which there are certain requirements. For them NSA "V. Levski" has been preparing for the development of a system and technology for the awarding of different qualification degrees to teachers, something which is regulated both by the Law and by the secondary legislation. Specifically in regard to the acquisition of a third VQD it is necessary that the

candidates have completed a one-year professional-pedagogical specialization with an average score at least "Very Good 4.50" and a diploma work with good pedagogical practice. The purpose of the specialization is to increase the professional and pedagogical competence of the trainees according to the occupation. It is conducted on a curriculum in which at least 50% of the course is for studying subjects related to the pedagogical, psychological or methodical training of the specialists or to the management of education. The academic curriculum must be at least 200 academic hours, at least 50% of which are attended. In relation to this, a training documentation for a one-year professional-pedagogical specialization "Innovations in physical education and sports training" was developed by the Postgraduate Qualification Center. At the moment, educational documentation for other similar specializations is also being developed.

Conclusion

As far as other professional qualifications are concerned, the basic requirements for their acquisition by applicants are related to:

- for V VQD – to have acquired additional professional competences from participation in training courses for increase of the qualification with a total duration of not less than 1 qualification credit and successfully passed a conspectus oral exam with a score no less than "Good 4.50".
- for IV VQD – to have acquired additional or new professional competences from participation in training courses for increase of the qualification with a total duration of not less than 1 qualification credit and successfully passed a written examination with a score of at least "Very Good 4.50" on a problem from the specific professional area in which the candidate works.
- for the II VQD - to have acquired additional or new professional competences from participating in training courses for increase of the qualification with a total duration of not less than 2 qualification credits and to achieve a score of at least "Good 4.50" on a writing paper related to the analysis of the results of a diagnostic procedure.
- for the I VQD - to have acquired additional or new professional competences from training courses with a duration of not less than 3 qualification credits and to complete a written work with an innovative character related to the pedagogical practice of the applicant. In any case, they will present no less than two publications on issues related to the topic of writing. Pedagogical specialists holding a degree have the right to acquire a first VQD under the following conditions: 1. If they have at least 2 years of teaching experience as a pedagogic specialist in a kindergarten, school or center for personal development support; 2. Have a PhD or a Doctor of Science degree in pedagogy, psychology or in a scientific field corresponding to the completed specialty of the higher education diploma

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DUAL EDUCATION SYSTEM IN UNIVERSITIES – OPPORTUNITIES FOR ADAPTATION IN THE LABOUR MARKET

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ABSTRACT. This report aims to outline the importance of the link education – business. An emphasis is set on the analysis of best practices in the dual education system in high schools, as a main source for outlining recommendations for its adaptation in universities. The dual education system is an appropriate mechanism for the acquisition of key knowledge and skills that will help human resources for better realization on the labor market. The successful development of this concept will lead to better adaptation of students to the requirements of the contemporary work environment.

Keywords: dual education system, human resources, best practices

ДУАЛНОТО ОБУЧЕНИЕ ВЪВ ВИСШЕТО ОБРАЗОВАНИЕ – ВЪЗМОЖНОСТ ЗА АДАПТАЦИЯ НА ПАЗАРА НА ТРУДА

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РЕЗЮМЕ. Настоящият доклад има за цел да изведе значението на връзката образование – бизнес. Акцентът е поставен върху анализа на добрите практики в сферата на дуалното обучение в средното образование, като основно средство за извеждане на възможности за неговото приложение в системата на висшето образование. Дуалното обучение е подходящ инструмент за придобиване на ключови знания и умения, които ще предоставят на човешкия ресурс по-добра реализация на пазара на труда. Успешното развитие на тази концепция ще доведе до по-добра адаптация на завършващите към изискванията на съвременната работна среда.

Ключови думи: дуално обучение, човешки ресурси, добри практики

Introduction

The report presents a practice which is applied in the education in Germany and has been proven to work well and produce good results.

It is a successful practice when business and education help each other and work together. Education and practice should be realized at the same time. During the practical sessions in an authentic work environment students can get an accurate idea of the nature of the work itself, the processes and the responsibility when executing it. It is useful for the students themselves to realize if they would be able to cope with such kind of activity. It is good for them to have the possibility to change their field in case they are not confident enough to adapt or if they are not satisfied with the job. Being in contact with the work environment during education is very useful for students so that they can acquire experience, qualification and if it is necessary to change the qualification. It is beneficial for business too, because this facilitates the recruitment process.

Nowadays, very often it is observed that students start working in a completely different field, most often-services. It is convenient for them because experience is not required and

because of the working hours which allow them to combine work and studies. They get familiar with their job, gain experience and confidence, and in most of the cases they do not become the specialists they have studied to. Business suffers too because companies are not able to recruit and train potential specialists. Therefore, I consider business and universities to be interlinked and it should be like this during the whole process of education. Thus, both parties will be satisfied.

Dual education system

Definition

A "dual education system" means a vocational education which takes place in parallel in two places - both at a vocational school and in an enterprise. (<https://pgm-plovdiv.eu/>)

General information

Dual education system is practiced mostly in Germany, Austria, and Switzerland. A prerequisite for education in Germany is the conclusion of a Vocational Education Agreement (Berufsausbildungsvertrag), and in Austria,

Switzerland and Southern Tyrol a Contract for the Acquisition of a Profession (Lehrvertrag). The location of the vocational school depends on the location of the enterprise concerned.

Vocational school education

Vocational school education covers two thematic complexes – special with theoretical subjects in the specialty and general, including German, foreign languages, religion and sport. During the classes secondary school students acquire theoretical knowledge and basic skills. The goal is to realize practical skills in the enterprise. The classes consist of 8 to 12 hours a week. They are taught in parts or in a set of activities. At the end of the year, secondary school students receive a certificate, which is also signed by the enterprise.

Vocational training

The basis of the vocational training is determined by the specific requirements of the individual profession. In general, the training takes 2-3 years. The training establishment is responsible for building practical skills and realizing the theoretical knowledge in the enterprise. The trainees attend 1-2 days a week the vocational school and the rest 3-4 they spend in the enterprise. Alternatively, block training is provided where secondary school students are successively educated for 3 months at school and trained for 3 months in the enterprise. The latter form is much less frequently applied.

Exams

When half of the training has passed an interim exam is given. It establishes the intermediate state of the acquired knowledge and experience. The result of this exam is not relevant to the final exams. At the end of the training a final exam is given which proves that the profession has been acquired at the apprentice phase. Exams are organized and conducted by competent committees. Written exams are unified.

Advantages and disadvantages for trainees

Table 1.

Advantages and disadvantages for trainees

Advantages	Disadvantages
The trainees work at different positions in the enterprise	Students are much busier
They get to know the work in the different workshops and departments Diversity and motivation - alternating theory and practice Faster adaptation - theory is complemented by real practical experience Payments are received during the training	Handling job and studies at the same time

Advantages and disadvantages for enterprises

Table 2.

Advantages and disadvantages for enterprises

Advantages	Disadvantages
They see the theoretical and practical skills of the trainee No additional training of the trainee is necessary if they continue to work in the enterprise The trainees have already acquired comprehensive knowledge	Insufficient maturity of trainees Training is associated with substantial costs The enterprise has no guarantee that the trained will continue to work in the enterprise There is not always enough trainees

Legal regulation and financing in Germany

Separating the competencies for the legal regulation of training in the vocational school and the enterprise is in place. Vocational training in enterprises is uniformly regulated throughout the country through the Vocational Training Act. Conducting training sessions in enterprises is regulated by the "competent authorities", i.e. chambers of commerce and industry, chambers of artisans, chambers of agriculture, chambers of doctors, if there are no specific prescriptions for this profession. These bodies set up Registers of Recognized Professions and Vocational Training Contracts (Verzeichnis der Berufsausbildungsverhältnisse (Lehrlingsrolle)), establish examination boards, issue regulations for the interim and final exams, provide the relevant companies with training consultants and carry out the relevant control.

Upon completion of the Vocational Training Agreement, the trainee is required to file an application for entry in the Register and to attach a copy of the contract. This registration is free of charge and the entry in the Register is a prerequisite for the final exam.

Funding is mixed - public (school) and private (company). Enterprises finance the cost of their vocational training (materials and staff). In countering the tendency to reduce the number of training enterprises, the Chambers of Commerce and Industry take on additional competencies. Since the 1960s, Germany has been relying on the close contacts between businesses and higher education institutions to improve career opportunities for young people and to increase labor productivity in enterprises. The experiment proved successful as a good practice and gradually emerged from the borders of Germany.

Initially, this practice started as an additional professional qualification for students who had completed secondary education but was subsequently integrated into the curriculum and entered universities. Nowadays in Germany it is practiced mainly (but not only) in the so-called Fachhochschulen (Vocational higher education institutions) They differ from classical universities in that they do not carry out research but focus on the practical application of education.

