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de Ciencias Económicas y Financieras*

University in Modern Society:  
Belarusian State University in the Country  
and in the World

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Económicas y Financieras

# University in Modern Society: Belarusian State University in the Country and in the World

Discurso de ingreso en la Real Academia de Ciencias Económicas y Financieras  
como Académico Correspondiente para Bielorrusia, leído el 16 de mayo de 2016,  
por

ILMO. SR. DR. SERGEY V. ABLAMEYKO

*Laudatio* y Discurso de contestación por el Académico de Número

EXCMO. SR. DR. LORENZO GASCÓN

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## **1. Introduction**

In Belarus higher education plays a significant role in society and the national innovation system. Like other countries with a developed system of higher education, the country is working out its own quality assurance policy.

A lot of Belarusian higher education institutions have been transformed into universities lately. Basically, University is called upon to be a center of education, science and culture in its country and region. A lot of universities have been successfully fulfilling their important role in the countries. Since the introduction of fee-based education in Belarusian universities in the 1990s they have considerably expanded and become large scientific and educational complexes where thousands of employees and students work and study.

It is also worth noting that universities keep on changing rapidly as they face globalization influence, innovative economy challenges, increasing consumers' demands of educational services and market requirements.

It is clear that under these conditions the task of efficient management of modern university is considered both very important and complicated. Unfortunately, there are no off-the-shelf time-tested models of university management in rapidly changing conditions. This fact makes the administrative behaviour an object of sophisticated social experimenting combined with continuous analytical work and monitoring of basic and auxiliary processes.

Therefore, it was decided to share our experience of governing the Belarusian State University (BSU). The BSU is known to be a large educational, research and

production complex which includes 20 faculties and 30 legal entities. Annually more than 40000 students study and the BSU staff is about 10000 people. There are more than 100 buildings in the University. The BSU is one of the largest universities on the territory of CIS and Eastern Europe.

In spite of its complicated structure the BSU staff work efficiently and it has been gaining recognition in the world scientific and educational environment from year to year, which is confirmed by the increasing world ranking of the BSU.

An attempt was made to represent all the BSU multifaceted activities and its effectiveness, to analyze organization of the educational process, research, innovation and production activities, students' extra-curriculum activities, international cooperation and assessment of the world University ratings, creation of modern information and communication environment.

Versatile work of the University managers aimed at turning separate independent sides and processes of the University life into a well-organized system of the integral scientific, educational and production complex was described. Based on the best domestic and world experience, this complex is capable of performing the role of the leading higher education institution in the country in accordance with the University Mission and Policy.

The system of the BSU management is largely determined by its tactical and strategic objectives and is aimed to:

- optimize the educational process extensively, using the information and communication technologies;
- enlarge the funds of e-library with academic literature;
- introduce training students new professions and specializations, meeting the demands of the labour market;
- further develop the Master's Course, including teaching in English including;

- improve the efficiency of PhD courses, Doctorate and other kinds of further education for adults, in-service training and retraining of specialists included;
- promote scientific and technical products to the domestic and global markets;
- develop new productions and products.

The two vectors, *internal* and *external*, are strategic for the BSU development.

The internal vector is intended to intensify and enhance all aspects of the BSU life, to develop and harmonize the intra-university links, to efficiently use the University resources.

The external vector demonstrates the position of the University in the global scientific and educational environment, including the participation in ratings; further develops the relations with domestic and foreign partners; expands export of educational services and high-tech technical products.

The current education environment poses new challenges. In this aspect the creation of the University management system requires university updating the existing control theories and the comparative analysis of the effectiveness of their application taking into account a specific character of the University. As scientific and applied investigations are in their early stage of development and higher education institutions management is poorly studied, the necessity for determining the key principles of its management is dictated by the ever-increasing role of higher education institutions in providing sustainable development of the society. Four basic approaches to the University management theory and practice were formulated:

- approach of differentiating various management schools: a) science management; b) administrative management, c) psychology and human relations management, d) science of management;

- process approach, according to which management has a number of inter-related functions: planning, organization, motivation, control and linking processes – communication and taking decisions;
- system approach, considering an organization as a whole complex of inter-dependent elements, such as people, structures, tasks and technologies that are focused on achieving various objectives in a rapidly changing environment;
- situational approach, implying the rejection of the existence of universal management means and methods, based on the present-day situation which is always unique in its content.

To assess the validity of the above approaches it is necessary to conduct a comprehensive analysis of the state-of-art of the BSU management system.

Modern university has two aims. Firstly, it contributes to the transfer of cultural values and knowledge from generation to generation, thereby ensuring cultural continuity and the existence of community as an integral entity and promoting the process of socio-cultural development. Secondly university not only transfers previously accumulated knowledge and cultural values for new generations, but it creates new knowledge. The whole University staff implement both objectives.

The University authorities, its staff and students are of unanimous opinion that only joint efforts of the whole BSU can significantly increase the efficiency of its functioning and developing, and, as a consequence, take a respectable position in the global scientific and educational environment.

We also consider that the BSU experience will be useful for many universities and their staff working in the field of higher education.

## **2. Main functions of modern university**

Modern university performs numerous tasks. It exercises its potential which is based on the best domestic and world experience in order to comply with the intellectual, cultural and social demands and interests of the individual, society and state and to facilitate sustainable development of a country. The university strategy is based on creative cooperation of the academic staff and students and aimed at:

- performing educational, research and innovation programmes;
- forming auspicious conditions for development of intellectual and creative potential of individuals;
- cherishing and upholding the best traditions of university classical education;
- securing a proper place in the world educational environment.

### **2.1. BSU strategic objectives**

The strategic aim of the BSU development is the maximum use of the educational, scientific, intellectual and cultural resources of the University based on the best national and international experience. This development is focused on meeting the entire spectrum of demands and interests of both an individual and the state. It will make an important contribution to:

- strengthening the role of the BSU as a national center for the integration of education, science and industry;
- developing the Belarusian intellectual, philosophical and cultural heritage;
- integrating education, science and production;
- strengthening the links with the labour market and employers;

- bringing the system of training specialists with higher education and highly qualified scientific staff up to international standards;
- providing equal access to the university education for the Belarusian youth from all regions of the country;
- integrating the BSU into the European higher education environment;
- BSU growing into one of leading European universities;
- raising the authority and competitiveness of the University in the international scientific educational environment.

## 2.2. BSU priorities

For the next five-year period the University sets the following development priorities in its activities:

- improving the content and technologies, updating educational and didactic resources to support the innovative educational process focused on the national economy needs;
- reaching a high level of research, improving and deepening the integration of the educational process with fundamental research through system interaction with academic and industrial sectors of science and innovative production; training highly qualified scientific staff; involving talented youth in research and project activities;
- implementing the staff policy aimed at perfecting personnel's skills and involving talented youth in scientific and pedagogical activities;
- enhancing the interaction between the University and employers, creating an integrated information scientific and educational environment of the University and its partners;

- increasing significantly the University extrabudgetary income and gaining profit, as one of the sources of financing innovative scientific and educational activities, raising salary;
- maintaining and developing traditions and values of the University, creating the potential of the educational and socio-cultural environment, fostering students' tolerance, civic and patriotic consciousness;
- improving the University management through the maintenance of the quality management system, continuous analysis of its effectiveness and disparities, control, timely adoption of corrective and preventive measures;
- establishing information and communication policies of the University as an integrated complex and a leading education institution in the national educational system of Belarus; harmonizing the information and communication flows in the University, providing feedback and establishing two-way communication in all areas of information interaction;
- expanding international cooperation, extending international contacts in the field of education, research and production activities, full integration into the European higher education environment based on the principles of the Bologna agreement;
- increasing the BSU rating, developing academic mobility, ensuring the export growth of educational services, scientific and technical products.

To achieve these goals it is necessary to solve the following tasks.

***In the educational process:***

- to improve the quality of training personnel for the state priority activities in the fields of natural, social and economic sciences, the Humanities, technology and education;

- in the field of to arrange in-service training for the teaching staff in the field of innovations, computer technologies and e-learning resources;
- to develop new educational programmes focused on training students in such areas as energy saving technologies; alternative energy sources; information technology, biotechnology and nanotechnology, pharmaceutical technology, new materials technologies, space technologies, information protection, security and sustainable development, etc;
- to develop and implement innovative curricula, electronic teaching materials, educational standards of a new generation; to modernize training resources; to optimize the ratio of classroom and distance learning; to strengthen the role of students' self-study training; to improve the educational process, its main characteristics being variability, nonlinearity, modular design and a student- centered approach to mastering professional competence;
- to improve the system of lifelong learning which is susceptible to the current labour market requirements (retraining and advanced training, the system of post-graduate training and further education);
- to develop a business education system aimed at preparing trainees for entrepreneurship;
- to create educational programmes in foreign languages for the first and second levels of higher education;
- to improve vocational guidance for young people, the system of pre-university education using distance technologies ;
- to enhance the prestige and competitiveness of the University on the world market of educational services;
- to adapt traditional forms of teaching to new conditions and implement new on-line learning based on the latest technological advances and current trends in the development of educational services;



- to include the University in the open education paradigm based on free access to some part of the University educational services and resources (including the use of distance learning technologies) and aimed at involving overseas students in the educational process. Open education implies widening a range of educational services and forms of education;
- to integrate the University into the European higher education area, to harmonize the University educational activities in accordance with the principles and norms of the Bologna agreement.

***In the University science:***

- to enhance the effectiveness of scientific research, creating research programmes and projects for high-tech industries;
- to enhance the efficiency of the participation of the BSU educational, scientific and production complex in the innovation processes in the economy and socio-cultural sphere of the Belarusian society;
- to predominantly develop research projects of high priority;
- to develop scientific cooperation, to implement joint research with the National Academy of Sciences, and other research, production and educational institutions within the country and abroad;
- to develop structures for technology transfer, to interact with the real innovative economy, business and investors;
- to enhance the system of PhD courses and Doctorate;
- to increase the share of research carried out by young scientists;
- to involve students in research projects of the University.

***In the field of innovative production:***

- to increase the investment attractiveness of the University enterprises and their role as centers for implementing innovative research and production

educational programs of the country's socio-economic sphere priority development;

- to create conditions for converting research results into market products; to form and develop a business culture system (business initiatives expertise, business training forms development, organization of a support system in developing and implementing market products and processes);
- to establish an information platform for innovative technologies (interaction between businesses and the BSU educational, scientific-industrial and production complex);
- to implement marketing of intellectual property;
- to develop economically efficient system of selling intellectual products and services of the university research activities.

***In the field of education and ideological work:***

- to improve scientific and methodological and personnel resources for ideological and educational work;
- to expand the information support network, to promote educational, research, innovative and other activities of the University;
- to provide organizational and methodological, logistical and technical support to youth organizations and the BSU student government; students' research, initiatives and projects aimed at promoting active citizenship, patriotism, student's legal, political and information culture;
- to form students' motivation and a value-based approach to physical training, a healthy lifestyle, physical self-improvement and self-education;
- to develop forms and methods of leisure, club and artistic activities, to support youth subculture.

***In the University management:***

- to implement the BSU Mission and Policy;
- to elaborate measures so as to improve the University management mechanism based on the implementation and development of an integrated information system of the University management (the management system interaction coordination and its effectiveness monitoring; information and analytical support in decision-making; optimization of the strategic, tactical and operational planning system);
- to rationally use the University resources and potential for effective functioning of all divisions of the educational, scientific and production complex;
- to develop resource self-sufficiency, to expand off-budgetary activities;
- to optimize the organizational and management structure, to develop economic mechanisms for improving the University complex activity;
- to computerize and automate the University management system through the development of an integrated software package of controlling methods;
- to build the University systematic information and communication policy; to harmonize the University information and communication flows, to provide feedback and two-way communication in all areas of information interaction.



### **3. Education**

#### **3.1. Quality of education - a key target for the university**

Education is one of the most important factors of the sustainable society development, competitiveness and national security of the state. The quality of education has become a fundamental category of the state national policy in all countries, the main priority in the international educational policy.

Current elaboration of a comprehensive strategy for the university development requires a profound analysis of the processes taking place in the higher education system, both at the national and international levels. In 1995, UNESCO adopted the policy paper “Change and development in higher education”. “It stated that” the responses of higher education to the changing world should be guided by three slogans which determine its local, national and international standing and functioning:

- relevance,
- quality,
- internationalization [1, p. 6 ].

The paper treated the notion of quality in higher education as “a multidimensional concept embracing all its main functions and activities: quality of teaching, training and research, the quality of its staff and programmes, and quality of learning as a corollary of teaching and research [1, p. 35-36].

According to the UNESCO document, there are three aspects of educational activity significantly influencing the quality of higher education. First, it is the level of the academic staff qualifications, and the quality of educational programmes provided by interaction and correlation of teaching and research. Second, in view of mass higher education the quality of students’ training can only be achieved through diversification of curricula, bridging the gap between higher and secondary education, and enhancing the role of youth vocational training and motivation. Finally, it is the quality of higher education institution facilities.

“The World Declaration on Higher Education for the 21st century” adopted by the World Conference on Higher Education, organized by UNESCO in 1998 paid special attention to the quality of education. The following definition of this concept was given: “Quality in higher education is a multidimensional concept, which should embrace all its functions, and activities: teaching and academic programmes, research and scholarships, staffing, students, buildings, facilities, equipment, services to the community and the academic environment” [2, p 26].

The World UNESCO Conference on Higher Education “New Dynamics of Higher Education and Scientific Research in the Development of Society” convened 10 years later in the summer of 2009 addressed the problem of quality again. The social role and responsibility of higher education in meeting the requirements of modern communities, in the issues of quality of specialists’ training, in the development of intercultural communications were specially marked in the final Communiqué. It is “quality assurance that is a vital function in contemporary higher education and must involve all stakeholders” [3, p.15-16].

The World Conference noted that “expanding access to higher education has become a priority in the majority of Member States and increasing the number of people in higher education is a major global trend”. However, it is “expanding access that poses challenges to the quality of higher education” [3, p.15]. Thus, the increasing number of students, recognition of the fact that higher education and the level of graduates’ competence are vitally important for economic, political and social successes of the national economy encourage higher education institutions to pay special attention to the problems of education quality.

The problems of the quality of higher education play the most important place in the Bologna process aimed at creating an all-European system of higher education. It was not until September of 1998 that the European Parliament and the European Council made recommendations to establish European cooperation in the process of enhancing the quality of higher education so that it could “be more transparent and reliable for European citizens and international students” [3]. It was then that the most essential features of the system of education quality were identified.

In 2005 the Standards and Guidelines for Quality Assurance in the European higher education environment were adopted [4; 6]. In view of the Republic of Belarus intention to join the Bologna process, a concern for the quality of education is of high priority.

The World Conference on Higher Education in 2009 pointed out that the XXI century is characteristic of integration of higher education and research [1, p. 15-16].

The activity analysis of the world leading universities revealed the following priorities:

- University polyfunctionality, its ability to provide not only knowledge transfer, but its generation as well;
- a wide range of specialties and specializations, including natural and social sciences and the Humanities;
- focus on research (especially basic research) and developments;
- availability of a well-functioning system of academic degree holders training, with special importance given to an increasing number of Master's students, PhD and doctoral students;
- focus on training on modern trends in science and high technologies;
- susceptibility to global experience and flexibility in regard to new directions of research and teaching methods;
- formation in the university a specific technical, scientific and economic environment including educational;
- integration into the international science and education system;
- an increase of educational services export.

It should be noted that in view of the third industrial revolution of the XXI century, the innovative development of our country calls for the need of specialists of a new type: initiative, sociable, adaptable to changes, possessing business communication and teamwork skills, able to acquire new knowledge.

Thus, the main objective of our University is to expand access to high-quality education in accordance with the requirements of innovative development of economy and modern needs of the society. Quality assurance applies to all aspects of University life.

### 3.2. Education quality is the BSU Mission

The BSU identified the following primary goals to be achieved:

- to enhance the content and education pack technologies of the innovative educational process aimed at meeting the national economy needs;
- to attain a new level of research, to improve and deepen the integration of the educational process with fundamental research;
- to develop programmes for improving the teaching staff expertise and their awareness of innovative ideas; as well as involving talented youth in educational activities interaction;
- to enhance the interaction between the University and prospective employers, to create an integrated research and educational environment;
- to raise the University rating, to develop academic mobility, to ensure the educational services and scientific products export growth;
- to improve the University management through the quality management system maintenance, continuous evaluation of its effectiveness [8, p. 20–21].

Currently, the University trains students in 74 specialties, and 278 specializations (the first stage of higher education) and in 71 specialties (the second



stage). They are taught at 16 Faculties and 3 educational institutions (the State Institute of Management and Social Technologies of the BSU, the Institute of Business and Technology Management of the BSU, the Institute of Theology of the BSU named after Saints Methodius and Cyril).

Innovative economy requires proper staff. Thus, the University is aimed at continuous updating educational programmes, introduction of new specialities and specializations, the use of innovative technologies in teaching. Since 2007, 20 new specialities and 20 specializations have been launched at the BSU.

In 2010, the University began training students in 2 specialities, and 11 specializations, a number of steps have also been taken to improve specialists training for scientific and industrial activities in the IT sphere. Here they mean such specialities as “Computer Science” and “Space Electronic and Information Systems and Technologies.” The curricula of these academic fields will facilitate training specialists in the sphere of software design and development in the area of hardware and software for processing and transmission of multimedia information, global navigation and telecommunication systems, airborne and ground-based information systems. These specialists are in demand for the accomplishment of the National Space Programme, as well as the implementation of new product fabrication and also for the development of new ICT.

During the years 2011-2014 the University introduced such specialities as “Microbiology”, “Biochemistry”, “Information Resources Management”, “Physics of Nanomaterials and Nanotechnologies”, “Nuclear Physics and Technology”, “Computer Mathematics and Systems Analysis”, “Mathematics and Information Technology”, “Space and Air Mapping”, “Computer Physics”, “Chemistry of High Energies”, “Fundamental Chemistry”, “Drug Compounds Chemistry”, “Applied Cryptography”, “Social Communication”, etc.

Training specialists for innovative economy is impossible without close cooperation with companies and organizations. In this respect, the University, concludes agreements on cooperation and joint ventures, creates departments subsidiaries. Agreements on the University cooperation with organizations and prospective employers, comprise joint research and developments and field practice organization as well. In 2014 36 agreements on cooperation were signed. Un-

dergraduates studying in the fields related to foreign trade activities are enrolled in practical speciality training programmes at export-oriented enterprises which are parties to relevant agreements.

In order to enhance efficiency and quality of training of highly qualified specialists, Master's, PhD students and doctoral students in modern fields of science the University forms dual subordination departments, academic and research centers.

For more rational use of unique and expensive scientific equipment, the BSU houses four shared-use centers:

- Belarusian inter-university scientific research service center;
- Research and technological shared-use center of “Nanotechnology and Physical electronics”;
- Center for shared-use of the equipment and apparatus of the Biology Faculty (“Bioanalysis”);
- Center for shared-use of the unique scientific equipment of the BSU Chemistry Faculty and Research Institute for Physical and Chemical Problems.

The university shared-use centers are equipped with unique apparatus and facilities to carry out scientific research and train highly qualified specialists. They meet modern standards of research, priority scientific and technical activities of the BSU.

Prominent scientists of the National Academy of Sciences of the Republic of Belarus, the Russian Academy of Sciences, leading experts of companies and foreign universities deliver lectures as guest-speakers. A new educational and scientific center was established on the basis of the Chemistry and Physics Faculties of the BSU, the Research Institute for Nuclear Problems of the BSU and the Joint Institute for Power and Nuclear Research of the Belarusian Academy of Sciences, to train specialists for nuclear power stations.

The Quality of education requires making changes in the syllabus. In 2013, the third generation educational standards and curricula related to them came into

effect. Shortening the first stage degree course for almost all, specialties of the Humanities and Science, including practice-oriented education, is a distinctive feature of new standards.

In 2013, the Concept of the University Informatization was adopted for the period until 2018. The main objectives of the University Informatization are the following:

- education quality improvement due to availability of learning resources and services regardless of users' location; educational processes intensification, and implementation of active learning strategies and other ICT-based teaching innovations; a large-scale use of multimedia technologies which provide visualization and information capacity of educational content; extensive integration of various informatization means including students and teachers' personal devices, into the educational process; development of students' motivation to get knowledge and be involved in continuous self-education;
- research efficiency enhancement and expansion of a fundamental and applied scientific developments range by implementing ICT throughout all stages of research, developing infrastructure to access supercomputing and grid-computing resources, national and international scientific and technical information, and by promoting the BSU scientific achievements in the world's information environment;
- administrative procedures improvement through developing electronic services which are provided by the university for legal entities and employees and implementing EDS-based e-document management [8].

The main result of all-round informatization should be the University competitiveness on the national and world educational services markets.

To meet modern society needs, the BSU takes the following steps:

- new learning technologies are implemented, including distance learning, telecommunication systems, remote universal database access;

- electronic textbooks and training programmes are developed;
- laboratories are modernized, new specialized laboratories are organized in accordance with national educational standards requirements.

The educational process aimed at increasing practical and individual work develops the following competences necessary for innovative activities:

- use of global information resources, skills to work with teaching materials and reference literature;
- experience in modern telecommunication means;
- application of analysis and innovation implementation methods;
- making contracts to carry out research and to master new technologies cooperatively;
- search, systematization and analysis of information on branch development prospects, innovation technologies, projects and solutions.

The annual analysis of final exam results allows one to study the tendencies of overall students' academic performance, to point out "weaknesses" in the educational process organization and correct them. Academic performance monitoring helps to increase students' motivation.

The data obtained suggest that at the moment establishing such an information environment, which could promote the development of students' research work and individualization of learning, enhance motivation for acquiring knowledge, and result in the formation of a personality capable of being involved in different activities, is of current interest for the University.

To create the most favourable conditions allowing one to introduce a student-centered approach to education, the rating knowledge assessment system was developed and implemented. The introduction of the rating system ensures the formation of personal needs for permanent acquiring knowledge and elaborating self-education skills.

The rating assessment system is a special type of testing implying traditional types of control (current, thematic and final), its traditional forms (checking home tasks, colloquia, tests, exams, individual assignments) are used.

New crucial features of the rating system are as follows: continuous and constant monitoring of student's academic progress, control being carried out according to strict rules agreed upon with students; the results of each control stage determine a student's personal rating.

The teaching staff of the University actively implements innovative educational technologies that proved their effectiveness: learning in cooperation, team training, project methods, case methods.

As mentioned above, the educational process is aimed at increasing both the proportion of students' individual work and the time of the teacher and student's personal contact and enforces individualization of learning. This, certainly, has a positive impact on the quality of education, but requires fundamental changes in assessing the teacher's efforts.

The Faculties use modern educational technologies: the principle of learning in cooperation and the peer-to-peer coaching method.

The Faculties carry out system work on the development of teaching and educational materials using modern information technologies. For creating electronic teaching materials both educational network platform and specialized software systems and complexes are used.

The Electronic materials developed by the Faculties are placed on their websites with remote access. Special rubrics "To the student. Training materials" were created. They comprise well-structured, educational and training materials such as:

- educational reference materials;
- educational programmes;
- materials for disciplines taught at the department;

- materials for controlled individual work;
- teachers' folders with scientific papers, lectures and other information;
- programmes of seminars and special courses.

Moreover, the electronic library started functioning, which provides:

- mass access to information resources in digital formats for different users;
- new opportunities to work with large volumes of information;
- integration of information resources of the BSU fundamental library into the world information environment.

As of January 2015 the electronic library contained 66 342 documents, 15 822 ones being educational and training materials.

In July 2013 the BSU electronic library entered the first hundred of the world's best electronic libraries, taking the 97th place in "Webometrics Ranking of World Repositories". In 2016 according to "Webometrics Ranking of World Repositories", the BSU electronic library entered the top 100 university libraries in the world (Top University).

### 3.3. Internationalization of education as a key factor of its quality

The BSU is one of the organizers of the Eurasian Association of Universities. It represents the Republic of Belarus in the University Network of the Central European Initiative, participates in the activities of the Belarusian Association of Assistance to the UNO, the European Commission and the Council of Europe and others.

The University has more than 350 cooperation agreements with educational and research institutions, international companies and organizations of 55 countries. The BSU is a member of the CIS University Network consortium. The University implements over 60 international scientific and educational projects,

including: the VII Framework Programme EC - 9; ISTC - 4; TEMPUS - 4, UNESCO - 4, ERASMUS MUNDUS - 5, SIMO - 1, DAAD - 4, NATO - 4, UNO - 2, UNDP-GEF - 2, VISBY - 2 and others.

Within the framework of international activities academic exchanges of students, postgraduates, teachers and research staff develop; joint research and educational activities are carried out. International projects in the sphere of the educational process organization and University management are implemented within EU programmes and other international educational and scientific projects.

The integration of the Belarusian higher educational system into the European educational environment poses new challenges to the development of educational services export. This is due not only to the increase of the competitiveness of Belarusian universities on the international education market, but to economic benefits, both for educational institutions and for the country's economy as a whole. Training overseas students affects the rating of the higher education institution, being one of the criteria of its effectiveness.

The strategy of modern university is the expansion of a range and types of paid educational services for overseas citizens, including the development of new curricula based on practice-oriented approach to learning, concerning programmes for higher education, life-long education and retraining.

One of the factors of the quality increase of educational services is an international accreditation of Belarusian educational programmes, which will undoubtedly bring the content and organization of the educational process closer to the world standards. The limiting factor in this process is the lack of methodological support.

The BSU is closely involved in the traditional cooperation with the Russian Federation and the CIS member states, as well as with the countries of Western and Eastern Europe. The programmes of joint training of specialists and highly qualified staff are implemented with universities- partners from China, Vietnam and Germany.

Students of Ruhr University (Bochum, Germany), University after F. Schiller (Jena, Germany), Leipzig University (Germany), University after M. Curie-Sklodowska (Lublin, Poland), the University of Lodz (Poland), Charles University (Prah, the Czech Republic), China University of international relations (Beijing, China), the University of Belgrade (Serbia), University after Chong Buk (Chendzhou, Korea) and others are trained at the BSU within the framework of exchange education.

At the same time University students get training at the BSU partner universities. Partnership with universities of the Far East, North Africa and Asia gives the opportunity to develop academic exchanges of students-orientalists, studying the Arabic, Chinese and Japanese languages (Chinese University of international relations (Beijing, China), Waseda University (Tokyo, Japan), the University of Cairo (Cairo, Egypt).

The BSU implements unique programmes of cooperation and development of academic mobility, “ERASMUS MUNDUS: EXTERNAL COOPERATION WINDOW” and “ERASMUS +”. These programmes provide a common European approach to higher education and are aimed at raising the quality and attractiveness of education. Being a member of the project, the University joined the consortium of 20 universities, 8 of them being the leading European universities (Germany, Italy, Austria, Poland, Denmark, the Czech Republic and the Netherlands) and 12 Russian universities, including M.V. Lomonosov Moscow State University and K.A. Timiryazev RGAU-ICCA. The programme allows students to master the specialties of the first and second stages of higher education, and PhD students and university staff to do practical study training abroad.

Academic mobility is performed within inter-state, inter-university and inter-department agreements, as well as within international programmes and projects. In 2014 more than 900 members of the staff went abroad on business trips for participation in conferences, seminars, exhibitions, for retraining and delivering lectures.

About 300 students received education within the framework of international programmes and agreements. University students acquire knowledge in biology and biotechnologies, economics and management, computer science and other subjects. They master foreign languages as well.



Overseas students getting education at the BSU confirms its prestige at the national and international levels. This ensures their professional readiness to work in the world economy environment. Undoubtedly, training specialists for other countries promotes geopolitical and economic interests of this country as a whole, and the BSU in particular.

Today the University is a leader in training of overseas students in the Republic of Belarus. More than 2,300 people from 53 countries, (22% of all overseas students) are trained in accordance with programmes for the pre-university education, higher education, PhD studies.