Dual education system in Bulgaria

Two years after launching the dual education system project in Bulgaria, now 20 schools operate under this system. There is legal regulation and financing, but only for secondary education. In Panagyurishte one of the first projects for dual vocational education is realized in the heavy industry in partnership between Panagyurishte Municipality, the vocational high school in the city and the local business on the branch model of the Bulgarian Chamber of Mining and Geology (BCMG). At the initiative of Assarel-Medet JSC in 2014 in Panagyurishte Municipality a pilot model of dual vocational education system was launched. Thus, in practice, at the local level, the branch model of the Bulgarian Chamber of Commerce and Industry is used to prepare human resources. When young people are eleventh grade at school, they will start working two or three days a week in one of the companies. In this way, they will enter the profession more quickly and if they like their workplace and perform well, they will be permanently employed after the graduation of the vocational high school. The partnership between Assarel-Medet JSC and the Vocational School of Industrial Technologies, Management and Tourism in Panagyurishte is based on four well-established specialties. Students who have completed seventh grade apply for the specialty "Mining Electromechanics". Upon completion of eighth grade there are three options - "Mining and Construction Mining Technologies", "Enriching, Processing and Recycling Technologies" and "Auto Transport Equipment".

The good thing is that in recent years in our country we have already started talking about dual education too. The basic idea of this type of education is that students receive the necessary theoretical knowledge at university but subsequently have a company training in their chosen specialty. Formally, this is part of the higher education process, but at the same time there is a work experience.

Conclusion

In conclusion, dual system allows part of the training to be conducted in the enterprise, in a real production environment, giving students opportunities to get scholarships and employment in the company. Therefore it is important dual system to be implemented at university. This type of training will help reduce youth unemployment in the country and improve the qualifications of young people. Qualified young people who have experience in their profession are a source of competitiveness and a prerequisite for introduction of innovation in enterprises. This is one of the ways to provide business with the right people and to solve the problems of the labor market.

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ENCOURAGING STUDENT ENGAGEMENT AND MOTIVATION IN ENGLISH LANGUAGE COURSES IN ENGINEERING AND TECHNICAL SPECIALTIES

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ABSTRACT. The student engagement and motivation in English language learning in engineering and technical specialties are determined by factors such as interest, success, influence of feelings and feedback - reflection. The motivation is enhanced by inspiring of self-confidence in acquiring knowledge, setting achievable goals and clear requirements, raising the curiosity by solving practical problems and sharing experience, providing an opportunity for self-assessment, stimulating receptivity by introducing an element of surprise when upgrading knowledge, the use of brainstorming and measured humor. It is necessary to justify the applicability of knowledge in English language by specific examples in order to achieve the satisfaction of the student. The active dialogue and the timely feedback of a lecturer-student are of utmost importance. The introduction of diversity through the use of video materials, presentations and discussions, helps to cover the differences in learning styles and allows each student the opportunity for expression. The increasing of motivation for English language learning of students in Bulgarian universities is closely related to improving the quality of education.

Keywords: motivation, engagement, English learning, training, foreign language skills, interdisciplinary approach, case study approach

НАСЪРЧАВАНЕ НА СТУДЕНТСКАТА АНГАЖИРАНост И МОТИВАЦИЯ ПРИ ОБУЧЕНИЕТО ПО АНГЛИЙСКИ ЕЗИК В ИНЖЕНЕРНО-ТЕХНИЧЕСКИТЕ СПЕЦИАЛНОСТИ

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РЕЗЮМЕ. Студентската ангажираност и мотивация при изучаването на английски език в инженерно-техническите специалности се определят от фактори като заинтересованост, успех, влияние на чувствата и обратната връзка – рефлексията. Мотивацията се повишава чрез вдъхване на увереност в знанията, поставяне на постижими цели и ясни предварителни изисквания, повишаване на любопитството чрез решаване на конкретни практически проблеми и споделяне на опит, предоставяне на възможност за самооценка, възбуждане на възприемчивостта чрез внасяне на елемент на изненада при надграждане на знанията, използване на активности от типа на мозъчна атака и внасяне на премерен хумор. Необходимо е обосноваването на приложимостта на знанията по английски език чрез конкретни примери с цел постигане на удовлетвореност у студента. От изключителна важност е активният диалог и своевременната обратна връзка преподавател-студент. Внасянето на разнообразие чрез използване на видеоматериали, презентации и дискусии спомага за покриване на различията в стиловете на учене и дава възможност за изява на всеки студент. Повишаването на равнището на мотивация за учене на английски език у студентите в българските университети е тясно свързан с повишаване на качеството на образованието.

Ключови думи: мотивация, ангажираност, обучение на английски, подготовка, чуждоезикови умения, интердисциплинарен подход, казусен подход

Introduction

English is a dominant language for global communication in business and science. In order to achieve the best possible professional qualification and optimal realization in the labour market, students from technical universities should have good knowledge of English. At this stage, there is still something to be desired about this. Mastery of English is one of the main requirements of employers in modern society and foreign language learning is an essential part of the preparation of students at St. Ivan Rilski University of Mining and Geology in Sofia city (Purvanova et al., 2010). A good command of English enables students to take part in the Erasmus program for the mobility of university students, where they can study one or two semesters at a selected foreign university - partner of St. Ivan Rilski University of Mining and Geology. Good knowledge of English is also required for successful completion of a PhD thesis, as well as for obtaining a scholarship for a PhD study abroad. With the necessary motivation, perseverance and serious attitude of the students,

the excellent results come. The benefits of language skills for career success are proven, personal development in/out of the profession, as well as for fulfillment of academic tasks (Yankulova, 2012). Knowing the style and the type of motivation of different students is important for the lecturer. Motivator for learning is the relevance of the information (Sternberg and Williams, 2001). It must match their current desires and needs and create the feeling that it is useful to them. Motivation is an inner state of people, a set of conscious internal motives, with the main function of determining, justifying, activating, directing, stimulating, maintaining and controlling their behavior through direct and intensive feedback between the specific objectives in language learning, actions and the final results obtained.

English learning in the engineering specialties should be subject to specific academic standards and implementation of professional requirements, according to the ideas for quality improvement, wider applicability, internationalization and international recognition of the education (Kostova, 2001).

Problem statement

The purpose of this report is to clarify the ways to improve the motivation and engagement of students at technical universities in English language learning and, hence the effectiveness and quality of their preparation. Motivation is the driving force behind a particular goal and is an important precondition for the success of English language learning. Learning begins with needs that generate motives and create a goal (Vassileva, 1993). To determine the level of motivation and engagement of students to English language learning, we apply the methods of summarizing, synthesizing and analyzing the information from the observation on their work and behavior in class. Most students are working and are married, coming with great ambition, motivation for achievements and the will to succeed.

Every teacher's task is to awaken, reveal and maintain the motivation of students, to help them seek their success, to instill in them the right habits necessary for their personal development and realization. There must be good communication between the lecturer and the students (Kostova et al., 2013). Students should be seriously involved in activities directly related to English language learning. They must be motivated to learn English to be able to use modern textbooks on specialized disciplines in English in the original in order to gain better technical training, to be able to work effectively in foreign companies and to develop their social relationships with colleagues (Kostadinova, 2013).

Factors influencing motivation

Factors that influence students' motivation for learning and their active participation in the learning process and taken into account when planning, organizing and conducting English classes, are:

- Personal motivation for learning English - striving for professional, educational and cultural improvement; goals, related to career development; satisfying personal interests; motivation under external pressure or imitation of someone else (Klaus, 1987).
- Devotion - the extent to which the student actively and conscientiously participates in the process of English language learning.
- Help from the learning environment - the extent to which the support of the teacher helps to gain an experience in learning.
- The student's value system.
- The physical environment at the university.
- Self-confidence, expectation for success and learning adjustment, as well as learning skills and interests.
- The conditions at home, assisting or impeding the learning process.
- Attitudes towards language and learning issues.
- Financial opportunities of the students.
- Cultural and personal characteristics ("stories") of the students.
- Previous educational and professional experience.
- Working conditions (for students who work).
- Skills available for effective learning and time management.
- Interest related to certain issues, job prospects.

- Intellectual, psychological, physical abilities of the individual student.
- The teachers- their professionalism, mastery and relationship with the students.

Students have a different entrance level of language proficiency, which implies a different tempo of mastering the subject. This creates a risk of losing interest in the learning process by more advanced learners who already have good knowledge of the matter, presented at the moment, or discouragement, disappointment and despair in less fluent learners - a situation that could be overcome by a differentiated, individual approach in learning (Nikov, 1994).

My observations show that the younger the learners or recently completed secondary education, the better they master the language and are more motivated. I found that encouragement makes students feel more special and along with satisfaction of achieving good results increase motivation for learning. Despite the unfavorable demographic situation and emigration (including educational emigration) from Bulgaria, which have a negative impact on the quality of the preparation of admitted students, the level of motivation for learning among our students is relatively high. However, there is a difference of possibilities and motivation among students for effective learning of the matter taught.