It should be noted that the level of secondary education of students from China, North Africa and Central Asian republics has significantly decreased. The lack of fundamental knowledge of natural sciences results in the loss of motivation of overseas students, and hence, expulsion from the university. It is recommended to assess overseas applicants' knowledge of both the host country language and academic disciplines. In view of the above it is necessary to reconsider the terms of overseas students' admission to the University.

### 3.4. Quality Management System

To become highly competitive, the University should pursue modern quality management strategies to comply with international standards. In March 2010, the quality management system was adopted to meet the requirements of ISO 9001 international standards. The quality management system is a major aspect of innovation and aims at the improvement of quality management in a higher education institution and of education itself. The BSU regarded the system to be a combination of organizational framework, educational strategies, procedures and resources necessary to introduce the policy of quality management.

The following requirements were stated: the system should be clear, concise, and easy-to-use so that the University could benefit in every field of its activity.

The Academic Council of the BSU formulated the Mission and Policy.

The long-term strategy goals are as follows:

- to enhance the University prestige and competitiveness on the educational services market and in the international scientific and educational environment;
- to acquire a high business reputation as a leading institution in the national system of education in the Republic of Belarus;
- to meet the needs of the individual, society and State in a wide range of basic and additional educational programmes, to provide life-long learning;
- to obtain world-class scientific results in fundamental and applied disciplines, to introduce modern competitive technologies based on new scientific developments.

Particular attention is given to the analysis of expectations and monitoring of customers' satisfaction, to the study of all interested parties requirements. The survey is conducted annually among the 1<sup>st</sup>, 2<sup>nd</sup>, 4<sup>th</sup> year students, graduates, young specialists and employers as well. Thus, almost 80% of the 4<sup>th</sup> year students and 86% of the 2<sup>nd</sup> year students are satisfied with the level of training and competence of the teaching staff. More than 65% of the 4<sup>th</sup> year students and 83% of the 2<sup>nd</sup> year students are sure they are taught what they need and the way they need.

Employers highly appreciate fundamental, theoretical, and practical knowledge of graduates, their computer, problem-solving and communication skills.

A high level of consumers satisfaction is confirmed by the annual nearly 100 percent assignment to work places of graduates trained at the expense of the State budget and the employment of those who study at their own expense. The increasing numbers of foreign students is a good tendency confirming the authority of the University as well.

The main goal of the BSU is not just to create the quality management system and to certify it but to implement and use modern management methods in order to improve the quality of education. This allows the University to offer a high-quality higher education focused on customers' demands both students and employers.

The relevance of control and quality management of specialists' training is determined by the necessity to ensure such a quality level of education which can meet all consumers' demands. High quality of education and its services is the major component of the University competitiveness.

The process of raising the education quality to the contemporary and perspective level needs management based on a system approach.

Providing the educational programmes quality, developing internationalization of education and implementing the quality management system of international standards are of crucial importance in the competitive University development.

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### 3.5. Transformations of Traditional Education: on the Way to Open Education

Modern university is a multifunctional and multilevel system which integrates the performance of numerous functions: implementing educational, scientific, production, publishing, and other activities. Modern education is developing within the framework of the world trends of globalization, informatization, rapid development of educational technologies.

The article “Open Educational Resources: Benefits, Problems and Development Prospects” by N.I. Listopad and S.Y. Mihnevich considers important achievements in the field of informatization and development of open educational resources, analyzes barriers to their widespread implementation and gives recommendations on the problems revealed, a complex approach to their solution being the development of national policies and initiatives, the State funding, the encouragement of open educational resources development and use [1].

In recent years, the phrase online pedagogy [4] is often encountered in the process of teachers’ interaction. However, at present there is no generally accepted dictionary definition as well as clear understanding of differences between online and traditional pedagogy. The Education Code of the Republic of Belarus about education refers to distance learning as a kind of part-time education. At the same time distance learning in the XXI century presupposes not only the exchange of information by post but also the use of the Internet, Learning Management Systems (LMS), interaction via sites, email, etc. Modern technologies use:

- basic time-tested materials for part-time course;
- materials adapted for use via the Internet;
- collaboration of several students working on the same project under the supervision of a teacher.

In most cases distance learning in our country is limited to sending part-time students teaching materials, the second and third options being widely used in further education of adults, retraining courses, trainings and seminars. Specially adapted resources for part-time distance learning are either not developed or are in their early stages, or are too fragmentary and do not embrace the entire education programme.

However, the methods and forms of online pedagogy can and should be used not only for part-time / distance learning but also in educating full-time students. It is due to the fact that modern students, “the generation of Wikipedia”, perceive and systematize information in a different way. Library funds are no longer regarded as the main source of information, monographs and textbooks are at best “downloaded” and stored in some directory on a favourite gadget / cloud storage and, in the worst case, are added as another tab in a browser and may never be opened any more.

A. V. Rubanov and L. A. Burchik’s research reports that “students’ interest in specific types of electronic educational resources is quite rich and diverse. They are most attracted by electronic textbooks and manuals, lecture notes and so on” [2, p. 34]. It is specified that video recordings of lectures, laboratory demonstrations and training videoclips attract students’ particular attention [2, p. 35]. Besides, the researchers rightly point out that the use of educational facilities of the Internet in the process of training presupposes their combination with traditional teaching methods. According to the survey of the students’ opinion, such forms of educational electronic communication, as on-line interaction of students with teachers and the creation of chats by academic groups are of great importance in taking a particular training course [2, p. 35].

In modern world when any sort of information is available to any person, it is enough just to ask Google. Those who studied twenty years ago, couldn’t even think of such an opportunity. But the students of “Wikipedia generation” do not realize that reading skills (which in most cases, are limited to ‘Googling’ on the Internet and browsing the first few snippets) differ fundamentally from skills necessary for working with the information received. It is necessary not only to scan information, but to make its profound analysis.

In the process of teaching it is necessary to modify clip, fragmentary perception of reality characteristic of modern schoolchildren, then to shift to the integrated knowledge system. The implementation of this complex and challenging task in a modern educational environment is impossible if traditional methods of reading and note-taking in the library are employed. It is necessary to reconsider the existing methods of teaching, to use the language of the Internet clear to students, infographics, visualization and schemes [3]. Online pedagogy opens up wide opportunities for teachers and learners' interaction. In other words, modern educational process encourages teachers to go beyond the scope of traditional training, applying the "blended learning" technology (b-learning) in addition to time-tested teaching methods.

### *3.5.1. Basic principles of online pedagogy*

The principle of maximum visualization in online pedagogy is crucial as teaching involves constant use of technical training tools (mainly computers). The use of modern technologies allows one not to be restricted to reading plain texts (as modern students experience difficulty in reading texts due to clip-thinking mentioned above), but to considerably diversify types of teaching materials.

The availability of video and text presentations, infographics and audio materials, etc. is vital for supporting the disciplines studied in the online mode because it helps students to master the material and understand a particular phenomenon [4].

The principal difference between online and in-class learning is that students are remote from a teacher and communicate with him in an asynchronous mode. It leads to narrowing the communication channel, delayed feedback, reduced students' motivation, and, ultimately, the loss of control over the learning process. Modern distance learning tools allow one to largely get over the above mentioned difficulties. The use of video lectures permits one to make up for the lack of visual contact between a student and a teacher. Video lectures with captions and graphics make it possible to facilitate the perception of the teaching material and contribute to its mastering.

Online learning tools also include special software for conducting webinars which enable any number of students to see and hear the teacher, to watch presentations, to be engaged in direct interaction with lecturers using audio and video

broadcasts by means of a student's microphone (a camera), to send text messages, visible either to lecturers or to all participants of a webinar. Students also have the opportunity to watch the entire webinar recording later. The latter option is of the utmost importance in online pedagogy, because some students may not be taking part in the webinar and also due to software and / or hardware malfunctions.

The principle of maximized interactivity is important both in online and traditional training. Software functionality of most learning management systems provides appropriate feedback. Such a mechanism can partially be realized while conducting webinars. In addition, forums allow teachers to get feedback from students and give them a chance to ask questions and receive answers, the answers being given by both the teacher and other students. Interactivity can also be implemented by various tests (training, monitoring, etc). The assessment and the teacher's comments are given straight away.

Online pedagogy also supports joint activities (collaboration) by grouping students to carry out team tasks. In this case, since the communication in groups in most learning management systems is often maintained with the help of forums, Wiki pages and task tracking features, a teacher can easily assess the contribution of each member of the group to problem-solving.

But online pedagogy, unlike traditional one, greatly reduces the motivation for learning. If a student has not done his assignment on time, as practice shows, this task will most likely be done a few hours (more often minutes) to the deadline, which is a consequence of the loss of physical control on the part of the teacher, or due to procrastination. To solve this problem it is necessary to set clear deadlines for assignments, to reduce grades for untimely fulfillment of tasks, to constantly remind students about the necessity to perform tasks, to send performance reviews on assignments, to encourage students who perform tasks on time regularly, etc.

The use of modern teaching techniques, provided by most learning management systems, helps to improve online learning, bringing it closer to traditional learning, makes the learning process more effective, facilitates access to education for those who cannot attend classes, expands learning boundaries beyond the lecture-room, as it is done in modern MOOC (Massive Open Online Courses ),

where the number of students amounts to hundreds of thousands of people learning simultaneously (Open Education).

### *3.5.2. Belarusian State University on the way to Open Education*

Transformation of traditional forms of education at the Belarusian State University is under way, online learning is actively developing (mainly in the form of blended learning (mixed training)). An increasing number of teachers attempt to use distance learning methods in their practice, create digital learning packs available by means of various learning management systems.

Two learning management systems are currently functioning in the BSU. They are “Network Education Platform E-university», which is a proprietary development of the IBA company (available at <http://euniversity.bsu.by>), and Learning Management System “Moodle” (located at <http://dl.bsu.by>), which is an open-source software developed by a consortium of higher educational institutions. Both platforms contain a considerable amount of educational materials, learning packages and teaching resources. The BSU Chemistry Faculty and the School of Business and Technology Management have considerable experience in implementing e-learning technologies in the educational process. The educational page available at <http://cdesbmt.by> is worth mentioning as well.

In view of the higher education development strategy the concept of informatization at the BSU offers several options. The first option focuses on the Internet learning, distance learning, online learning. The other alternative is aimed at improving the existing teaching system using electronic devices. Opting for the first strategy results in the BSU strengthening its virtual presence on the world market of educational services [5].

The development of modern learning tools, wide availability of the educational MOOC resources, technologization and informatization of the society, students’ having different mobile devices at their disposal practically deprive the teacher of the choice, he has to change keep up with students, otherwise he lags behind. The University could face the same problems. Without implementing and improving modern electronic tools and methods, one cannot imagine dynamic development of the University.



### *3.5.3. Transformation in action*

First of all, the transformations will concern a traditional lecture that one can hardly imagine without the multimedia presentation used for illustrating the material under study, images of complex concepts, operations, graphs.

Relevant use of ICT during seminars also improves their efficiency and promotes mastering the material. Nonetheless, random use of these technologies in education is practically useless.

The “Blended learning” format proves to have a significant potential in modern education. This format is defined as an effective and useful tool for optimizing educational interaction and intensifying the learning process, making students active participants of the process [6].

In addition, the use of the “blended learning” format has its advantages over the full-part distance learning, which does not involve direct “live” contacts. In particular, the use of “blended learning” makes up for the lack of proper computer skills as students can discuss problematic issues during individual or group consultations. Moreover, the problem of authentication of a student performing a test is eliminated, the problem of the feedback reduces significantly, since teachers possess additional means to stimulate students’ activity.

The use of webinars gives good results, which are actually a method of on-line learning, but can also be applied in “blended learning”. Depending on a type of technological platform chosen for conducting a webinar, with several hundred people being present, a teacher has the opportunity not only to speak but also to make a multimedia presentation, and students have the opportunity to comment on or ask questions both in a voice mode and using a built-in chat. The possibility to make a recording of the webinar allows the students who could not attend it to use the webinar in an off-line mode. Both teachers and students can participate in such sessions from anywhere in the world where broadband Internet access is available.

The transformation of the educational process should be of a system nature, affecting all levels of the University activities, and be entirely based on the concept of informatization, creating a complex integrated information system of the University management.

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## 4. University science

### 4.1. Scientific research at the Belarusian State University

Being the most important institution for socio-economic reproduction and development, university is at the epicenter of innovative transformations, acting as a guarantor of their content and quality. It's quite obvious that this mission accomplishment involves innovative activities of the university itself that consist, first and foremost, in organizing the educational process directly related to research activities and high-tech production. The latter implies the creation of the generative university scientific and educational environment not only susceptible to the dynamics of socio-economic processes in modern society, but also capable of exercising significant influence on this dynamics.

We believe that this innovative scientific and educational environment of modern university should be aimed at training highly qualified specialists with the expertise required for practical implementation of the tasks to be performed in different fields of activity. The successful solution of this problem is possible only on the condition that the university itself aims to create new knowledge, conduct theoretical and applied research, produce and market high-tech competitive products, students being directly involved in these processes at all levels and stages. The structure of this innovative scientific and educational environment of modern university is considered in detail in [1]. The author of this article correctly notes that “the task of independent management of the university networks in line with marketization of higher education and innovation policy is economically absolutely new and socially important”. The author believes that “knowledge gets its true social value and brings profit and a excess profit; coherent collaboration with the business sector acquires the strategic importance in terms of converting knowledge into a particular product, process, technology, and promoting cultural and social innovations.

Innovative university education is a process and a result of such academic and entrepreneurial activity which, apart from existing experience reproduction, arouses the desire of future specialists to make changes to the existing culture, so-

cial sphere and economy in order to create a new competitive product and supply it to the consumer, resulting in constant, steady improvement of life quality. This type of education focuses students' attention on the country's current problems that both a particular person and the whole society face. Innovation, as a characteristic of modern education, refers not only to the principles of its implementation, but also to its results that are important for both social and economic spheres. Therefore, the creation of an innovative education model and its implementation are a prerequisite for solving the problem of the transition of the Belarusian society to an innovation-based development model.

At present the University is faced with the challenge of overcoming the mismatch between a social need for a specialist who will work in innovation-oriented economy and the traditional training system. The needs of socio-economic development of Belarus in some cases exceed the capacity of the existing education system. The weak point is poor interaction between teachers and specialists working in the real economy; the contradiction between outdated, poorly connected to the production academic courses and new technologies used in the national economy clearly displays itself. "Rules of the game" continuously change in the real economy (e.g. technological solutions, infrastructure of the industrial sector and enterprises change), while the curriculum content and the conservative education model change rather slowly. Ideally, modern innovative higher education should leave behind the needs of the real economy, be problem-oriented and practice-oriented; it should also involve continuous professional development of the academic staff.

It is clear that our education system is designed to become part of the Belarusian innovation-based economy and society. It should be taken into account that innovative processes taking place at the university are caused by the need to respond to socio-economic development not only in Belarus but in the world, and to raise the university competitiveness in the global market. Therefore, we strive to introduce innovations in all subdivisions of the BSU educational and scientific-industrial complex. The development of the University innovative education system is connected with the expansion and deepening of the University's relationship with its partners in Belarus and abroad in different fields: science, technology production, etc. On the other hand we are interested in the increase of mobility of the educational process in the BSU and the creation

of conditions that can respond to for rapidly changing demands of the labour market.

The author of the work [2] offered a new social mechanism of innovative university management. He called it a project-oriented mechanism which is based on “a mixed financing paradigm (state, public and private) of large polyfunctional research universities”. The mechanism offered aims at “disseminating the project business principles within the university to all spheres of its activities, including the most effective educational activity in terms of financial return”.

Implementation of domestic developments at enterprises, focus of the country's economic activity on goods and services export bring the questions of staffing innovative activity to the forefront. Universities with their high personnel potential, research laboratories and facilities are capable of assuming integration and coordination functions in the innovative activity.

Currently, the BSU is a large educational, research, production and cultural complex determining the national image of the sovereign independent state in many respects. The educational training of the personnel elite of the Republic of Belarus in the fields of the Humanities and Science is carried out. Basic and applied research in the most important fields of science is conducted at high level.

The BSU occupies a leading position in the system of the scientific and educational organizations of Belarus, incorporating the faculties covering practically all vectors of contemporary natural sciences. It also includes educational and research institutes, national scientific centers and a number of hi-tech scientific and production enterprises dealing with production and marketing of the University scientific and technical products. Moreover, the BSU research and production divisions are involved in managing and marketing of their own innovative products. Coordination of the BSU complex scientific and innovative activities is implemented by administrative divisions. Innovative activity is based on a wide range of fundamental and scientific research associated with highly qualified specialists training. The University possesses all the facilities necessary for training highly qualified specialists with theoretical background and practical skills acquired at the innovative enterprises of the University.

The state recognition of the BSU competence in education is confirmed by the accreditation of the Belarusian State University by the Presidium of the National Academy of Sciences of Belarus in 2011.

Currently, there are 147 departments at 16 major Faculties, 7 interfaculty departments, 3 educational and research centres, 41 research laboratories, 5 scientific departments, 4 research institutes, 2 national and 1 republican scientific centres, a number of scientific and industrial unitary enterprises and corporate educational divisions and other structures and organizations carrying out innovative scientific and technical activities within the BSU.

The results of research conducted at the University are the basis for solving major problems in science and technology.

The BSU is actively involved in implementing state programmes at all levels.

For example, the BSU is the head executive organization of the following state scientific research programmes: “Energy Security, Energy Efficiency and Energy-saving, Nuclear Power”, “Chemical Technologies and Materials, Natural Resources Potential”, “Electronics and Photonics”, “Functional Materials and Composition Materials, Nanomaterials”, “Informatics and Space, Scientific Support for Security and Protection against Emergencies”, “Fundamentals of Biotechnology”, “Convergence”, “History, Culture, Society and the State”. The BSU is also a leading executive organization of 2 state programmes (“Granite-3”, “Innovative Biotechnology” for 2010-2012 and until 2015 year, the subprogramme “Bioenergy (Energy Resources)” and subprogramme “Low-tonnage biotechnology”, 3 state scientific and technical programmes (“Chemical Technologies and Engineering”, subprogrammes “Low-tonnage Chemistry”, “Pharmaceutical Substances and Medicine”, “Medicine”, “Standards and Scientific Instruments”, “Scientific and Training Equipment”).

#### 4.2. Research and Development at BSU

Recently, the BSU research institutes have achieved significant innovative scientific results in carrying out state programmes at various levels.

**The BSU Research Institute for Applied Physical Problems after A. N. Sevchenko** in cooperation with the open joint stock company of the rocket and space corporation “Energiya” (n.a. S. P. Korolev) manufactured external sensors of “Photon gamma” equipment for the space experiment “Molniya-gamma” aimed to study the physical nature of high-altitude discharges in the region of thunderstorm activity. This block of the external sensors was mounted on the outer surface of “Zvezda” module of the Russian segment of the International space station.

An efficient method for the synthesis of compounds, which can be effectively used to create new types of liquid crystalline materials with large optical anisotropy was developed.

The development and delivery of pulse-type power supplies for electrotechnical devices are one of the most successful and innovative projects at this Institute. In 2014 two new contracts with the Research and Testing Center for Aerospace Industry (Pereslavl, Russia) were concluded and implemented.

**The BSU Institute for Physical and Chemical Problems** developed a series of highly efficient disinfectants of a wide action spectrum for needs of agriculture, food and processing industry, such as “Valisan-K”, “Valisan-T” “Tiprodes”, “Tiprodes-Vet”, “Mirasan”. A pilot production complex for their manufacture was established at the production sites of LLC “NPK Navigator” (Grodno) and LLC “BIKRASK” (Minsk).

A method for synthesizing a new class of colloidal nanoheterostructures, which is a promising material for electro-optical devices and solar batteries, was developed.

Heat-resistant materials based on the phosphate matrix and multi-walled carbon nanotubes with boron components were developed for creating composites, providing protection against electromagnetic radiation and heat-resistant materials, operating at temperatures of 1000-1500° C. Scientific collaboration of the Institute for Physical and Chemical Problems and the Chemistry Faculty of the Belarusian State University with Chinese colleagues in the field of development

of heat-resistant materials based on phosphate binders is worth noting. Within the framework of this research in 2014 two contracts were implemented and 4 more contracts were signed with the Institute of Petrochemistry of Heilongjiang Academy of Sciences (China).

The creation of a magnetic explosion generator by the scientists of the **BSU Research Institute for Nuclear Problems** contributed to the Republic of Belarus joining the limited range of developed countries capable of conducting work in this area. Magnetic explosion generators converting chemical energy of explosion into electric energy were developed and tested. A number of contracts with Russian organizations for the development of projects specified above were signed. Within the framework of contracts in 2014 the studies of explosive-emission processes in high-current electronics were carried out.

The scientists of the **BSU Research Institute for Nuclear Problems** and the Scientific Center for High-energy Particles Physics took an active part in experiments on the search for the Higgs boson at the Large Hadron Collider at CERN at all stages of research ranging from the development of detectors to the analysis of the data obtained. These results allowed them to confirm the existence of the Higgs boson and discover a number of new fundamental physical laws.

**The BSU Research Institute for Applied Problems of Mathematics and Informatics** developed mathematical models, methods, algorithms and software spatio-temporal cluster analysis and the dynamics of disease clusters that are used to identify territories and time intervals with an increased level of thyroid cancer and leukemia among children and adolescents in the post-Chernobyl period. It enables one to monitor spatio-temporal trends of disease rate dynamics, which is essential for epidemiological studies, preventive measures and medical care volume and costs forecast. Automated multifunctional spirometers “MAS-1” are in constant demand on the Russian and Kazakhstan markets.

The University Faculties actively participate in implementing innovative research.

**The Faculty of Radiophysics and Computer Technologies** developed a multifunctional module platform-independent computer measuring complex



“Alma Meter” listed in the Register of the Republic of Belarus. It was launched in mass production and implemented in the educational process at three Republican higher education institutions. “Alma Meter” includes seven measuring modules of different types and provides a modern level of automating measurements for industrial, scientific and educational tasks.

**The Physics Faculty** staff together with specialists of the unitary enterprise “Activ BSU” continue the development and production of equipment for the laboratory practical training in physics. In 2014 the Republican Scientific and Practical Center “Darin” of the Ministry of Education and Science of the Republic of Kazakhstan was provided with original installations equipped with physical devices.

**The Chemistry Faculty** developed mesoporous titanium dioxide substrates, enabling control over the growth of living tissues due to local irradiation.

**The Biology Faculty** studied and discovered the mechanism of natural and synthetic steroid phytohormones impact on cell processes in plants. It was shown that plant hormones involved led to stimulating immune system and initiating the formation of the root system. Together with the Institute of Bioorganic Chemistry of the National Academy of Sciences the Faculty started the development of a new generation of root stimulators for forest and ornamental plants nurseries, horticultural and greenhouse units.

The technology of extraction and purification of recombinant human lactoferrin from the milk of transgenic goat-producers was developed. The laboratory experimental production site to obtain semi-preparative quantities of lactoferrin was created. Specifications and laboratory regulations for the production of food supplements and medicines on the basis of lactoferrin were developed.

Genetically modified stem cells with glucose-regulated ectopic expression of the human insulin gene were obtained, which can be a theoretical basis for the development of methods for substituent therapy of patients with diabetes mellitus.

**The Geography Faculty** developed a classifier and a technological scheme of processing remote sensing data on the land degradation dynamics. The results were aimed at implementing international obligations of the country due to joining the United Nations Convention to Combat Desertification. This classifier is used by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus in developing the National Action Programme strategy to combat land degradation.

A new applied scientific direction, environmental impact assessment (EIA) of the planned economic activity was developed. EIA results were used when customers' projects of the planned economic and other activities were examined by the State Ecological Commission.

A new technology of ecological agriculture based on the use of green fertilizers and ecologically safe use of soil resources for the Republic of Belarus was developed. It was certified according to the European Union standards.

Extensive research in the field of social sciences and the Humanities is carried out in the BSU.

**The History Faculty** completed a series of studies related to transformational changes in Belarus in the 19th and the first third of the 20th centuries, at the transition stage from traditional to industrial society. A conceptual vision of evolution of ethnic groups' folk culture traditions, social dynamics in the Belarusian society in the second half of the 19th and the early 20th centuries, the formation of the Soviet model of modernization of the Belarusian village of the 1920-1930s was created. This study allowed scientists to understand historical experience of modernization processes in Belarus, the formation of prerequisites for becoming a modern Belarusian nation, the development of state and political processes that led to creation of the Belarusian state in the 20th century.

A monumental work of a Belarusian historian and archaeologist E.M. Zagorulsky "Belaya Rus' from the middle of the first millennium to the middle of the XIII century" was published. It is devoted to the investigation of one of the most interesting periods in the history of Belarus, covering almost one thousand years.

**The Philosophy and Social Sciences Faculty** developed a theoretical model of ecological behaviour types dependence on socio-economic conditions.

**The Economics Faculty** developed assessment techniques of the state expenditures efficiency and economic security financial indicators and worked out an innovative development model of the agro-industrial complex of Belarus. This technique might increase stability of the national economy financial system and market.

**The Law Faculty** worked out a doctrine of forensic evidence structure of crime. The model developed could reflect crime development in its different phases which would help to fully the restore processes underlying the formation of traces.

**The International Relations Faculty** conducted a comprehensive analysis of the major integration associations within the CIS, as well as in Europe, Asia and Africa, identified the key aspects and specific features of their functioning at the current stage, assessed relevant factors of world politics and their influence on the foreign policy of the Republic of Belarus. To ground a mechanism of competitiveness growth of the Belarusian economy under internationalization and regional economic integration the order of improving the Republic of Belarus competitiveness was determined.

For greater awareness of the scientific community of the research, technical and innovative activities of the BSU the site: <http://research.bsu.by> was created. It reports detailed information on all fields of science and innovative activities.

In spite of the world financial crisis the institutions of the BSU Complex export scientific and technical products worth \$ 1.6 mln - 2.3 mln. The University delivers its products to 39 countries, among them are the USA, China, Great Britain, Germany, France, Israel, etc.

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## 5. Information and communication technologies at modern university: experience in design and development

When information technologies permeate all spheres of university life, education can't but undergo profound changes. Higher education becomes accessible to a growing number of people. Universities convert into educational centres allowing people to get education throughout the whole life. All these processes may evolve only on the basis of modern informatization and communications equipment.

### 5.1. Modern trends in informatization of education

Design and development of information and communication infrastructure of modern university should be based on the analysis of education informatization trends. There exist two groups of these trends. The first group includes informatization trends in education. The second group involves trends in education supported by information and communication technologies.

#### 5.1.1. Trends of education informatization.

**Distance learning (e-Learning) technologies.** These technologies appeared long ago. In the first place, they were used for training employees in large companies (corporate training), especially in the USA military sphere. Practically all systems of distance learning that were used in corporate learning and higher education had similar architecture and functions. The functions provided a classical model of a training course: a lecture (theme) – a workshop (test tasks). To improve the efficiency of distance learning a special format for storing distance training courses, SCORM, was developed.

In general, distance learning has not changed a lot since then. Multimedia possibilities of different training courses are extended, training courses players for mobile devices are developed, popular social networks and means of communication (such as Skype) are more often used for communication, rather than built-in tools for distance learning systems. Tools for adaptive assessment are more widely applied. The cooperation of leading higher education institutions of the USA, Western Europe, South-Eastern Asia and Russia for sharing and developing electronic content and transition to open learning concept are recent years

important trends. One of the problems that arises in this case is education quality and its objective assessment.

***Electronic on-line textbooks.*** Electronic textbooks and teaching manuals have evolved from paper books to multimedia electronic on-line textbooks over the last 20 years.

Combining electronic editions into on-line libraries provides new opportunities due to integrated glossary, common system of hyperlinks, cut-through search in the library, construction of semantic links between learning materials. In general, electronic textbooks evolve from downloaded and used off-line books to on-line “cloud” libraries.