Motivational practices

The interest of learners in academic activities and in particular in English learning, is preserved and can be increased by:

- Active dialogue and precise analysis of timely student-teacher feedback through surveys, conversations, tests and relevant reflection of its importance;
- Discussion of confusing moments and making a creative atmosphere for work and enthusiastic learning;
- Maintaining pragmatism in the learning process, based on an emphasis on practical knowledge and skills in the learning content. Giving exercises and provoking cognitive interest;
- Emphasize the skills for understanding and conducting a conversation;
- Building and maintaining the identity of each student as an active participant in the learning process;
- Creating an appropriate learning environment, an academic atmosphere and necessary equipment (Angelova et al., 2005);
- Facilitating the access to relevant information, textbooks and reference books;
- Placing possible and meaningful tasks with realistic deadlines;
- Stimulating student's initiative and ambition;
- Strict monitoring of the attendance in classes and the engagement of the students during the semesters;
- Periodic analysis of the student's achievements;
- Using of appropriate form and time of teaching (learning system, textbook, teaching method, methodology), exercises, review and calm environment (Purvanova et al., 2014);
- Adopting good practices and modern methods in the learning process (Purvanova et al., 2008);
- Applying of interactive methods in language learning (Purvanova et al., 2011);

- Introducing a surprise element in teaching and testing;
- Using the brainstorm method;
- Using presentations and video materials in English teaching;
- Providing opportunities for improving their evaluation and grades;
- Flexibility and adaptability of the curriculum, linked to the needs of business, as well as the social practice of the student;
- Introduction of IT in the learning process (Kremenska, 2010);
- Encouraging students to have more perseverance and persistence in the implementation of the assigned goals in the curriculum;
- Enrichment of the university library with periodicals and specialized literature in English in the field of technology, innovations, good practices in mining and entrepreneurship;
- Introducing a competence-based approach to teaching in close cooperation with business. Organizing of a meeting (or on-site visit) with foreign investors in the mining sector, for example "Balkan Mineral Mining" AD, Krumovgrad town.

From my educational practice I can point out that the attention of students is best attracted by discussing current issues and applying an individual approach in view of their psychological peculiarities.

Analysis for student motivation

It is wrong to think that all students have a strong motivation to learn. Some may have begun learning under different circumstances, or external pressure from an employer or have prejudices to the English language. For other learners, motivation to learn English may be reduced due to personal problems. It is the teacher who must take into account the factors that motivate or demotivate students and influence the effectiveness of their learning.

It is important for the lecturer to know what discourages students in learning English. Learning is an emotional process, and there is also fear in it - not to be exposed to fail, or be an object of ridicule for your poor pronunciation, not to be appreciated, not to understand you, not to notice you, and etc. Fear, anxiety and anger are emotional factors that negatively affect learning. They cause stress or are the result of stress that can lead to negative disorganized behavior. Other demotivators for adequate learning are fatigue and boredom. Working or married students have to balance between many responsibilities that often appear to be a barrier to their participation in learning activities - lack of time, money, information, problems with daily workload, bureaucratic problems, issues with raising a child and with transport.

Methods, approaches and rules for motivation

On the basis of my analysis in teaching English to students of five majors – Computer technologies in engineering, Automation, information and controlling equipment, Development of mineral resources, Management of resources and production systems, and Processing and recycling of materials, I can say that greater engagement in English learning is available mainly in the initial courses of computer specialty. A multidisciplinary socio-constructivist approach can be used to enhance student engagement in English language

learning (Papworth, 2016). Students are offered to use their skills acquired in other modules of their curriculum, such as project planning, project management, preparation of project reports, planning and holding meetings and working together.

The interdisciplinary approach to foreign language learning makes students to analyze and combine knowledge of different disciplines in solving a particular problem (Terzieva and Pancheva, 2013). When defining methodological guidelines and shaping the content of a specialized language course, focusing on the application of the English language in the context of professional activity, it is necessary to analyze the specific needs of students to develop foreign language skills that are part of the professional competencies, i.e. what students expect from the training and to apply multiple method (Purvanova et al, 2016). In the curriculum content it could be included situations, activities, functions, concepts and language forms (Terzieva and Kolarski, 2014).

It is established a link between English language competence and the level of academic and professional training, integration of language knowledge and knowledge of the specialty, common language and communication skills, and specific skills for self-development and introducing key situations for the career (Terzieva and Kolarski, 2014).

Applying a case study approach in English language learning to students at technical universities helps developing foreign language communication skills. From the analysis of the content of specialized engineering and technology disciplines are defined basic concepts- scientific and technical, related to professional activities and key situations which will form the basis for development of case studies, reflecting different real situations from the practice in the respective field (Terzieva et al., 2015).

The main rules for motivating students are:

- The more the training responds to the learners' individual needs, interests, goals and their abilities, the greater their motivation for learning is.
- The more a person has studied, the more his motivation to learn the English language is! Adults learn better if they have already experienced the benefits of learning (Slavin, 2004).
- Students are motivated to learn if they are involved in the learning process. Therefore, the teacher should be aware of or match the expectations with the goals and the training program, to include them in the evaluation process and self-evaluation.
- Students are motivated to learn if different motivation factors are adequately combined for them: lack of time, place, and transport difficulties; financial incentives-scholarships, expected promotion; appropriate learning proposals; professional requirements; family environment; free time for learning and access to study materials.

I have found out that it is also very useful to apply audio-visual methods in the learning process.

The role of the teacher to motivate students

Teachers should teach with enthusiasm and ask themselves the following specific questions:

At the beginning of the class:

1. How can this learning content best meet the needs of my students?
2. What can I do to create a positive attitude in my students towards the curriculum?

During the class:

3. Is consistency of exposure to the curriculum relevant and does it stimulate my students' interest?
4. How does the emotional effect of the presentation of the material and the microclimate positively stimulate students?

At the end of the class:

5. How did the presentation of the material in the specific consistency lead to an increase or strengthening the feeling of the students' sense of competence?
6. What does the learning material in this lesson give to students (Brown and Race, 2002)?

Teachers can better motivate their students to learn English if they know: their level of life and learning experience, their knowledge and learning skills; what would be useful for their learning; what is the level of their personal responsibility to learning; what learning orientation (problematic or subject) is more appropriate for them; what is the level of their motivation to learn; what are their expectations, attitudes and interests in terms of learning English.

In teaching English, the teacher should aim at:

- A microclimate based on trust, cooperation, understanding and learning pleasure;
- Focus on students' responsibility for their own learning;
- Developing a sense of responsibility, satisfaction and appreciation, enhancing the enjoyment of learning (Tzvetkova, 2001);
- Enabling additional consultations and communication outside the classroom;
- Sorting tasks according to the degree of complexity; assigning additional tasks to achieve better learning results;
- Encourage the expression of unconfident students;
- Encouraging the expression of personal opinion on the topics studied;
- Creating and developing positive critical thinking, developing the quest for more information, overcoming the consumer's attitude to learning.

As an example of my practice I can point out that the most effective implementation of realistic goals is the use of specific terminology and communicative skills. In my opinion, it is important for the teacher to combine traditional with innovative learning and also to be good-natured, i.e. to respond to the needs of students, to be concerned about their interests in order to gain their trust.

Conclusion

Increasing motivation to learn English is a difficult task and its successful implementation depends on internal and external factors. Personal strive for self-improvement, the creative thinking, the optimistic view of life are of great importance for each student. To help students and provoke their motivation to learn, we teachers must create the conditions for:

- an appropriate environment for learning;

- motivating feedback and encouraging messages;
- constructive criticism;
- persuasion and encouragement;
- setting realistic goals;
- supporting ambitious learning and initiative.

Motivation for learning is strictly individual, based on the personal characteristics and interaction of the individual with the environment. The perfect combination of traditional methods and forms of learning with modern methods and approaches is the only right solution for the future of technical universities to become an attractive and challenging place where students will learn with strong motivation and engagement. English language learning should be structured so as to increase motivation for learning and lead to personal change.

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CONCEPTUAL FOUNDATIONS OF ASSESSMENT AS AN EDUCATIONAL ACTIVITY

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ABSTRACT. The problem with the evaluation and grades in various aspects is a topic of broad and current interest, discussed in the works of leading psychologists, pedagogues and methodists. The ambiguous nature and role of evaluation in training is described. Its meanings, peculiarities, grounds, goals, principles, functions and types are analyzed. Different strategies, as well as organized forms of examinations and grading system are discussed. The factors that affect the objectivity, validity and reliability of the assessment are mentioned. The emphasis is on modern assessment tools of learning outcomes.

Keywords: assessment, verification, measurement, testing, evaluation, grade, test, formative and rating evaluation

КОНЦЕПТУАЛНИ ОСНОВИ НА ОЦЕНЯВАНЕТО КАТО КОМПОНЕНТ НА УЧЕБНАТА ДЕЙНОСТ

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РЕЗЮМЕ. Проблемът за оценяването и оценките в различни аспекти е актуална тема, обсъждана в трудовете на водещи психолози, педагози и методисти. Описана е нееднозначната същност и роля на оценката в обучението. Анализирани са нейните значения, особености, основания, цели, принципи, функции и видове. Разгледани са както различни стратегии, така и организирани форми на изпитване и оценяване. Посочени са факторите, които влияят върху обективността, валидността и надеждността на оценката. Акцентът е насочен към съвременните средства за оценяване на резултатите от обучение.