Interactive textbooks provide opportunities for personalization of the educational process. Firstly, such personalization implies that a trainee can get information in the easy-to-use form. Secondly, personalization is provided due to integration of electronic textbooks with external applications that ensure control over the results of the coursework, analysis of gaps in one’s knowledge, elements of on-line learning, etc. Finally, an on-line textbook can be adapted. Analyzing student’s preferences and his abilities to learn, one can try to modify his educational activities, offering him basic and additional content in a convenient form.

One can suppose that in future on-line learning will be less similar to traditional textbooks and these learning tools will use other formats of educational content (see, for example, Khan’s Academy).

***Mobile and “cloud” technologies.*** Education becomes mobile following the development of modern society that widely uses information technologies in all spheres of life. This means that access to information and educational services is constantly provided regardless of time and location. Today, mobile education presupposes comfortable use of light, user-friendly and constantly portable devices by students, teachers and executives (smartphones, pads, etc).

Mobile learning can take various forms. Using different mobile devices students can gain an access to educational resources, communicate with other users, create content in and outside of the classroom. Mobile learning involves activi-

ties required for achieving learning objectives, for example, effective university systems management.

Along with the use of mobile technologies outside of an education institution, mobility “enters” the classrooms (electronic textbooks, systems of assessment of learning outcomes, display of presentations and other educational materials on students’ personal devices, etc). Mobile technologies are widely used at all levels of education.

As a rule, now mobile learning involves using “cloud” technologies. They allow one to quickly update educational content, the analysis of the trainees’ behaviour and needs being taken into account. “Cloud” technologies elasticity allows a trainee to get only relevant amount of information and educational services in the required period of time using a flexible charging system. Mobile and “cloud” technologies are a platform for developing open education.

***Social network services use.*** Social network services are one of the most dynamically developing areas where information technologies are most widely used. These services provide users with virtual platforms that unit people in network communities by means of computers connected to the Internet.

In fact, the use of social network services in educational activities, as a rule, is based either on independent self-organization of active students or their self-organization around an active teacher.

***Gamefication.*** This educational trend can be used in two main ways. First of all, one can acquire new knowledge and expertise playing computer games. An example of such use is LegoEducation project. The second, no less important use of this trend, is the introduction of competition elements in the educational process.

#### *5.1.2. ICT trends in education.*

***Changes in the educational paradigm.*** At the end of the 1990s UNESCO experts stressed one of the leading trends in modern world development, its growing volatility. In these circumstances national education systems cannot remain invariable. Changes concerning the very heart of education take place.

The first trend is the formation of the concept of continuous education, or lifelong learning. Within the framework of continuous education one cannot do without self-study experience. Therefore, today it is important to learn how to learn. This is the second key trend of current changes. It is supported by the fact that modern ICTs become more intelligent. They really can provide interested students with tools for effective self-study. The third trend resulting from growing volatility of the world is a tendency of educational systems towards continuous modernization.

***Transformations of the educational process.*** Wide adoption of ICTs in the educational process leads both to positive and negative consequences.

Methods and technologies of educational content formation are improved. The education system becomes more flexible, its response to changes in the surrounding world increases due to automation of various processes. Modern methods for organizing learning material improve efficiency of its use.

Efficiency and adequacy of the education system management mechanisms increases. Availability of timely and reliable information, computer tools for its processing and analysis allows one to make more sound judgements at the time when there is a need for them. Monitoring of deviations from the set parameters is the basis of these processes.

Creative abilities of teachers and students, their knowledge and self-study skills are developed. The developed information culture opens up fundamentally new opportunities for self-realization. Workload and psychological stress reduce due to automation of routine operations.

Due to introduction of special computer technologies that allow identifying and bridging gaps in one's knowledge the educational process becomes more individualized and differentiated, consequently more effective.

There appear new models of organizing the educational process. In some cases they give a good result. For example, there is a growing number of supporters of "flipped classroom", i.e. traditional homework is done in class, and a new theme is studied at home.



Integration tasks of acquiring knowledge about the regularities of the surrounding world are supported, opportunities for personality development increase. Properly organized information environment increases the level of student's activity, develops abilities for alternative thinking and skills in working out a strategy of search for solutions to both learning and practical problems. Moreover, students can foresee the results of their activities.

Informatization should certainly be regarded as a promising direction for modernizing the entire education system.

However, the introduction of ICTs in education results in a number of problems. If they are not taken into account, there will be more harm than good.

Extensive use of ICTs leads to reduction of social contacts and interaction, develops individualism. These processes are objective and it is impossible to eliminate them. One can speak about a system of compensatory measures that will smooth out the situation.

The most difficult is the transition from routine operations with educational information to practical ways of its use. This problem is of a psychological nature and it implies the transition from thought to action. Constant use of a computer can further complicate this transition.

Certain negative aspects arise as a result of application of modern search and navigation systems. It is connected with freedom, which is not so easy to deal with of. Nonlinear structure of the information found tempts the student to follow the suggested links. When misused, it can distract from the material under study. The second reason is information excess, "information noise" or "information trash" that accompanies almost every request on the Internet. The consequence is the formation of mosaic thinking.

The development of multimedia systems has given rise to an abundance of information products "stuffed" with different kinds of information. There are two problems here. Firstly, short-term human memory possesses very limited capabilities. Therefore, when a student is shown a text which is off-screen read, and at the same time animation effects and a couple of pictures are demonstrated, he

distracts from some types of information to keep track of others. As a result, he misses important training information. Secondly, people differ in the way they perceive information. Depending on what cerebral hemisphere is dominant, he perceives better either images or presentation logic. When everything is mixed in one presentation slide, everyone suffers.

The training dialogue between the student and the computer is very limited in its logic. Consequently, complex learning material is divided into several parts, which is not always justified.

The student becomes silent while working on the computer. He does not verbalize his thoughts and ideas. As a result, he loses his speech communication skills.

## 5.2. Transition to open education

Open education is an educational system available to any interested person, without any analysis of his initial level of knowledge, using distance learning technologies and methods, and providing a mode of training suitable for the student. The world tendency in this respect is transition from the open publication of educational information resources in digital libraries, (a large-scale example was demonstrated by the MIT, the Massachusetts Institute of Technology, half a dozen years ago), and open learning tools (for example, Programming System Scratch of the same MIT) to open (completely or partially free) training accompanied by teachers-tutors. In fact, open education provides a person with long-life learning, which is dictated by the needs of modern society.

An important tendency in the open education development is that it is usually developed by institutions consortia (for example, Coursera in which more than 10 million students are registered. They study 1000 courses from more than 100 universities). In September 2015 eight leading universities of the Russian Federation introduced the National platform of open education. [/https://opened.ru](https://opened.ru). The platform is expected to receive 100,000 subscribers by the end of 2016.

The main means of open education platforms monetization are selling certificates with university brand, testing with the proof of identity, as well as person-

alized support (tutoring), search for employees and employers, and, finally, the transition to paid educational services.

In fact, the benefits that participants of the largest consortia of open education are trying to get cannot be reduced to a momentary return on the investment and the immediate profit. According to the authors, in 10-15 years online training (at least at the levels of higher and further education) will dominate, and only several hundred universities will ensure the educational process in the globalization context.

### 5.3. Development of cooperation in education

Successful development of education today is impossible without the cooperation of individuals involved in the educational process: education institutions, teachers, educational technology developers, students, etc. Such cooperation, first of all, should eliminate unsustainable labour, time, and resources costs in developing methods, educational content and various training aids.

An example of targeted universities cooperation, discussed above, is the creation of an open education platform. Another form of cooperation is the joint coordinated work of education institutions for the development of e-content, hosted in digital libraries.

An important trend is the integration of teachers in the discipline communities, the educational technologies used, etc. Social networks often become tools of such integration. One should bear in mind the expediency of forming specialized professional networks.

Finally, one cannot but mention such a form of students cooperation as collective work on projects as a part of virtual teams, competitions between teams, etc.

### 5.4. The concept of information and education environment

With the development of the information society the educational process is transferred to the electronic environment. The transfer of knowledge in this envi-

ronment is ensured not only through traditional communications “teacher – student”, characteristic of traditional forms of learning, but also through students active networking, sharing knowledge, receiving information from a teacher, alumni, prospective employers, etc. In their learning students use not only university information resources, but also the diversity of information sources and services available online. The educational process becomes long-life and lasts throughout an individual’s life.

Based on the foregoing university informatization should be considered as a process of information and education environment formation. In addition to university internal information resources and services, this environment includes, the resources and services provided by national and international educational networks and the Internet. Information and education university environment should be as open as possible, widely representing university in the global information area.

## 5.5. Management and design of the BSU informatization processes

An important factor in the successful design and development of informatization processes at the University is a well thought-out system of these processes management. Consider this system organization in the Belarusian State University.

### *5.5.1. Management system of the BSU informatization*

The University informatization issues are regularly discussed at the meetings of the Council of the Belarusian State University, the elective collegial body of the BSU self-government.

The University Informatization Strategy is defined by the Council for Informatization. The Council is headed by the University Rector. The Council consists of both the leading BSU experts and the representatives of the National Academy of Sciences and other state institutions.

Current issues of financing in the field of informization are resolved at the meetings of the BSU Rectorate.

The implementation of the Informatization Council and the Rectorate decisions in the field of information is carried out by the BSU Center for Information Technologies.

The Center for Information Technologies was established in May 1997 with the aim of running common policy in the field of educational process informatization, scientific research and the BSU management development, implementation and maintenance of the University new information and communication technologies.

The main objective of the Center is to provide Faculties, departments and other units and the BSU services with the means of the educational process informatization on the basis of the information network of the BSU and modern computer systems. The Center for Information Technologies solves the problems of intra-university informatization, providing the educational process, the university scientific and entrepreneurial activities, inter-university activities in the field of information technologies and resources, international activities in the field of information with information technologies and resources.

The Center for Information Technology coordinates the work in the field of informatization at the BSU Faculties and other structural divisions.

#### *5.5.2. Concept of the BSU informatization*

The main document on the basis of which the design and development of the BSU information infrastructure are accomplished is the Concept of the BSU Informatization for the period until 2018, adopted in 2013 at the meeting of the University Council.

The main goal of informatization in the University is the transition to a qualitatively new level of education as the result of:

- formation of a qualitatively new look at the place and pedagogical technologies of applying ICT in the educational process;
- availability of qualitative educational resources and services regardless of their users location;
- intensification of the educational process, introduction of active learning methods and other educational innovations based on the use of ICT;

- large-scale use of multimedia technologies that provide visualization and high informativity of educational content;
- effective involvement of diverse informatization tools and means, including personal devices of students and teachers;
- development of students' motivation to knowledge, continuous self-education.

The objectives of the BSU informatization until 2018 are:

- improving the efficiency of research activities;
- expanding a range of basic and applied scientific developments through the introduction of ICT in all phases of research, infrastructure development, access to supercomputing and grid-computing resources, national and international scientific and technical information, and propaganda of the BSU scientific achievements in the global information environment;
- optimization of administrative procedures through the development of a system of electronic services provided by the University to legal entities and individuals, and the introduction of an electronic document management system based on the technology of electronic digital signature.

The main tasks of the BSU informatization until 2018 are:

- ensuring general authorized access of the educational process participants to the information resources and services of the University;
- creating conditions for the most efficient use of students' personal computers and mobile devices.

The Concept identified the following main directions of the development of the BSU information and communication infrastructure:

- creation and development of a modern data processing center and the introduction of “cloud” computing;
- equipment of the educational process with University computers, and maximum use of personal computers and mobile computing devices (tablets, smartphones, etc) and introduction of “cloud” computing;
- development of telecommunications infrastructure, including wireless networks, the expansion of the Internet access;
- introduction of multimedia technologies;
- development of electronic resources;
- expansion of the BSU representation in the Internet;
- introduction of electronic documentation process.

The main principles of the Concept implementation are:

- project-based approach;
- planning flexibility;
- focus on practical outcome;
- personal responsibility for effective implementation;
- information security;
- maximum use of personal computing devices;
- compliance of the financial costs with work complexity and the expected results;
- elimination of developments duplication.

## 5.6. The BSU ICT infrastructure nowadays

**Telecommunications infrastructure.** Modern telecommunications infrastructure was created in the BSU. A single corporate network using the BSU own fiber-optic backbone with the total length of 50 km covers the University campus. Almost all computers in the buildings are connected to the BSU corporate network and have the Internet access. The total number of computers is more than 4.5 thousands. The BSU Center for Information Technologies provides the network centralized management. The network has a unified system to authenticate users and authorize their access to information resources.

The development of telecommunication infrastructure is considered as a necessary condition to ensure a high bandwidth and quality of service in users access to the educational environment of the BSU from the local network and via the Internet. To achieve this, the BSU corporative network capacity was expanded to 1 Gbit/s. The external access channels to the Internet and networks in Belarus have the capacity of 2 Gbit/s. For implementing “cloud” computing and providing the BSU staff and students with access to the information resources via the Internet it is necessary to expand the external channels up to 10Gbit/s by 2020.

The possibilities of access to the BSU network and the Internet of mobile devices users at the University campus were expanded by providing WF points with continuous coverage (seamless roaming) in all BSU buildings. The BSU wireless network is integrated into the international *eduroam* system. Techniques of authorized secure mobile access to information resources of the Internet and e-services of the networks within the *eduroam* community were developed and implemented.

The expansion and modernization of the BSU telephone network were made on the basis of VoIP and wireless technologies.

The techniques of network security were designed to meet the requirements of a new level of the BSU network infrastructure development (external channels high capacity, extensive connection of students and staff mobile devices, etc.)



***Creation and development of a “cloud” data processing center.*** The Data processing center, which was created in the BSU on the basis of the IBM PureFlexSystem platform is successfully developing.

The main advantages of the “cloud” data center are an effective use of technical and information resources, decisions scalability, reduced costs of informatization, a possibility to provide a high level of information security. At the first stage the main services provided to the BSU network users are “infrastructure as a service”, the “cloud” storage of information, a “platform as a service”, virtual machines for doing laboratory work. The latter option allows the student to work with virtual laboratory software both from all computers within the BSU network and at home, connecting to the Internet, without having to install specially tailored software.

The data processing center will be integrated with the supercomputer cluster SKIF K 1000-2. The BSU network users are provided with virtual working places targeted at high-performance computing on this cluster platform. The problems of storing multimedia information arrays and providing access to them through the implementation of the service- “video on demand” will be solved in the process of scaling.

The use of “cloud” technologies in the BSU ensures mobility and relevance of educational resources. “Cloud” educational environment also allows the academic staff to use modern and constantly updated computer infrastructure, software and services provided by the data center, thus avoiding additional expenditures.

***Computer hardware.*** With the objective of the maximum application of personal computers and personal computer devices (tablets, smart phones, etc.) in the educational process, the University reconsidered the standard configuration of computer classes operating in the “cloud” IOS. The number of computers in most classrooms can be reduced by 40-50% taking into account the number of students in groups. The remaining workplaces are equipped with comfortable (wired and / or wireless) means of access to the BSU network enabling students to use computing devices of their own. Using virtual workplaces provided by the “cloud” data processing center allows one to partially work on computers in a terminal mode. This makes it possible to prolong computer life span and to respectively reduce the number of updated computers to 10% annually.

When equipping computer labs, departments, offices and BSU services preference is given to cost-effective multi-terminal systems.

Equipping the Faculties with multimedia video projection devices and screens is, as a rule, carried out by permanently installing video projectors and screens in classrooms. In large lecture halls presentations and videos can be demonstrated through the net, the lecturer being able to control the broadcast directly from the lecture hall.

***Introduction of multimedia technologies.*** Further development of multimedia technologies in the BSU envisages both extending the volume of multimedia content, and improving the network tools of its delivery to users.

A wide range of measures aimed at expanding the multimedia capabilities of the corporate BSU network was implemented. A range of live television broadcasts in the IP BSU network and / or the Internet (celebrations, meetings of the Academic Council, Days of Faculties, etc.) is constantly expanding as technologies are improving. It is common practice to conduct multilateral video conferences with scientists in different parts of the world participating in these conferences from their desks. The BSU teachers can deliver lectures online both to the BSU students and to another targeted audience interactively. Students can virtually attend lectures delivered by teachers from other countries.

Creating educational multimedia content (video lectures, lab demonstrations, recording video conferences, video tutorials, etc.), its cataloging and storing should become top priority of the BSU informatization.

The system “video on demand” should be implemented in the nearest future to facilitate access to multimedia content.

***Development of electronic scientific and educational resources system.*** The creation of electronic educational resources, including electronic textbooks is under way, taking into consideration multi-platforming as one of the most relevant aspects of informatization. This feature enables students to work with educational content on various devices, including mobile ones. Access (either authorized or free) to electronic resources should be provided both from the corporate BSU

network, and from the Internet. On this assumption, the allocation of resources is carried out on the websites of the Belarusian State University and its Faculties, on the BSU electronic library site of distance learning (dl.bsu.by).

Work is under way to digitize all the printed material available in the BSU library depository.

***Library service informatization.*** In order to further improve the information and library services automated service technology is being introduced both in the BSU library (access to the electronic personal data card, the automated delivery of books using personalized documents, ordering documents from the book depository, automated registration in reading halls and media libraries).

***Expansion of the BSU representation in the global information environment.*** The expansion of the BSU representation in the global information space is regarded as an important means of the BSU competitiveness growth on the world market of educational services and innovative designs.

According to the rating of universities in Webometrics (Webometrics Ranking of World Universities), which is calculated by the research team Cybermetrics, part of the Spanish National Research Council, the BSU takes 584 place among 22 000 universities rated. The BSU is among the three top CIS countries universities. Among the universities of the capitals of the neighbouring countries represented in the rating one can see Warsaw University (282), Vilnius University (689), the Latvian University (897), Kiev National University named after Taras Shevchenko (1023).

Webometrics analyzes university web presence, taking into account scientific publications. According to the rating developers, the indicators used in the analysis, allow one to fully assess university performance.

***Electronic document flow.*** The electronic document management system is functioning in the BSU aimed at reducing the volume of paper documents, ensuring the transparency of development and harmonization of documents flow for all its participants. The introduction of electronic document flow in the BSU should not be limited to the sphere of management and administration. Creating “cloud”

data centers enables storage of electronic educational process documents such as abstracts, reports, essays, assignments for course papers, course papers, etc. to be carried through. Specifying the rights to place, share, modify or read documents allows one to create a system for safe storage of such documents, saving paper and energy resources. Students and teachers can exchange tasks, students can send their works to teachers via an appropriate means of communication (e-mail, social networks, etc).

#### 5.7. University integrated computerized management system

Computerization of modern university business processes is a pertinent trend in university informatization. It is aimed at improving (or at least maintaining) the educational process quality under the conditions of transition to mass higher education and the Bologna Process, as well as at reducing material costs for supporting university functioning. This trend is associated with the development and implementation of specialized software platforms for the University management computerization.

The main purpose of the development and implementation of computerized systems of university management is to improve the educational process quality. This goal is achieved through constant quality parameters monitoring, ensuring the reliability and speed of getting information on various aspects of the educational process with the specifications required. It results in the validity and efficiency of administrative decision-making management that directly affects the implementation of the university educational function. The next goal is reducing the maintenance costs of the university educational activities by optimizing the use of all university resources, increasing the productivity of the staff activity and effective management of the paid educational services provision.

Finally, the third goal is democratization of the educational process, development of academic freedom by ensuring transparency of the activity of all subjects involved in the system: from students to the University high-ranking officials, thus creating a comfortable and democratic information environment for the interaction of subjects involved in the educational process.

Implementation and maintenance of computerized management systems also make it possible to provide an integrated approach to the University management, to optimize decision-making processes, to improve communication within the university as well as communication with the outside environment, to improve reliability and availability of information on the activities of the university for all subjects of the management system, to optimize the number of staff members and to ensure efficient use of their working time.

An integrated computerized system of the University management developed by the BSU Centre for Information Technologies has been successfully implemented in the Belarusian State University. The system operates on the MS-SQLSever platform. It includes the following major subsystems:

- BSU organizational structure;
- applicants for entrance;
- students;
- PhD and doctoral courses;
- paid tuition and training;
- personnel management;
- research projects support;
- BSU Complex legal entities;
- BSU telephone directory.

These subsystems were worked out right in the BSU. In addition, a computerized system of the University management includes the following third-party applications:

- LMS e-University;
- library automation subsystem;

- accounting system;
- “Campus” information system.

All information systems are closely integrated to avoid doubling input raw data, they are served in 24/7 mode and developed in accordance with changes in the regulations documents and following users’ requests. The total number of authorized registered users of the information systems is 912 BSU employees.

The computerized system of the University management developed in the BSU is used in other 8 Belarusian universities.

## 5.8. Conclusion

In the XXI century the BSU has entered a new stage of the educational process development - e-learning stage, the basic principles of which are:

- mobility, ensuring universal access to educational information resources and services;
- openness, a steady increase of the proportion of free access to scientific and educational resources;
- innovation, development and implementation of new educational technologies based on widespread use of ICT.

The Belarusian State University has created an effective system of information processes management, worked out the Concept of the University informatization reflecting the current trends and taking into account the would experience on education informatization.

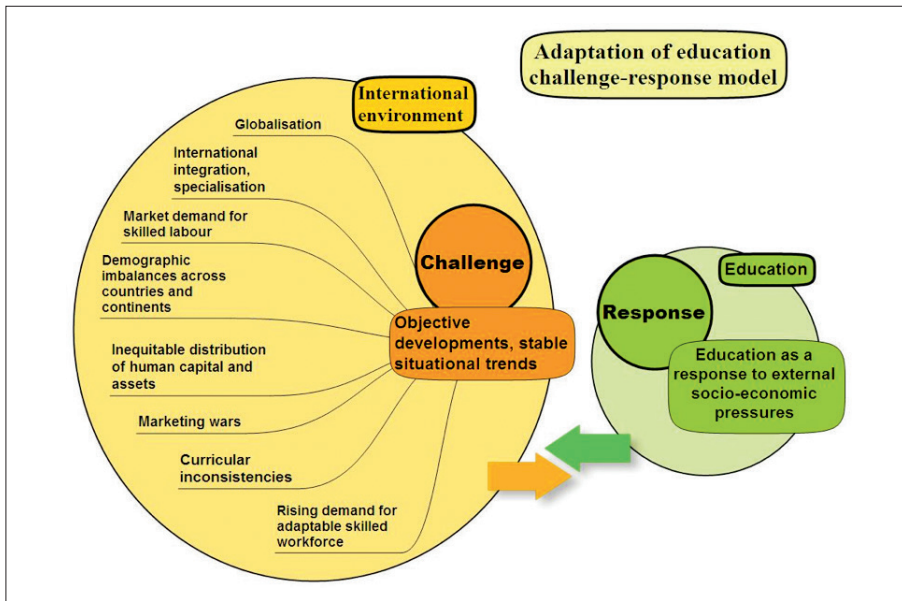
The implementation of the BSU concept allowed creating a modern information and education environment that meets the requirements for informatization of the educational process.

## 6. Internationalization of Education as a Key Factor of its Quality

### 6.1. Internationalization in education

Education is an important tool for internationalization. Jane Knight suggests the following definition of internationalization in education: “internationalization is a process of integrating the international / cross-cultural aspects of teaching, learning and research in provision of educational services” [1].

Obviously, globalization is at the top of the agenda in the study of culture and civilization challenges. In this view, education is approached as an adaptive structure reacting to external demands (Figure 1).



*Figure 1. Internationalisation management in university education - an adaptive model*

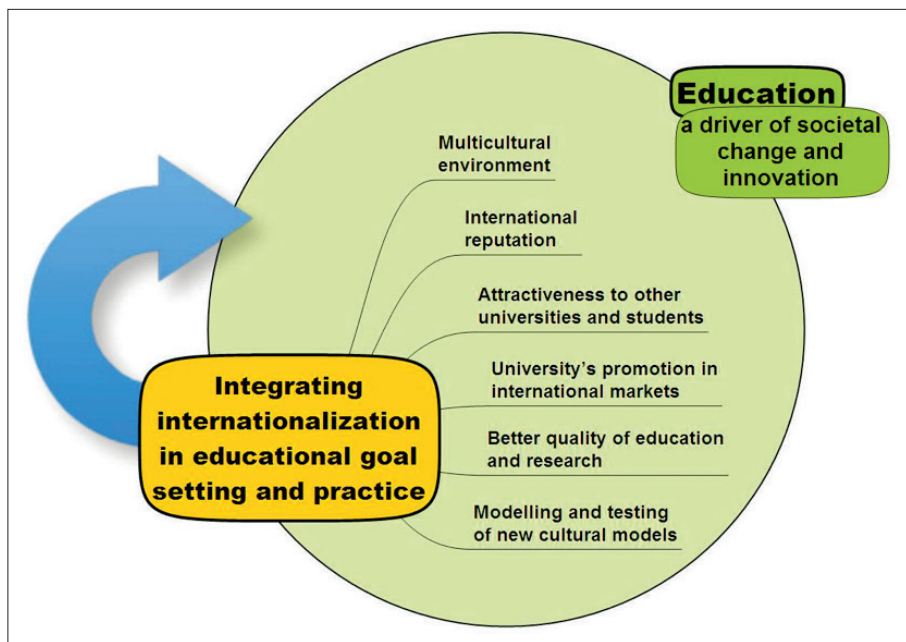
The second broad approach focuses on the long-term future of education, by ascribing to it interest in self-preservation and autonomous development. This interest is very well posited by the French sociologists Bourdieu and Passeron

in their seminal work “Reproduction in education, society and culture”. It emphasizes the specific mission of education regarding institutional reproduction that is critical to the fulfilment of its intrinsic “teaching mission”, rather than being determined by the political, economic and cultural circumstances [2]. In its quest for self-preservation and development, education will view internationalization as a source of motivation for change. This view is rooted in the recognition of the university and its staff of the importance of integrating internationalization in its practices and teaching goals, without seeing it merely as a reaction to some external requirement or situational demand.

In this approach, the presence of international students is viewed as an opportunity for creating a multicultural environment and building the university’s international reputation, and being a party to inter-university agreements as a tool for expanding academic exchanges and mobility. Similarly, international certification of courses is regarded as a tool for promoting the university in the global education market [1, 3]. This conceptualization is based on the notion of systematic interest in education, and sees internationalization as a path towards establishing the multicultural, international and global dimensions of education, thus improving the quality of education and research [4].

It is also assumed that education is not simply realization of social and cultural needs, but rather an important factor in societal and innovation-driven development. Education thus becomes a modelling and testing ground for new cultural transactions and innovative products that not only respond, but also give rise to new social and cultural developments. The education institutions’ responsibility, as assumed by the second approach to internationalization, is based on a prospective view of the future and potentials for societal development, not merely on a reaction to external challenges [Figure 2].





*Figure 2. Internationalization management in university education - a productive model*

## 6.2. BSU international cooperation

Internationalization is a key aspect of modern university. Today the Belarusian State University has over 400 international agreements signed with universities and scientific institutes out of more than 50 countries of the world, which makes the BSU the country's leader in this field. Among the BSU partners are leading European HEIs, such as Bochum, Jena, Oldenburg, Leipzig the universities in Germany, the universities of Toulouse and Savoy in France, the universities of Padua, Trento, Perugia in Italy, Barcelona, Granada and Malaga universities in Spain, the universities of Warsaw, Wroclaw and Krakow in Poland, Charles and Karlow universities in the Czech Republic, Vilnius university and the Latvian university in the Baltic states, and many others.

Relationships with scientific and educational establishments of the countries of South-Eastern Asia are of a strategic character. Today the BSU cooperates with 20 HEI's of China, among them are the Chinese University of International Rela-

tions, Beijing University, Shanghai University, the leading universities of Heyludzyan province, Harbin Polytechnic University and Harbin University of Science and Technology. Our University is proud to host the Confucius Institute, the Chinese partner being Dalian Polytechnic University.

Bilateral cooperation includes different forms of joint activities:

- undergraduate, Master's and PhD students international exchange programmes;
- exchange programmes for teaching, administrative and research staff;
- joint Master's and PhD programmes;
- joint research projects, conferences and seminars;
- exchange of periodicals, scientific and methodological literature;
- sharing experience and best practices in the sphere of University management;
- cooperation in the field of R&D products.