Ключови думи: оценяване, проверка, измерване, изпитване, оценка, бележка, тест, формиращо и рейтингово оценяване

Introduction

The issue of evaluation and assessment in various aspects is a topic of broad and current interest, discussed in the work of leading psychologists, pedagogues and methodologists. The results of the control over learners' learning activity are as a rule expressed in its evaluation. It is multidimensional and multifaceted, oriented towards quality education management.

Numerous definitions of terms such as verification, assessment, control, testing have been published in the literature on evaluation studies. They are very close and often used interchangeably. The nuances of this terminology when using levels of student preparation in learning are often the subject of scientific discussion. E. Perovsky believes that verification is a wider concept used in learning than the assessment and assessment of pupils' knowledge is an expression of the relationship between what the student knows about given issues of the subject and what he should know about these issues at a time of learning (Andreev, 1995). According to R. Taylor, assessment is a process of discovering how far-fledged and organized the learning experience is from the actually produced desired results, and the evaluation process involves identifying the strength and weakness of the plan (Andreev, 1995). There are other understandings about the essence of learning appraisal, such as: education assessment is a general term that includes all processes and

outcomes that describe the nature and extent of children's learning, the degree of compliance with the objectives and tasks of teaching, and their interaction with the surrounding (Satterly, 1989), and assessment is a case of interaction of one person, directly or indirectly, with another, with the knowledge to obtain and interpret information about the knowledge and understanding, peculiarities and relationships of this other person (Frith and Macintosh, 1984). Evaluation in the training process is a process of matching the learning outcomes achieved with the pre-set goals for doing it. The evaluation activity is knowledge of the relation between the need and the activity performed for its satisfaction. The assessment is a complex cognitive activity that identifies the value of the activity and its outcomes compared to the desired states of the subject with what it is supposed to be (Andreev, 1995).

Assessment as a process

The assessment is considered by scholars both as a philosophical category and as a pedagogical category. Some consider that evaluation means opinion, judgment about the quality and meaning of something. V. Andreev associates the evaluation with the decision-making process for the results of measurements made in unity with evaluation judgments for the level of measurable quality (Andreev, 2012). Evaluation is a particular form of reflection designed to determine the value properties of objects and phenomena, and their usefulness.

Evaluation relationships in the broad sense are such manifestations of public and personal consciousness in which, from the positions of certain norms, prescriptions and certain knowledge of the object under consideration, the positive or negative significance of the respective characteristics of the object is expressed, i.e. where there are norms, there are always estimates. A number of authors consider that each assessment is knowledge, but not all knowledge is an evaluation, and that each evaluation is a comparison, but not every comparison is an assessment. According to Broghen, assessment is a process in which everything is known to compare to measure effectiveness and intensity with one or other value object, and while in the process of knowledge, the subject realizes the objective reality, he realizes in the evaluation process what is the reality he is aware of, realizes himself in it (Brozek, 1982). Thanks to knowledge, the subject develops his consciousness and, on the basis of his assessment, he deepens his self-awareness. Some of the comparisons that can be made using evaluations are: student comparisons; comparisons with state requirements; comparisons of abilities; comparisons of the efforts made in the learning activity and comparisons of the achieved personal improvement. Comparison in school practice between pupils' different learning outcomes is natural and predominant in the time and yearly analysis of a learning process already in place. The assessments are important, but they can not influence the learning process that led to the final (established) outcome. Comparisons of students' learning achievements with state requirements for their preparation are also a natural process. The state requirements themselves are a benchmark (criterion) to measure learning outcomes. These comparisons are made on the basis of the adopted system of assessment - normative or criterion, and it is permissible for the legal system to be used for the procedural (current) assessment and the criterion for the resultant (the product, the result). Comparisons of learners' abilities, their readiness to master the curriculum in accordance with the objectives set, should be done with caution. The conventions and the unknown factors in these areas are many. Comparing school achievements with the efforts made is necessary, but not unambiguous. There is no unambiguous measure of the quality of the effort and its relationship to the result achieved. Comparison between school achievement and personal development can not be done uniquely because the development of personality has a multifactor character. Benchmarking is performed on the basis of externally defined criteria - operationalized learning objectives that serve as standards.

The structure of the assessment includes a subject, criteria and evaluation act. The subject is the person who determines the characteristic of the given object from the position of the criterion used as a criterion. The subjects of evaluation in education are teachers, directors, pedagogical staff, appraisal committees, inspectors, experts. The student is also subject to self-assessment of his / her learning activities and results. The assessment diagnoses the learner's ability to master the learning content according to pre-set operational objectives. The subject or object of the evaluation process is knowledge, skills, habits and competences, their completeness, awareness, correctness, accuracy, durability, links to life, as well as the oral, graphical and practical form of their

expression. Concerning the acquired knowledge, which is subject to evaluation during testing, V. Bepalko (Bespalko, 1982) points to the following classification: (1) knowledge - knowledge: it is based on recognition, differentiation, classification of objects, properties, processes from a certain field of phenomena of actuality (known knowledge) in re-perceiving the previously learned information about them or acting with them; (2) knowledge - reproductive action (knowledge-copy): it is at the level of self-reproduction, discussion, referencing, analysis and application of the information on the previously used orientational basis for the implementation of a certain action; (3) knowledge - productive action or skill and habit: pattern activity on a set of objects where the subject reaches a subjective new information in the process of self-building or by transforming a certain guideline for implementing the new action; (4) knowledge - transformation and or creative action: characterized by the use of the information used to solve practical tasks in relation to a wide range of phenomena and objects; application of widely used information. Using correct questions, a level of absorption can be identified and evaluated. Effective assessment also requires effective queries, because the ineffective outcome is sometimes linked to inefficient queries, which may be inappropriate for the subject or an inappropriate question.

There is also understanding of knowledge, skills and competences not as a subject of assessment but as criteria for assessing achievements in education and as a goal of education. Clear definitions are needed for these categories. Knowledge in science encompasses facts, notions, laws, hypotheses, theories, and predictions that make up the scientific map of the world. Most often, the skills are formulated as a psychophysiological system, related to the mastery of a complex situation, which exhibits the characteristic of repeated repeatability. Specific skills in the exact sciences refer to the use of scientific information in solving cognitive problems. Competences are a series of skills structured in a system and in a certain sequence that enable individual activity of the individual. These are dynamic behavioral behaviors that demonstrate knowledge, skills and attitudes. In their realization, the three spheres of personality are unified - cognitive, emotional and volitional.

Based on the cognitive levels of B. Bloom (knowledge, understanding, application, analysis, synthesis, evaluation), evaluation and self-assessment are carried out. In the literature examining the problems of evaluation in education and learning, systemic verbs have been developed, which some authors call active and other behavioral. Their help sets out tasks to determine the level of utilization. These verbs are the following: knowledge - name, designate, define (problem, principle, object), list, describe, indicate, choose, arrange, define, repeat (rule, law, principle); Result - distinguish (facts from theories), write (formula, equation), tell, replicate, recognize; Understanding - Explain (in its own words), Link (cause - consequence, structure - function), Describe (table, graph), Convert (translate text into a table, table into text, etc.) (Graph, formula, etc.), make (diagram, diagram), measure, calculate (quantitative dependencies), give example, compare (similarities, differences), illustrate, group, classify, Sort in a new way, collect data, save data, tell; Application (concepts,

principles, laws), demonstrate (method), follow (algorithm), choose (device), make (try), build (graph, diagram) Model, decide, modify (simplify), draw, oppose (predict), compare (experimental), distinguish data from conclusions; (Hypothesis, assumptions), discover (hidden meaning, principle of organization), prove (thesis, suggestion), sequence (events), predict (consequences), discuss (problem) Formulate (problem, hypothesis), distinguish (meaning from insignificant facts), determine (relationships, relationship between conclusions and theory, between hypothesis and procedure for its verification); Synthesis - write, propose (plan, hypothesis, procedure), compositions (task), assemble (facts, parts), develop (experiment, project), construct, combine, design, plan, organize, Modify hypothesis, synthesize, integrate, create; Assessment (whether the ideas meet the criteria), defend their position, discuss critically, find weaknesses, justify the rightness. The full use of these in the design of verification tasks allows preliminary determination of the subject of the assessment. In order to specify the assessment objectives, more and more lecturers are turning to taxonomies. Appropriate for evaluation is also recommended by R. Ebel.

The accepted evaluation criteria are especially important in the evaluation process. They are a measure of truth, of credibility. The criterion is a unity of qualitative and quantitative features that reveal the essence, content of the process, or the object assessed with their help. The evaluation criteria are derived from the objectives of the training, its functions and the specific conditions under which it is carried out. M. Andreev points out that the socially determined learning objectives can play only the role of a generic, global criterion. They are a measure of effectiveness, optimality, intensification and quality, related to the time spent in society for the formation of the socially valuable qualities of the personality and the mastery of professional experience created by mankind. Training is designed and programmed specifically, therefore, the criteria are projected into state documents by establishing educational content (Andreev, 1982). It is a difficult task to formulate criteria that create criteria, and some critics think that formulating them is not worth the effort. American authors Callahan and Clark in their book "Teaching at Primary and Secondary Schools" describe the necessary steps to formulate criteria that create criteria (Radev, 1996). Criteria provide a standard for depth of penetration in the phenomenon studied, breadth of scope and detail of knowledge, their relevance to the technologically-practical meaning. Relative to the assessment of knowledge, they can be: correctness, accuracy; comprehensibility; specificity; generalization; systemic and durable; relevance and portability; personal significance. The criteria are usually expressed through a system of indicators. The indicator can be considered as a generalized qualitative-quantitative characteristic of certain processes and phenomena. It is also defined as a measure of the state and change of the object of study. It is also defined as a means of measuring, collating, referencing, and as measured by a particular methodological feature of the content of a given concept or regularity as it appeared at a given place and time. In clarifying the scientific-content characterization of the notion criteria and indicator in the literature, there is no uniform opinion and distinction between them and the relationship between them. It is acceptable to consider the criterion as a

measure of the specifics and the performance of an activity, and the indicator to qualitatively or quantitatively characterize individual countries, properties or capabilities of the activity or phenomenon. In their concrete application to measure the effectiveness of the activity, some dynamics are observed depending on the complexity of the phenomena studied, the degree of community, the subordination and the subdivision of the elements of the system of phenomena and processes that is measured or evaluated. In some cases, the criterion may be an indicator of phenomena or processes of a more general nature and as a criterion for phenomena and processes with a lower degree of community. The evaluation act or the time of the assessment is a comparison, a search for compliance of certain knowledge about the characteristics of the object under assessment with previously adopted prescriptions (norms, criteria), giving expression of the degree of conformity, i.e. the positive or negative significance of the object. The evaluation criteria act as a specific scale with certain meanings. Evaluating an activity or object is one of those meanings that corresponds most accurately. The rating displays the degree of zooming in or out of the ideal score. Different grades have different impact on learners. A positive evaluation, reflecting the objective state of the controlled object, when it is fair and bears the appropriate incentives, inspires the personality for new efforts and achievements. A positive assessment that is not considered fair does not have the same impact. It is considered undeserved and leads to negative consequences. This ratio is also observed in the negative evaluation, i.e. it can also be fair or unfair and in this sense has a different impact. The fair negative assessment requires testing to determine its future activity in the sense of deciding whether to repeat or overcome the weaknesses it has committed. The expected result is improving performance. When a negative assessment is unfair, it often leads to new violations. Regulatory capabilities of assessment are realized through its impact on the personality. The effect depends on both the quality of the assessment and the organization of the assessment impact.

Scaling scales can be distinguished in the following way: Name Scale - it is applicable to objects that allow only a census. Several counting operations are possible: frequency, fashion, and quantity of uniform objects labeled with the same numbers. Ranged scale - establishes the order of the objects. Objects need to be compared to some common feature to establish the location of each object in the scale (earlier / later, higher / lower, etc.) as the elements in the scale are not always evenly spaced. Frequencies, fashion, median, and odds correlation coefficients are possible. Interval scale - an ordered set of actual numbers with arbitrarily chosen zero point. Applies to objects whose properties change evenly over a certain interval. All arithmetic operations are applicable except for finding the coefficient of variation - the ratio of the standard deviation to the mathematical expectation. The scale of relationships - an ordered and monotonous set of real numbers with a natural zero point. All arithmetic and statistical operations are eligible.

There is also a wide variety of distinct functions of assessment. As such, they can be referred to as: training, educative, control, development, diagnostic, prognostic, selective, regulatory, information, emotionally motivating,

stimulating, social, cognitive, grading functions. There is a clear distinction between evaluation and a grade. The latter serves to establish a numerical analogue (numerical or verbal, quantitative or qualitative) of the evaluation decision. According to Belich's attribute analysis, each individual activity involves successively: user, motive, purpose, object, method, means, and result. In this sequence, another element of comparing the end result with the goal is needed, and this is, by its very nature, the assessment. There are mainly two main reasons why assessment in training is a necessity. They are social and pedagogical. Social reasons relate to the social profitability of learning, to the preparation of the citizen of modern society. The pedagogical reasons are associated with the full development of the personality, with the development of his individual abilities in the context of an effectively constructed learning process through the use of appropriate methods and activities. Critics identify a whole series of arguments against the test and the grades. The most common arguments against the assessments are: cognitive results, the presence or lack of knowledge are taken into account, but the emotional, relational effects of the training cannot be correctly identified. The assessment process inevitably involves heterogeneous expectations, both for tutors and exhibitors, as well as for learners. Individual perception and personal self-regulation of environmental behavior may distort the objectivity of the assessment and make false signals for comparison. Evaluations only reflect the curriculum content (curriculum), and this is far from achieving the overall personality goals. Assessment is inherent in personal relationships and goes away from the real goals of learning that is contrary to learner's needs because it is rated by someone for someone. Assessment is an intrusion into the inner world of man and provokes emotional tension. The assessment is not always reliable enough because it reflects the existing reality with all the connotations and limitations of that reflection. Refusal of comments does not mean absence of pedagogical assessment. The evaluation acquires a qualitative character in the context of a meaningful assessment that allows to solve the main tasks of the control and to form the self-assessment. In the variety of evaluation variants, as a modern means of assessment, there are a number of links to discussion, contradictions and ways of improvement. Normative assessment is based on a comparison of learners' individual achievements with others or on comparisons of individual groups. The purpose of this assessment is to show at what level everyone has mastered the curriculum, what progress has been made, and which category falls within the distribution of learning achievements. In the normative assessment, the dispersion of learning outcomes is large and the outcome varies greatly. Conclusions are drawn on average achievements and decisions are made in the field of training differentiation in current day-to-day learning activities. In this assessment, exam questions are diverse in purpose and complexity. Norm is a kind of criterion, but it is determined on the basis of how performance is distributed in a given set of learners, and not on the individual performance characteristics. Therefore, the regulatory assessment creates conditions for scattering the requirements within the different groups. In benchmarking, the learning achievement is compared to a standard (benchmark, criterion), external target or state requirement. Criterion assesses how many learners have

achieved the goal (criterion, standard). The criterion is presented as an absolutely necessary minimum of quality in preparation for successful completion of a particular degree. The exam questions are strictly defined, they check out unambiguous knowledge, skills, habits, and lack the diversity that characterizes the normative assessment. Threshold achievement is typically set at 50%, and the criterion typically varies between 60-100%, with the most commonly used criterion being 70% of knowledge, skills and competencies. The higher the criterion, the smaller the dispersion (scattering). A person below the criterion is considered unsuccessful. Formative assessment is a continuous process that allows information on the strengths and weaknesses of learning to be collected, focusing on what learners can do, not on their weaknesses and errors. This leads to peace of mind, confidence, and satisfaction with learning success and increased efficiency. The evaluation is formative when the information it receives is actually used as a factor in adapting the training to the realization of certain educational goals. It is a qualitative assessment of different aspects of the outcome achieved in the learning process and the orientation in a given action and task, as well as characterizing a particular difficulty. The aim is to focus efforts on developing specific knowledge and skills, to detail strengths and problem areas in achievements. This combines the norms of social comparison with the individual comparison of the learner's achievements in terms of his / her own progress. The formative assessment supports the reflexive behavior of the student by developing self-assessment skills in a relaxed environment (Gurova et al., 2006). Formative assessment has a diagnostic, motivational, and predictive function. It is realized through open discussions on achievements and errors, short comments, self-assessment by certain criteria, mutual evaluation, informal discussions, "mirror" evaluation, portfolio, etc. The teacher and the student assess the learning strategies and their outcomes against the learning objectives. Both subjects can provide feedback on strengths and weaknesses to narrow the gap between the actual and the recommended levels. Feedback enables operational control over achievements and ways of working. Through it, it can be timely to determine the appropriateness of the methods used by the teacher, the deficiencies in mastering the knowledge, skills and competences, the misunderstanding of the curriculum or the performance requirements. Feedback is a major tool for making a formative assessment. It creates reflective behavior that guarantees success. The trainee is placed in natural conditions of cognitive activity and unconditionally masters and consolidates specific knowledge, skills, competencies and cognitive approaches for self-realization. Formative evaluation can only be realized if the person receiving the feedback is in a position to accept, realize and make sense of it. This implies self-assessment skills and some autonomy that is the result of purposeful preparation. Key features determining the content functioning of formative assessment are: part of effectively planned learning; emphasis on how to learn; key professional skills of the lecturer; humanity and constructivism, since evaluation has an emotional effect; motivation; the result of a mutual understanding of the learning objectives and the evaluation criteria; importance for improving the individual learning process; provides constructive guidance; develops students' capabilities for self-assessment and self-management; builds a

holistic view of the learner and guides him towards improving the learning process. Personally-oriented learning, changing the orientation of teaching from monologue to dialogue will eliminate the fear of asking questions and making mistakes.