The Belarusian State University belongs to a highly internationalized university community and pays great attention to cooperation with foreign partners both at the inter-university level and within the international projects framework. Annually, 25-30 international projects focused on academic exchanges, improvement of the University management, design of joint study programmes, development of infrastructure, organization of conferences, seminars and other events within such programmes as Tempus, Erasmus Mundus, Jean Monnet, EU Cross-Border Cooperation, DAAD, FPB-Belarus, SIDA, VISBY, Baltic University, CIMO, Visegrad Fund, CEI Fund, Eurasia, UNICEF, UNESCO and many others are implemented at the BSU. Currently, the BSU is successfully involved into 9 Tempus and 6 Erasmus Mundus projects addressing academic mobility (EMA 2), curricular development (ACES, NETCENG, TRADIR, Comolte, ENERGY), human security (HUMAN), promotion of innovations (SUCSID), university management (INURE) and internationalization (PICASA).

The BSU is the largest international cooperation center in the field of education and science in the country. The following centers work under the University:

- Informational Center of European Union;
- Informational Point of European Union;
- Center for UN Studies;
- Center for International Studies;
- Center of Academic Mobility, etc.

So far the major part of links between countries has been established within EU Programmes and joint projects implemented within their framework. The BSU is an active player in this field too as 25-30 international projects are implemented annually.

One of the projects (BMU-MID with a total budget of 3 349 625 EURO) targeted at Belarus, Moldova, Ukraine, Georgia and Armenia opens up similar opportunities for exchange studies and joint research.

Another major cooperation framework is the **EU Tempus Programme**. Currently, the SUCSID project “Inter-universities Start-Up Centers for Students’ Innovations Development and Promotion” is being implemented, giving the opportunity for cooperation with Tampere University of Technology and, sharing experience with its advice and support service for the entrepreneurship and innovations “Talli”, as well as with the Finnish network of associations supporting start-up businesses “New Enterprise Agencies”.

A promising cooperation mechanism with Finland is provided by the **Finnish Centre for International Mobility CIMO**. Being in charge of a number of nationally-funded programmes of collaboration in higher education, CIMO is responsible for implementation of the North-South-South Programme funded by the Finnish Ministry for Foreign Affairs and supporting cooperation between higher education institutions in Finland and developing countries. Currently BASERCAN (Baltic Sea Region Caucasus Network) project of total budget €120 000 is implemented within the NSS Programme. The project was launched in 2012 and is aimed at enhancing student and teacher exchanges between network partners. Apart from the BSU, Belarus is represented by Yanka Kupala State University of Grodno. The Coordinator of

the network, featuring two Georgian Universities as well, is Aleksanteri Institute of the University of Helsinki, Finland. 6 BSU academic and administrative staff members and 6 BSU students are to benefit from the project. In 2013 a student from the Faculty of International Relations received a scholarship for 3 months' studies to Helsinki University.

As of October 2013 the BSU became a member of **the Baltic Sea Region University Network (BSRUN)** founded in 2000 to facilitate and enhance cooperation between its members. In addition, Belarus is represented by two more HEIs: Yanka Kupala State University of Grodno and Grodno State Agrarian University. There are two Finish HEIs, the University of Eastern Finland and the University of Turku in this network. In October 2013 BSRUN and Business & Innovation Center of Turku University held the conference "University Cooperation in Baltic Region" which was funded by the Baltic Sea States Council. (Finland was president in the Council for 2013-14). The idea of "Neighbourhood Policy" as a ground for cooperation between Belarus and the Council was suggested.

Two important events were hosted by the BSU under the BSRUN auspices. The International seminar "Erasmus Mundus as a catalyst for internationalization: sharing best practices and exploring future perspectives" was held on February 10-12, 2014. In March 2014 the BSU and BSRUN organized the Seminar on the Experiences of the EuroFaculties for the Future.

**Cooperation scientific and research activities** between the two countries are also given great attention to. One of the major tools for such cooperation is the EU's Seventh Framework Programme for Research (FP7). Several research visits to Finnish research institutions were paid by Belarusian specialists and researchers, and a number of joint scientific projects were launched. Among them was the EU FP7 CACOMEL project (FP7-247007, Call ID "FP7-PEOPLE-2009-IRSES") implemented by the University of Eastern Finland and the BSU Research Institute for Nuclear Problems (the laboratory of electrodynamics of nonhomogeneous media) in 2010-2013.

The FP7 also facilitated cooperation at the **inter-university level**. Thus, the links between BSU and University of Eastern Finland's Faculty of Social Sci-

ences and Business Studies were established within the project NET4SOCIETY (International network of National Contact Points for Socio-economic Sciences and Humanities) represented on the BSU part by the Faculty of Philosophy and Social Sciences. An Agreement on cooperation between the two Universities was signed in 2010. Belarusian professor paid a 59-day research visit to Helsinki University at the beginning of 2013. Her study was devoted to modern problems of foreign sociology. During her visit she chaired the Section for Eastern Neighbourhood problems at the International Research Conference held in Helsinki on May, 22-25 2013.

Belarus and Finland are cooperate in the sphere of **nuclear safety**. Thus, within the State Program on Staff Training for Nuclear Power Engineering of the Republic of Belarus a number of specialists were trained in Finland. In 2011 22 students of the BSU Chemistry Faculty visited Helsinki for five-day training held by the Radiation and Nuclear Safety Authorities (STUK), Finland. A number of academic a member also had the opportunity to advance their professional skills. In April 2011 four staff members of the Chemistry Faculty participated in the training course “Safe Chemistry Practices at Nuclear Power Plants and Waste Management” delivered by the STUK in Helsinki and Lavis, featuring staff members of VTT (Technical Research Center Finland). In December 2011 four staff members of the Chemistry Faculty of visited Helsinki and Olkiuoto within the training course “Nuclear Fuel Cycle in Finland” delivered by STUK, thus setting up new links with STUK, Posiva Research Company, Energy Company Teollisuuden Voima Oyj (TVO).

Such a long list of Finnish HEIs having links with the BSU can be considered as one more evidence of the interest shown by both countries in joint work and cooperation. The education systems of both Belarus and Finland face similar challenges, develop close and interconnected fields of research, and cooperate to enhance the quality of education. In this aspect, sharing best practices, enriching experience through joint work and enhancing student and academic staff mobility between the BSU and Finnish HEIs, without any doubt, contribute to development of both sides. Proactiveness of partners, commitment to internationalization of study and research, as well as new tools of cooperation such as Erasmus Plus Programme allow both Belarusian and Finnish HEIs to establish long-term and mutually beneficial cooperation.

### 6.3. Academic mobility

Academic mobility is of particular importance in modern world and, hence it, is the main component of the inter-university cooperation. More than 1500 teachers, young scientists, undergraduates, Master's and PhD students of the Belarusian State University go abroad every year for scientific training, delivering lectures, participating in conferences and joint international research projects.

Visiting parties are mostly represented by the world and regional leaders in economic and cultural development. The International Programmes and Project Office helps students and academic staff to apply for international scholarships and grants to study and do research abroad. The information is provided by e-mail, information meetings and presentations and through individual counselling.

The current academic mobility is mostly funded by European and international programmes, such as Erasmus Mundus, Visby, DAAD, GFPS, Marie Curie International Incoming Fellowships, International Visegrad Fund, Huygens Scholarship Programme, Lithuanian Scholarships, Gerda-Henkel Scholarships, Polish Governmental Scholarships and many others.

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## **7. Belarusian State University: Past and Present**

### **7.1. History of the Belarusian State University**

On February 25, 1919, the Central Executive Committee of the Byelorussian SSR decided to establish the first national university in Belarus. However, the occupation of Minsk by the Polish Army delayed this plan, and the University was opened on October 30, 1921. The historian and slavist Vladimir Picheta became its first rector.

October 30, 1921 is the official foundation date of the main higher education institution in our country, the Belarusian State University.

Elimination of illiteracy, assimilation of European and world cultural heritage, formation of the national system of higher education and science — all these impressive achievements of the Belarusian people in the 1920-1930s would have been impossible without the University and the work of its staff.

On November 1, 1930 students started attending regular classes at its three Faculties: Workers', Medical, and Social Sciences. At that time the teaching staff consisted of 49 lecturers including 14 professors and 25 associate professors. Such prominent scholars as professor M.N.Pokrovsky, professor V.P.Volgin, academicians E.F.Karsky, K.A.Timiryazev, D.N.Pryanishnikov and others were among the founders of the first Belarusian University.

The 1920-1930s marked one of the most dynamic periods in the history of the University. The University campus construction was started under the resolution of the VIII All-Belarusian Congress in November 1927 and in 1930 it welcomed students.

In October 1927 PhD courses were initiated. Soon, close relations with scientists from Germany, Lithuania, Poland and Czechoslovakia were established, students' scientific societies were organized at the faculties.



*1928, the BSU students and faculty members*

Rapid development of the University played a significant role in the creation of the educational system of the Republic. The University educational and research capacity gave birth to a number of independent higher educational establishments, such as Minsk Medicine Institute, Minsk Law Institute, Minsk Pedagogical Institute, the Belarusian Institute of National Economy, Minsk Chemistry and Technology Institute, which later became part of the Polytechnic Institute. The Belarusian State University contributed much to the foundation and development of the Academy of Sciences, the Republic's State Library and a number of large research institutions.

In two decades the Belarusian State University trained 5240 specialists in History, Law, Mathematics, Chemistry, Biology, etc. The activities of the People's Writer of Belarus Yakub Kolas and the outstanding Commander-in-Chief, Marshal of the Soviet Union G.K. Zhukov were associated with the name of the University of that period. It was the time when L.A. Artsymovich, P.U. Brovka, K.K. Krapiva studied and worked at the University. These outstanding people made a valuable contribution to the development of both national and world science and culture.

1941 was the year of the most severe ordeal in the history of the University. On June 21, 1941 a jubilee exhibition was arranged at the University presenting



the achievements of the staff consisting at the time of 17 professors, 41 associate professors, 90 teachers and assistants, 60 post-graduates and 1337 students. The day following the celebration, June 22, 1941 became a tragic landmark in our history. All the post-war generations of teachers, post-graduates and students of the University have always remembered and will remember their colleagues who left the classrooms and scientific laboratories to sacrifice their lives for the glory and independence of their Motherland. The evidence of this is the obelisk erected at the University campus in the 1970s in honour of those who perished in the battle against fascism.

The war caused great damage to the University. The University campus was almost completely destroyed. The University archives, library funds, laboratories and study-rooms were plundered. Despite the ravages of the war regular classes at its six faculties began at the station of Skhodnya near Moscow in October, 1943. After the liberation of the Belarusian capital in August 1944 the University reopened in Minsk. The same year the Faculty of Journalism started functioning at the University.

The pre-war University resources had been restored by the end of 1950. A new period in the history of the Belarusian State University began, the period of its rapid development, creative teaching and scientific research. The teaching staff taught more than 1700 students of seven Faculties.



The 1950-1980s were characterized by the University activities scope expansion. The Government's decisions were aimed at improving the University resources and facilities. The content, forms and methods of the teaching process and research changed dramatically. New buildings of the Faculties were erected and some new ones started functioning: the Faculty of Law, Faculty of Mathematics and Mechanics, Faculty of Physics, Faculty of Applied Mathematics and Computer Science, Faculty of Radiophysics and Electronics, Faculty of Philosophy and Economics. Research institutions organized within the University structure in 1971 (Applied Physics), 1976 (Physics and Chemistry), 1986 (Nuclear Physics) were involved in extensive investigations.

The Belarusian State University deservedly occupied an honorable place among the leading universities of the Soviet Union. Its international prestige considerably increased, scientists and professors actively participated in international symposia and conferences, sessions of the UN General Assembly and UNESCO. The Order of the Red Banner of Labour awarded to the University on January 7, 1967 became the evidence of its achievements in the development of science, education and culture, and in training highly qualified specialists for all branches of economy.

In the 1990s the Belarusian State University was considered the largest scientific and educational center recognized for its impressive achievements and traditions. June 27, 1991 the Supreme Soviet adopted the Declaration of Independence of the Republic of Belarus and the Belarusian people faced the vital task to develop a sovereign state.

Being the oldest and largest University of the country, the Belarusian State University contributed to the programmes of strengthening the Belarusian statehood, the development of economic and social reforms in our republic. In 1995 the Faculty of International Relations, in 1999 two new Faculties, the Faculty of Philosophy and Social Science and the Faculty of Economics, were formed on the basis of the former Philosophy and Economics Faculty. The Military and Humanities Faculties, as well as several educational entities of unitary status were attached to the University.

The efforts of the University scholars have always been focused on fundamental science. A number of centers of national importance were created within

the University framework to research problems of physics (1993), ozone sphere monitoring (1997), applied mathematics and computer science (2000), etc

After becoming an independent state in 1991, the Belarusian State University was officially recognized as the leading higher education institution of the sovereign state. New Faculties and Institutes were created: the Faculty of International Relations (1995), the State Institute of Management and Social Technologies (2003), the Military Faculty (2003), the St. Methodius and Cyril Theological Institute (2004), the Humanities Faculty (2004); the Institute of Business and Technology Management (2006), the Confucius Institute for Sinology (2007). In 2008 the Faculty of Journalism was reorganized into the Institute of Journalism. The University also established university preparation and continuous education centers. Several new research centers were founded as well: the Centers for Particle and High Energy Physics (1993), Ozonosphere Monitoring (1997), Applied Problems in Mathematics and Computer Science (2000), and Human Problems (2000). New buildings were constructed for the Faculties of Biology, Philosophy and Social Sciences, and International Relations, the Institute of Journalism, and the University television center.

Glorious University traditions set by first Rectors were further developed by their successors – N. M. Bladyko (1937), V.S. Bobrovniksky (1938), P.P. Savitsky (1938 - 1946), V.A. Tomashevich (1946 - 1949), I.S. Chimburch (1949 - 1952), K.I. Lukhashov (1952 - 1957), A.N. Sevchenko (1957 - 1972), V.M. Sikorsky (1972 - 1978), V.A. Bely (1978 - 1983), L.I. Kiselevsky (1983 - 1990), F.N. Kaputsky (1990 - 1995), A.V. Kozulin (1996 - 2003), V.I. Strazhev (2003 - 2008).