Portfolio is a product folder of the work of each learner that allows for the systematic tracking of its development - achievements, successes and difficulties in fulfilling certain tasks. This approach provides a good opportunity for feedback. Through it, all those involved in the learning process can at any time receive information on the level of training, success rate, professional abilities and progress in the relevant field. Portfolio types can be differentiated depending on the selection orientation and the conditions of use (official regulation for external and internal evaluation or creation for personal use). According to these criteria, the following portfolios exist: portfolio-file; training portfolio; reflective portfolio and professional development portfolio. Profiled assessment refers to the learning of a specific topic, a given piece of study material, a given cognitive category or an important element of preparation. It is based on individual essential characteristics of learners' achievements arising from the objectives of the subject matter. As regards these characteristics (aspects), the evaluation criteria and the performance indicators are formulated. The goal of the achievement profile is not to sum up all the components of achievement, but to present them differentially. For example, for physics training, some of the components shaping the profile can be: oral testing, seminar exercises and laboratory practice, it is acceptable for the different profile components to receive different results as assessed by several analytical, specific assessments. The profiled assessments lead to the formation of the overall assessment on the subject. The most explicit feature of the evaluation is the most obvious. The final profile shows which goals have been reached and at what level. Advantages include the following: the great operational significance for learning cognitive structures informs very accurately about the achievements and nature of gaps in the learning content; stimulates a more generalized reflection on the consistent (progressive) realization of the common goals; dynamics and flexibility, and justifies the formation of final assessments of individual subjects. The limitations of the profiled assessment are: examining more elementary knowledge and abilities of learners because they reflect smaller components of comprehensive learning content. Without tests profiled assessment becomes obstructed or impossible. There are no uniform national requirements, standards, examination procedures that are objective and reliable and are not suitable for all types of learning content. Overall assessment is associated with shaping a global, aggregate assessment of student's achievement. Final examinations after passing an exam after certain periods of training are common. The overall assessment does not define individual characteristics of learning achievements and competencies. The cumulative evaluation performs primarily a selective and certified function. It is realized through exams, tests, research, projects, etc. And is used when the grounds for successful competence formation are sufficient.

All evaluation options have their advantages and disadvantages. They cannot be universal in terms of

relevance, but may be appropriate in a learning process according to pre-set goals. Combining them in the learning process is the basis for achieving sustained progress and reliability of ongoing and final evaluation. Didactics includes a field called docimology that examines, describes and explains the laws and technologies of verification and assessment as part of the control in the learning process. Docimology has been identified as a relatively self-directed area in the first two or three decades of the twentieth century. The word docimology has greek origins (dakime - test, exam, docomoso - test, docimastykos - examining). The founder of this line is the french scientist henri piron. Some other modern tools for evaluating outcomes in and out of learning are: multi-valued evaluation systems, multi-criteria or complex grades, no-grades system, differentiated grades, meaningful evaluations and criteria-based assessment, rating and modulation rating systems. Each evaluation must have an emphasis on objectivity, reliability and validity.

Many theoretical and methodological tools related to the modern tools for evaluating the learning outcomes describe the theory and practice of creating tests and test tasks, the theoretical basis for the creation of tests, terms, concepts, classification of tests, and indicators of quality. Problems related to the passing of the test ball into a note, the didactic possibilities of the test lecture, the use of computer testing, the procedures for making tests, the prognostic validity of the tests, the comparison of different evaluation models are current. Discussions on normative-oriented and criterion-oriented tests are of broad and current interest. A field called didactometry is developed, which deals with the development and implementation of didactic tests.

Conclusion

The assessment and evaluation of learners' knowledge and skills are topics of discussion in today's pedagogical theory and practice, which are becoming more and more important. A determination has been made to develop and use new methods and forms, as well as to improve the existing verification and evaluation system by developing objective indicators and criteria for establishing the level of preparation and development. In order to achieve greater objectivity in the evaluation and realization of its main functions, it is advisable to thoroughly consider the combination of using different methods - traditional and non-traditional.

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RETROSPECTION AND CONTEMPORARY STATE OF PEDAGOGICAL CONTROL

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ABSTRACT. The high relevance of the subject is theoretically grounded. The historical aspects of the development of pedagogical control are discussed and its structure and content are described from the different points of view. The types of control in the learning process are analyzed as preliminary, current, thematic, intermediate, final, and detailed classification is made. The functions, the principles and psychological-pedagogical aspects are listed. The traditional methods and innovative tendencies for control in modern education are described.

Keywords: pedagogical control, control functions, principles of control, evaluation, evaluation, test, portfolio

РЕТРОСПЕКЦИЯ И СЪВРЕМЕННО СЪСТОЯНИЕ НА ПЕДАГОГИЧЕСКИЯ КОНТРОЛ

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РЕЗЮМЕ. Актуалността на дадената тема е теоретично обоснована. Разгледани са исторически аспекти на развитие на педагогическия контрол. Неговата структура и съдържание са описани съгласно различни гледни точки. Видовете контрол в учебния процес са анализирани като предварителен, текущ, тематичен, междинен, окончателен, заключителен и е направена подробна класификация. Изброени са функциите, принципите и психолого-педагогичните аспекти. Посочени са традиционните средства и иновационни тенденции за контрол в съвременното образование.

Ключови думи: педагогически контрол, функции на контрола, принципи на контрола, оценяване, оценки, тест, портфолио

Introduction

Pedagogical diagnostics is a trend, directed towards the quality of education. It presents a main component in the monitoring, which is a standardized way for data collection, processing, analysis and interpretation in an attempt to obtain true information for the conformity between the process and the result of the education, according to the normative requirements. Each study-session always requires the necessity for determining the result from the involved effort. This process has been used for ages of pedagogical control together with methods, which according to today's belief are doctrinal. Only in the last couple of centuries, scientifically-controlled methods have been incorporated. By its nature, pedagogical diagnostics involves independence. It has adopted its methods more or less from the psychological diagnostics. The pedagogical diagnostics today tends to be more actively discussed and questioned than a settled scientific study, therefore, it shall not come as a surprise that there are a number of different definitions for the education's diagnostics, i.e. the consequences and the achieved results. In the diagnostics, wider and deeper meaning has been incorporated, than in the traditional means for checks and balances of the education. The checking process only determines the results, but it does not explain their source. The diagnostics, on the other hand, is looking at the results in terms of the path, the means for their achievement, it determines the

tendencies, the dynamics for the creation of the final educational product. The diagnostics involves control, checks, examination, data collection, analysis, dynamics' identification, tendencies, foreseeing the development of the events. In this way, the pedagogical diagnostics is directed towards optimizing the process of individual education, also to provide the rightful determination of the results and to lead to minimum errors in the process of moving from low to a higher level of education.

Pedagogical control

The control in the educational system is used to determine how this very same system achieves its means - common ones, related to the quality of education and the preparation of the learners according to educational levels and subjects. It is also directed towards the efficiency of the work of those subjects (namely teachers, students, and other managerial positions). The main object of control and assessment is the level of efficiency of preparation and education of the students, also how well proposed standards have been achieved in the process of preparation in terms of their capabilities, of the Bulgarian traditions and world achievements and how well the engaged with education people and institutions perform their functions and responsibilities. The pedagogical control is a specialized control over the whole educational-raising process,

being used in the educational system. Its nature consists of regular collection of information for the behaviour of the system, in terms of taking effective managerial decisions for its functioning and development. The control as an educational mean is performed not like a check of the qualities for the learned from the education, but like reaching and performing active track of the infallible bit of their studying habits. The control is also a mean for getting information for the quality of the educational process. The control of the pedagogue is directed to the performances of the student, also to the level of interaction between the student and the pedagogue. Essential role plays the mechanism of control, which performs the following functions: *nurture, education and control* (Hrusanov, 1976; Draganov etc., 1981), *orientation, education, control, management, diagnostics, development, nurture* (Krivoshapova, Silutina, 1981); *gnoseology, deduction, control-awareness, nurture, diagnostics and prognosis, regulation, selection and stimulation* (Andreev, 1987) and others such as *management, informative, simulative, emotional and social functions*. The main idea behind the control function is the establishment of a reverse relation (out: student – teacher and in: student – student), but also assessment of the results of the control. It has the following stages of fulfillment: 1. Evaluation of the goals, criteria, and figures, according to which the measurement is performed; 2. Information collection and its application for determining the factual state of the controlled event, process or result; 3. Comparing of the two present states – the planned and the reality; 4. Evaluating and assessment of the similarities and differences between the two; 5. Discovering the reasons for deteriorations (Radev, 1996). *The educational function* of the control consists of perfection of the knowledge and skills, and on their systematization. In the process of checking, the learners are repeating and they learn the learned material. They not only re-create the learned from before, but they acquire knowledge and skills in a new situation. The control helps for separating the main, the core knowledge and to systemize the whole. The educational function forms motivation for successful action, true criteria for self-control and self-assessment, stimulate new ideas, experience, contemporary technology and approaches. *Diagnostics function* - getting information for: errors, disadvantages and missing details in the knowledge and skills of the learners; the emerging reasons, preventing them from learning the material; the number and character of the errors. The results of the diagnostics control help in the choice of the most efficient and intense methodology of education, also for determining the directions for future improvement of the content of methods and means for education. *The prognosis function* of the control helps in receiving of bypass information for the educational process. As a result of the control check, reasons for the prognosis of a certain stage of the educational process is being attained. The results of the prognosis are used to create a model for future behavior of the learner, who made mistakes of a certain type or has missed some details in his studying history. The prognosis helps to make right conclusions for future planning of an educational process. *The developing function* of control consists of stimulating the educational curiosity of the learner for the achievement of their creative skills. During the process of control, the speech, the memory, the attention, the imagination, the persistence and the thinking of the learners are developing,

motives and skills for application of the learned material are being developed. The control plays an important role in the development and emergence of such qualities of the person, such as ability, tendency, interests and necessities. *The orientation function* – getting information for achievement of the goals of education for everyone – how much it has been consumed and in what stage the learned material has been studied. The control informs the learners about their difficulties and achievements. *The educational function* of control consists of developing a responsible behaviour towards the education, the discipline, the accuracy, the honesty and the taken responsibilities. The check-control forms consistency and asks for more serious behaviour, for more regular self-control towards the achievement of the set goals. It emerges as a requisite for the will, persistency and learning habits and desire for self-control. *The regulative function* relates to making the relevant decisions for future action of the control system, incorporating corrections for the removal of the weaknesses and deteriorations, through project-planning and optimization of a stability in the system. *The emotional function* relates to the fact that each type of mark creates a certain emotional reaction in the assessed person. The main idea is that the learners are meant to not only interpret for themselves the learned, but to feel it, cognitive and behavioral reactions, which develop their competencies. In fact, the mark could inspire, could direct for getting over the difficulties, support, but it could hurt, form low personal self-assessment, ruin the contact with others. The realization of this important function in the control-check of the results of the education consists of the idea that the emotional reaction of the teacher has to correlate to the emotional reaction of the learner. The situation of success, and social welfare are prerequisites for easy acceptance of the mark, and common analysis of the errors and mistakes, which need to be removed. *The social function* relates to the requirements of the society towards the level of preparation of the learner. In the pedagogical literature a common approach on the period for tracking the information for the results of the educational activities does not exist. The analysis of the different views leads to the conclusion that the control has to be performed regularly and to be based on diagnostic level, which would increase its effectiveness.

The above functions of control set a variety of requirements for it, such as *purposefulness, diversity, individualism, systematization* and a *motivated character*. *The purposefulness* determines the set goals, priorities and tasks, which the controlled subject sets for himself, i.e. related to the questions of *why, what* and *how* it is going to be controlled. The goals of the pedagogical control are directed at determining the condition and results of the educational process, the efforts of the teachers, those of the students and of the educational system as a whole. Each controlled subject sets the goals for its controlled activities in terms of the priorities of the educational system, which it manages. The structure of the controlled activity is set in terms of the position and responsibilities of the controlled subjects through the whole hierarchy of the educational system. *The diversity* is a requirement which supposes realization of control over the content, the format, the depth, the freedom and the independence of the exposition. *The individualism* not only provides a personal assessment of each of the controlled

subjects, but its individual explanation and its individual categorization. *The systematization* supposes a regular control with clear stages, which would motivate for individual work. *The motivated character* maintains the moving forward, each effort and hard work.

In the literature, there are many and different meanings to the nature of the control. This unequivocal aspect is provoked by its different dimensions. According to U. Balabanski in a wide meaning, the control means a principle of a reverse effect, typical for self-regulative systems. The control over the educational system provides for external reverse relation (control, executed by the teacher) and internal reverse relation (self-control of the student). The control is a main part of the education process, organically related to the studied material, its learning, its application, the habits and skills related to it (Balabanskii, 1989). E. Bozhovic believes that the control is orientated mainly towards the knowledge, the skills, and the habits and is effective only when it is related to the diagnosis of the reasons for mistakes and difficulties of the students. In force is the line control-diagnostics – correction of the educational work of the students (Bozhovic, 1979). V. Voronov looks at the control as a main component of the process of education, meant to determine the level of achievement of the goals, to determine the level of knowledge and the skills, including the ability to resolve issues, to do practical tasks. The control needs to show the level of development of the students, the formation of established individual qualities. The latter is a difficult task, as the main important role of the control is to check and assess the knowledge (Voronov, 1999). I. Gac. defines the control as discovering, measuring and assessing the knowledge and skills of the students. Its main component is the check (Gac, 2003). The word check means activity, having in mind to clarify something, to certify its rightfulness and wrongfulness, i.e. to clarify, to certify with the help of specific means. The check of the knowledge and skills, helps to provisionally establish the actual and final condition of their volume and quality. This process does not necessarily need to end with a mark, but it proposes for one, under the form of a feedback. For the check, there are different principles which present: immediacy, volunteering, obligation, going public, discreet, openness and so on. They can be chosen selectively according to the specific need. Other authors accept the pedagogical control as a common didactical and methodical system of a controlled activity, which is done under the supervision of a pedagogue, which brings a strong character, connecting the pedagogue and the student and is directed to the marking of the results of the educational process (Zvonikov, Chelioshkova, 2007). L. Kruisin and S. Ojegov build up on the check with supervision over the check (Kruisin, 2006; Ojegov, 1999). V. Migala and E. Migala maintain this view and extend it as a process, guaranteeing achievement of a set goal (determining the criteria, measurement of results and making corrections if differences occur (V. Migala, E. Migala, 2003). The point of view of certain authors in terms of the nature of the control, defines control as a matter to be compared to the planned result with some requirements and standards. M. Kasyanenko believes that the control in the pedagogical matter includes not only the assessment of the condition of the process in relation to the normative background, but also its recommendations, correction of the process, support for the

teacher and the student (Kasyanenko, 1986). To a certain degree, a plausible definition is the one given by M. Chelioshkova: The control is both an object of theoretical examination and a ground for practical activity of the pedagogue. With its help, the advantages and disadvantages of its methodology can be discovered, the relation between the works of different pedagogues can be compared, the achievements of the different students can be marked, the missing bits of their education discovered and thus to be able to give the necessary information to the person in charge for taking some policy measures (M. Chelioshkova, 2001).

The principles of control are: objectiveness, systematization, neatness, clarity, wideness, complexity, differentiation, counting the aging and individual characteristics, democracy; humanism; applying different kinds of approaches and methods of control; educational character etc. The objectiveness is related to the scientific explanation of the content of the diagnostics' tests (tasks, questions), diagnostics' procedures, precise and clear criteria for marking of the knowledge and skills. The practical objectiveness means, that the established marks are independent from the methods and means for control and from the pedagogues, doing the diagnostics. The principle systematization consists of the necessity of performing a diagnostics control on each stage of the didactical process – from the adoption of knowledge to its practical application. The systematization means that all students get under regular diagnostics from the first to the last day of their education. This principle requires a complex approach for doing the diagnostics, under which the different forms, methods and means of control are used interchangeably, following the same goal. This kind of approach excludes the universality of the different methods and means for diagnostics. The neatness principle consists of doing open exams with all of the students under the same criteria. The rate of each student, established in the process of diagnostics brings neat, comparable character. This principle also requires publicity and motivate for a mark. The mark - this is a norm, according to which the students get to know what is required from them and also for the objectivity of the pedagogue. For the process of didactical control to be effective, it is necessary to organize the controlling-marking activities in order to achieve not individual principles, but their conformity.