On November 31, 2008 the President of the Republic of Belarus Alexander Lukashenko appointed Sergey V. Ablameyko, the then Director General of the State Scientific Organization “United Institute of Informatics Problems of the National Academy of Sciences of Belarus”, Rector of the Belarusian State University.

## 7.2. Belarusian State University Today

### 7.2.1. *Academic community*

The BSU teachers, researchers, students and postgraduate students are the core of the University. Today the BSU teaching staff is about 3000 members. The BSU takes pride in 15 academicians of the National Academy of Sciences

of Belarus, 16 Corresponding Members of the National Academy of Sciences of Belarus, 400 Doctors of Science and 1840 PhD degree holders.

The BSU students' community consists of more than 30,000 undergraduates, Master's, PhD and doctoral students. Full-time students, who successfully pass exams, receive scholarships and study free of charge.

The University annual enrollment exceeds 5000 students. The BSU is an attractive place of study for many overseas students. Today more than 2000 foreign students from 53 countries are pursuing their education at the BSU.

As of now the Belarusian State University is a leading higher educational establishment in the national system of education. It is a significant educational, research and industrial complex consisting of numerous educational, research and production enterprises.

The Belarusian State University offers a variety of programmes at all levels of education. The Higher Education Programme is organized at the BSU Faculties and education institutions in 74 specialties and 278 specializations. The BSU offers training in more than 75 specialties in accordance with the Master's Degree Programme. The PhD Programme which is aimed to prepare highly qualified researchers holding a PhD degree is provided in 125 specialties of different branches of science.

The BSU pre-university education programme makes it possible for international students to study the Russian language in order to be able to study professional disciplines and be admitted to degree programmes.

Belarusian and foreign students can benefit from a variety of non-degree programmes, such as Student internships, research internships, study-and-travel tours, Russian/Belarusian Language Courses.

#### *7.2.2. BSU in international rankings*

According to major international rankings, the BSU is among 2 per cent of the world leading universities out of 30 thousand education institutions. According to *QS international ranking*, the BSU was among 430 best world universities

in 2015. The BSU is the only Belarusian university on the list of the prestigious *Times Higher Education World University Rankings*, occupying 601-800 positions. The *Webometrics Ranking of World Universities* also places the Belarusian State University among top 2 per cent of the world universities (584 place).

All University study buildings are equipped with well-furnished classrooms, seminar rooms and reading lounges. There are 70 computer laboratories and 4 media classrooms.

Information Resources of the University Network include a web-server, web-servers of the Faculties and the BSU divisions and the Intranet-server. Students are taught using such up-to-date technologies, as e-University, Moodle and e-Learning systems. The computer-aided network information system «University» enables the University staff and students to implement effective administrative procedures through the system of electronic registration and personal authentication. The BSU Lyceum uses distance learning for posting training materials on the Internet. Overseas students who study Russian as a Foreign Language at the Faculty of Pre-University Education are able to use specially designed software “Study Russian”.



In February 2010, Supercomputer SKIF was installed in the BSU. It allows running tasks simultaneously on 288 CPUs. It is one of the centers of the national scien-

tific and educational GRID-network. Access to the Supercomputer resources within the University network is granted to the University students and academic staff.

### *7.2.3. Notable alumni*

Svetlana Alexievich, the BSU graduate, was awarded the Nobel Prize in Literature in 2015. Svetlana Alexievich graduated from the Faculty of Journalism of the Belarusian State University in 1972. Her diploma thesis was devoted to Literary Criticism in the “Neman” journal. According to the press release of the Swedish Academy, the prize was awarded to the Belarusian writer “for her polyphonic writings, a monument to suffering and courage in our time.”

Among other notable alumni of the Belarusian State University are ministers, prominent scientists and educators, political leaders working in different countries all over the world.

*Laudatio* y Discurso de contestación por el Académico de Número

EXCMO. SR. DR. LORENZO GASCÓN



EXCMO. SR. DR. LORENZO GASCÓN



Excelentísimo Señor Presidente  
Excelentísima Señora y Excelentísimos Señores Académicos  
Excelentísimas e Ilustrísimas Autoridades  
Señoras y Señores,

En primer lugar deseo dar las gracias al Excelentísimo Señor Presidente y a la Junta de Gobierno por el privilegio de responder en nombre de esta Real Corporación al discurso de ingreso del Ilustrísimo Señor Doctor D. Sergey Vladimirovich Ablameyko.

La continuidad de esta Real Academia de Ciencias Económicas y Financieras de España se garantiza con la incorporación de nuevos Académicos. El proceso se basa en la cooptación y por la libre y democrática decisión de nuestros estatutarios órganos de gobierno. Y se realiza por votación secreta del Pleno de la Real Academia.

El acierto y la capacidad de atracción en este ámbito ha sido siempre una de nuestras prioridades. Así, en el entorno internacional y a título de muestra, en estos momentos contamos como académicos correspondientes para Francia a Valéry Giscard D'Estaing que fue Presidente de la Republica Francesa y a Thierry de Montbrial, Presidente y fundador de la "World Policy Conference" y del IFRI, al Profesor Dr. Jürgen Donghes principal Consejero en temas económicos del Gobierno alemán, a Romano Prodi Ex Presidente del Gobierno de la Republica Italiana, al banquero Barón Daniel Cardon de Lichtbuer y a la Baronesa Jacqueline Delruelle para Bélgica, etc... Y hasta siete académicos correspondientes distinguidos con el Premio Nobel de Economía. Entre los fallecidos quisiera tan sólo recordar al mítico Hermann Abs que fue el primer Presidente del Bundesbank y luego, durante muchos años, del Deutsche Bank; al Dr. Hansen, Rector de la Universidad de Harvard; a Gaston Thorn gran y brillante Presidente de la Comisión de la Comunidad Económica Europea y Presidente de las Naciones Unidas y a Raymond Barre, Presidente del Gobierno de Francia.

No creo que haya otra Corporación de nuestro ámbito que cuente con este palmarés.

En Bielorrusia entramos por la puerta grande.

El Dr. Sergey Vladimirovich Ablameyko es una gran personalidad del mundo académico. De la “*intelligentsia*” Bielorrusa.

Se graduó en 1978 en la Universidad Estatal de Bielorrusia, Minsk, con el diploma de Matemáticas. En 1984 se doctoró en el campo de sistemas de proceso de información en el Instituto de Cibernética de la Academia Ucraniana de la Ciencia y en 1990 con el título Dsc de la misma institución.

Actualmente el Dr. Ablameyko es Catedrático, Académico de la Academia Nacional de la Ciencia, Presidente del Consejo Académico UIIP y Presidente del Consejo Científico BSU. Combina la investigación científica (análisis de la imagen, modelo y reconocimiento de gráficos, geometría digital, sistemas basados en el conocimiento, sistemas de información geográficos y representación médica) con la organización de actividades editoriales. Está en el Consejo de redacción de Cartas de Reconocimiento de patrones, Reconocimiento de patrones y Análisis de la Imagen, Gráfica de la Máquina y Visión y otras publicaciones internacionales y nacionales. Es el Redactor jefe de dos diarios nacionales. Además, conduce varios proyectos internacionales en análisis de la imagen financiados por la Comisión Europea a través de Programas COPÉRNICO, INTAS, ISTC, 6º y 7º Programa del Marco, proyectos internacionales con organizaciones de Rusia, Ucrania, India y China y se ocupa de Programas Nacionales y proyectos en Informática y Proceso de imágenes. También maneja varios programas conjuntos ruso-bielorrusos en el Espacio, Superordenadores y tecnologías de la REJILLA (cada Programa tiene un presupuesto de más de 10 millones de US\$). Sergey Vladimirovich Ablameyko es Decano de IEEE, Compañero de IAPR, Socio de la Academia Técnica Bielorrusa y Académico de la Academia Nacional de Ciencias de Bielorrusia.

Fue Vicepresidente de la Asociación Internacional para el Reconocimiento de patrones (IAPR), Presidente de la Asociación Bielorrusa para Análisis de la Imagen y Reconocimiento.

Sus publicaciones incluyen más de 350 trabajos científicos, nueve de ellos son libros de “authored/co-authored”, 34 libros corregidos y más de 180 documentos arbitrados (en inglés) en revistas internacionales y conferencias internacionales

Además, dos seminarios, nueve disertaciones de PhD y dos disertaciones DSc han estado preparadas y defendidas bajo su supervisión. Sergey Vladimirovich Ablameyko ha participado y presidido numerosas conferencias, foros y congresos dedicados al ámbito del ordenador y sus problemas técnicos.

Le han sido concedidos numerosos honores nacionales como el Premio estatal de Bielorrusia (el premio científico nacional más alto), Premio de la Academia Nacional de Ciencias para el mejor trabajo científico y Medalla Bielorrusa de F. Skoryna,

Premio ruso de la Amistad y muchos otros galardones. También ha participado en viajes a centros de investigación en Italia, Finlandia, Australia, Japón y Alemania.

Finalmente digamos que es el Rector de la Universidad del Estado de Bielorrusia.

Su discurso de ingreso se desarrolla en un largo, denso y clarificador recorrido sobre lo que deben ser las principales funciones de una Universidad moderna.

Han sido particularmente enriquecedoras sus reflexiones sobre la educación en general y lo que debe ser la Universidad de la Ciencia.

Lógicamente y teniendo en cuenta los campos de interés científico a los que ha dedicado su vida docente, académica y de investigación ha profundizado en su disertación sobre las tecnologías de la comunicación en la moderna Universidad, así como en la importancia de la internacionalización de la educación como un factor clave de su calidad.

Personalmente me ha interesado en grado sumo la última parte de su discurso dedicada a la historia de la Universidad del Estado de Bielorrusia.

Su pasado y su presente. Como fue fundada en 1921 por el Académico Vladimir Ivanovitch Pichet. La guerra, como consecuencia de la invasión alemana, no sólo dejó casi completamente destruido el recinto y su campus sino que significó la muerte de numerosos profesores y estudiantes que sacrificaron sus vidas en la defensa del suelo patrio.

Volvió a levantarse y a ser un modelo educativo con sus facultades de Leyes, Matemáticas y Mecánica, de Física, de Matemáticas Aplicadas, de Ciencia de la Computerización, de Radiofísica y de Electrónica, de Filosofía, de Economía, de Química y de Física Nuclear. Brillando todas ellas no sólo por su labor docente sino también por sus trabajos de investigación.

Actualmente cuenta con un claustro de cerca de 3.000 miembros. Entre ellos 15 Académicos, 400 Doctores en Ciencias y 1840 graduados de doctorado. Y lo que es fundamental, más de 30.000 estudiantes.

Debo felicitar a nuestra Real Academia de Ciencias Económicas y Financieras de España por su acierto al haber sabido cooptar al Ilustrísimo Señor Dr. Sergey Vladimirovich Ablameyko como Académico Correspondiente para Bielorrusia y, en nombre propio y en el de nuestra Real Corporación al recipiendario por su discurso y para darle la enhorabuena por su ingreso.

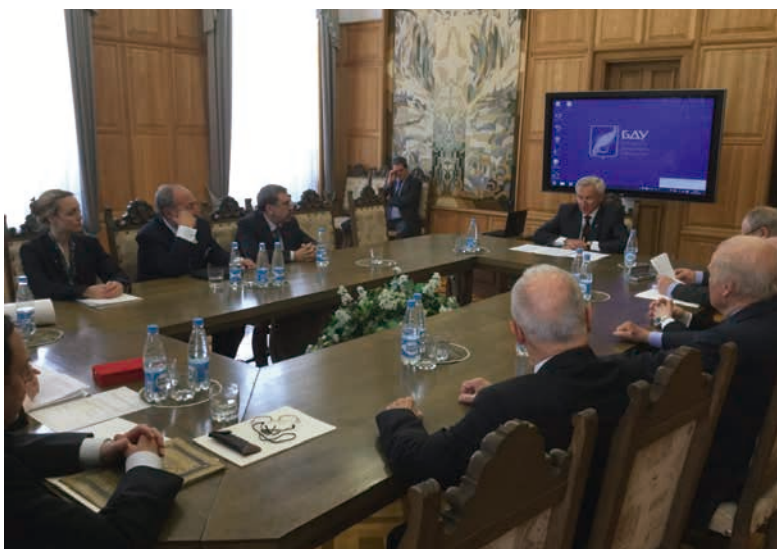
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SOLEMNE SESIÓN DE INGRESO

*PICTURES FROM SOLEMN ACADEMIC SESSION*





El Presidente de la RACEF Dr. Jaime Gil Aluja toma juramento al nuevo Académico Corresponsiente para Bielorrusia, el Dr. Sergey V. Ablameyko, en presencia del Vicepresidente Dr. Lorenzo Gascón y los introductores, Dr. Enric Arderiu y D. Emilio Ybarra. El acto tuvo lugar en el Rectorado de la Universidad Estatal de Bielorrusia. (Minsk, 16 de mayo de 2016) *Academic statement.*



El nuevo Académico Dr. Sergey Ablameyko en su discurso de ingreso, bajo el título 'University in Modern Society: Belarusian State University in the Country and in the World' / *Admission speech.*



El Vicepresidente de la Real Corporación Dr. Lorenzo Gascón, pronunciando la *Laudatio* y Contestación con motivo del ingreso del nuevo ingreso académico/ *Reply speech*.



El Académico de Número Dr. Ramón Poch hace entrega al Dr. Sergey Ablameyko, del diploma acreditativo como Académico Correspondiente para Bielorrusia/ *Diploma as Corresponding Academician to Belarus*.





Una actuación musical representativa del folklore bielorruso cerró el solemne acto de ingreso/*Belarussian folklore*.




Foto de familia de los Académicos que asistieron al solemne acto de recepción del Dr. Sergey Ablameyko como Académico Correspondiente para Bielorrusia. De izquierda a derecha los Dres.: Ybarra, Arderiu, Aguer, Krasnoproshin, Gascón, Gil (Presidente), Ablameyko, Poch, Pont Amenós, Gil Lafuente y Rodríguez Castellanos. */Group photo of Academicians.*







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