Common classification of the types of control could be made according to: the timing in terms of place norm in doing the education: provisional (ingoing), current, periodical (based on a theme), conclusive (final) and outgoing; the rhythm (the repetition): one-time, periodical and constant; quantity of the students: individual, as group, front and as masses; character of the sanctions: formal (regulated by legal norms) and informal, which most of the times leads to spontaneous reaction against the controlling subject, showing its position to the subject and the result from the control-check – approval; teasing; irony, decline to give a feedback etc.; the way of execution: oral, written, practical and as a combination; in terms of who does the control for the result of the work of the students: external, mutual and self-control. The external is done by the teacher over the work of the student. The mutual is done by a student over the work of another student. The

self-control is entirely based on independent work. The provisional control is needed to receive information about the outgoing level of knowledge of the student in a previous course of education and before studying a new subject. The results from such a control need to be used for adaptation of the educational material according to the necessities of the different students. Current control is performed in the everyday educational work and it consists of systematic supervision over the scientific-education knowledge. The information received from such supervision helps to plan and organize rational methods and means for consecutive educational purposes. The control based on themes aims at assessing the knowledge and skills of the students from several weeks of studying. The goal is to determine to what level the students get to know the system of knowledge and skills and to what extent they manage to cover the common requirements of the system. The periodical control as a rule is done after studying logical conclusive parts of the educational process – themes, sub-themes, unfinished themes or a full course of study. The student learns to think logically, to synthesize and to analyze it. In this kind of control, additional time is provided for preparation and an opportunity becomes available to re-sit an exam for a better mark. In giving the final marks, the teacher takes into account not the average marks for the year, but the final marks given to a certain topic, which null the previous lower marks, with which the objectivity of the control increases. An opportunity arises to get higher marks. To finalize the marks and deepening the knowledge become a motivation for the students, reflecting in their desires and interests towards the studying process. It is necessary to note, that the control based on themes is occasionally called a periodical. The medial control is done through a control-check of the educational achievements of each student before going into the next part of its education, in which it is impossible to not know the previous material. The final control, these are exams over the whole course of education. This control is usually done in the end of the studied discipline and it establishes the ability of the student for a further education. The outgoing control visualizes matriculation in school or thesis/diploma writing in university.

For the pedagogue, this question is important: How to control? The means for pedagogical control can be reviewed under different viewing points: methods (traditional and non-traditional); character (subjective, objective); using of technical means (through machines or automatic); forms (oral or written); periodical (provisional, starting, finishing, current, final, conclusive); masses (individual, front, or as a group); controlling face (teacher, student-student, self-control); with didactical material (self-study book, tests, tickets, controlling programmes; over the basis of a known worked and studied material; over the basis of a new material. For control of the knowledge, skills, habits and competencies from a psychological point of view is advisable for the teacher to use several methods of control. For the effective functioning of the controlled system, it is necessary to look at several restrictive conditions: objectiveness, i.e. there needs to be common criteria for marking in all of the teachers and this criteria needs to be clear beforehand for students; publicity, so that each interested person can analyze the results and to make the relevant conclusions; immunity – the mark, given by the

teacher needs not to be questioned from neither of the sides. In the school practice there are several traditional forms of control over the knowledge and skills of the students: 1. short independent work 2. Short independence written work; laboratory work, oral exam, traditional oral exam in front of the board. The short independent work 1 is a form of written control of the knowledge and skills of the students. This is a list of questions, to which the students need to give short and immediate answers. The time for each answer is strictly regulated, therefore the formulation of the questions needs to be precise and requiring unequivocal answers. Exactly the need for short answers is what it distinguish it from the other forms of control. With its help a restrictive area of knowledge can be checked and not the skills which the students should have been acquired. In this way, the quickness of performance can be seen both as an advantage and disadvantage, as it restricts the area of control. Even though, this area of control could be applicable together with other forms of control. Short independence work 2 is a form of written control under which students receive a quantity of questions aiming at getting a fully-explained answers. In terms of questions, there could be both theoretical and other types of questions (qualitative, quantitative, graphical, and experimental). This independent work is quite more time-consuming than the previous one, and the quantity of questions can be no more than three. It is possible that the written work consists of only one task. The form of written controlled work is the most common practice in teaching. The number of variations of the controlled work is a discussed topic. At school, one can come across from two to eight types, as the teacher is trying to ensure as much independence as possible for each student. Increasing the number of variations leads to increasing the time needed for the teacher to mark the works, also difficulties arise as to create variations with the same level of difficulties. It is appropriate the efforts to be directed towards improving the students' preparations and decreasing the number of variations. As to the tasks, included in the written controlled work, they need the following rules: the tasks, included in the written works can be with different level of difficulty, this allows the teacher to determine how well the student has learned the taught material, and if not, whether the student has the minimum knowledge for the same content; tasks can also involve issues of increased complexity, not necessarily for implementation, but also for solving them, students receive an additional good grade and the teacher - the opportunity to reveal the knowledge and skills of the students that do not meet the requirements of the program; In the composition of the control work are included not only computational tasks but also qualitative, requiring, for example, graphical description of the processes or analysis of the event in a possible situation. The laboratory control is a complex enough form of control that requires learners not only to have knowledge but also to apply this knowledge to new situations, wits, and awareness. Laboratory work provokes the cognitive activity of learners, because from working with a pen and a notebook it goes to working with real objects. Then the tasks are carried out with greater desire and enthusiasm. Laboratory work should be combined with other forms of control, such as a short self-test or a test. Such a combination can sufficiently fully clarify the learners' knowledge and skills with minimal waste of time and also take away the difficulty of long written speeches. The

traditional oral examination before the blackboard is organized differently depending on its purpose and the content of the material to be checked. Among the targeted verification mechanisms can be listed: to verify the fulfillment of the home assignment, to clarify the students' readiness to study new material, to check the level of understanding and learning of new knowledge. Depending on the content, it is based on pre-scientific study material. The methodology of the oral examination includes two main parts: the compilation of verification questions and their assignment; the learner's answer to the questions asked. The compilation of verification questions and tasks is an important element of the oral test. The quality of the questions is determined by their content, the nature of the learner's mental actions in answering the questions, and the verbal formulation. When composing the questions, it is always a matter of checking that knowledge that is fundamental in a given course or is being learned relatively hard by the learner or which is necessary for the successful use of further sections and course themes. Oral verification is considered effective if it is aimed at clarifying the meaningfulness and perceptions of the knowledge and awareness of their uses if it stimulates the autonomy and creativity of learners. The quality of the questions is determined by the nature of the mental actions that learners perform in answering the question. That is why, questions of memory, thought (comparison, proof, summary) and speech are given among the assignments. The quality of the oral examination depends on the selection, the sequence and the formulation of the question. The second component of the oral examination is the answer to the questions. The literature provides two conditions for qualitative clarification of the knowledge of the tests: lack of stressors of any nature (the teacher and others comment on the answers at the end); Creating an environment that provides the best work of his intellectual powers. An interruption is only allowed if it does not matter, but deviates from the subject. When evaluating the response, attention is paid to the correctness and completeness, the sequence of the presentation, the quality of the speech. According to J. Babanski (Babanski, 1983) the forms of control are: frontal, group, individual, combined, mutual control and self-control. The frontal form of organization of control consists of asking different questions from the teacher on a relatively small volume of material. Very often it takes a lively talk. The drawback of this form of control lies in the fact that it is difficult to ensure the circumstance and versatility of the verification of each individual. The purpose of the group form of organization of control is the verification of completed training or part of the course of its performance by learners. A separate group participates in solving the questions asked, but at the same time other students are also being asked to discuss. The individual form of control is used to detail the knowledge, skills and habits of an individual learner. The individual control draws attention to the factual and conscious nature of the answer, the logic of the judgments, the evidence, the ability to use learned knowledge. The combined form of control combines individual, frontal and group control. This form makes it possible to basically check several learners for a comparatively small amount of time. Its disadvantage lies in the fact that it restricts the training function of the check, since those who perform tasks independently do not take part in the frontal work with everyone and their results are checked

by the teacher after the hour. When all forms of control (except self-control) take place, it is necessary to observe two basic principles of formation of the groups, namely the principle of free formation (at the request of learners) and the principle of formation of groups organized by the lecturer.

Modern trends in pedagogical control are eclectic in nature and are characterized by reconciliation of traditional media with new multimedia and internet technologies without adequate analysis of didactic, technological and psychological problems. Some of the so-called new means of control and evaluation are: the different types of tests; Portfolio; Design and protection of a project; Developing and presenting a presentation; Exam with posters, charts, charts and patterns; Exam with open book, idea analysis, proof of thesis, rejection of thesis; Exam with interactive board; Mutual evaluation; Self-assessment, etc. The intensive development of new computing technologies enables automation of the process of current and final control based on various software tools used. Frequently, control programs are combined with training programs, using dialogue between the teacher and learners to check and adjust the learning activities with the help of additional information that provides for identified learning gaps in learners' knowledge. Modern knowledge control and assessment systems typically have an easy-to-use interface, support various forms of verifying tasks, and allow scenario control, text, static and animated images, sound, video, and so on. By giving preference to innovation, it is always necessary to seek out different grades of learning outcomes and to understand the applicability of novelties. For example, information obtained through automated control means must necessarily be backed up by additional data on memory, imagination, thinking, and speech. Computer skills, communicative abilities, etc. should be taken into account.

Conclusion

The retrospection and analysis of the current state of pedagogical control indicate that it is of particular importance for the management of education. As a primary tool for providing immediate, purposeful, timely, objective feedback, control helps to make sound and successful management decisions at all levels. Improving its quality and effectiveness is linked to the precise definition of its objectives, strategies, priorities and technologies. At this stage, they should aim at raising the level of learning activity and its outcomes in order to overcome formalism and support pedagogical activities. Education control should give a true assessment of its outcomes, highlight good practices and stimulate them, sanction poor work, because effective control is synonymous with successful governance.

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