Scientific and research activities: evaluation criteria, development prospects (based on the activities of the Federal State Government-financed Educational Institution of Higher Professional Education "Orel State University")

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Abstract. The paper focuses on the importance of establishing a unified system (content structure) of reporting on the research work of a faculty, a department (laboratory), a research institute, a research center, a research and education center of the Federal State Government-financed Educational Institution of Higher Professional Education "Orel State University". Taking into account the organization of university research activities, the authors analyze the implementation of the system.

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Introduction

The need for collecting comprehensive information on the scientific research carried out at the university is becoming an increasingly pressing problem among others in the wide range of university activities.[1, 2, 3, 4, 5, 6] This approach corresponds to the national demand for establishing electronic document management systems in the framework of e-government system. Scientific research is the second indicator among eight others in the calculation methodology of indicators marking the effectiveness of educational institutions of higher education. [7] In this regard, the demand for revitalization of the research work of university academic and research sectors is increasing.

Over the years of its development Orel State University became a scientific and educational center and one of the leading universities in Central Russia. Scientific research is a top priority among its various activities.

Scientific research of the University is conducted in accordance with the Charter of Orel State University through the Academic Council resolutions and the regulations on: the research sector, the scientific department, the organization of research activities, the post-graduate and doctoral training programs, the Student Research Society, the Young Scientists Council, the scientific research institute, the scientific and educational center, the research laboratories and in accordance with other relevant regulations and applicable laws. General supervision of the University scientific work is carried out by the Scientific Council and the University rector; the operational management of research activities is entrusted to the University pro-rector for research and academic activities. [8]

Scientific research of the University academic staff is carried out according to the individual and chair plans of scientific activities (working plans of scientific research institutes, laboratories, research and educational centers, etc.). Scholars, doctoral students, post-graduate students, researchers, lecturers are actively involved in research activities and competitions held by the Ministry of Education and Science of the Russian Federation, the Russian Foundation for Basic Research, the Russian Foundation for Humanities, the Russian Science Foundation. They are responsible for research and development work performed under economic contracts with customers from industry and research institutions of the Russian Federation and the Orel region.

For operational management and coordination of scientific activities of the University research departments an advisory body was created - the Scientific and Technical Council of Orel State University. It includes sections on basic research areas of which there are sixteen at Orel State University. They are: physical and mathematical sciences; chemical sciences; biological sciences; engineering sciences; agricultural sciences; historical sciences; economic sciences; philosophical sciences; philological sciences; jurisprudence; pedagogical sciences; medical sciences; psychological sciences; political sciences; art history; Earth sciences.

The structure of the University scientific research sector includes the research department, the

department for training of highly qualified academic staff, the Expert Advisory Body on Academic Degrees of Professor and Associate Professor, dissertation councils, the Scientific and Technical Council, the Ethics Committee, scientific research institutes, laboratories, museums and other scientific units. Each major research department has its own hierarchy.

12 major functional departments that have been created at the University by now are functioning successfully in crucial scientific areas. These departments include: the Research Institute of Natural Sciences; the Research Institute of Philology; the Research Institute of Psychology and Pedagogy; the Research Institute of Legal Problems; the Research Institute of Russian provincial culture; the Research Institute of the Content and Methods of Organization of Students' Research and Innovation Activities; the Research and Education Center of Nanotechnology; the Scientific Center of Globalization Challenges and European law; the Educational Research and Practice Center of Conflict Resolution; Prioksky Regional Multidisciplinary Business Incubator; the Research Institute of the Problems of Socio-economic Processes and Their Simulation; the Research Institute of Central Russia History and History Methodology.

There are more than 10 individual research laboratories at the University (V.P. Gromov's Laboratory of Function Theory and Functional Analysis named after, the Laboratory of Service Work, the Histology Laboratory, the Laboratory of Clinical Microbiology, the Laboratory of Clinical Pharmacology, the Research Laboratory of the Development and Implementation of Evidence-based Tools and Methods of Social and Economic Processes Research in the Conditions of Market Economy Development, the Laboratory of Common Problems of Didactics, the Research Laboratory of Information and Communication Competences (ICT competences) of the Future Teacher, the Laboratory of Historical Informology, the Laboratory of Educational Technologies Used in Training of Students of the Faculty of Physical Education and Sports in Contemporary Socio-economic Conditions, and other laboratories).

The University has more than 10 museums (the Museum of Ethnolinguistics, the Museum of Ethnopedagogics, the Museum of Zoology, the Histological Museum, the Clinical Anatomy Museum, the Museum of the Russian textbook, The Museum of Education: from the Classical School – to the Classical University, The History Museum of the Faculty of Physics and Mathematics, the History Museum of Orel State University, the Herbarium named after V.N. Hitrovo, etc.).

Five centers for collective use have been established on the basis of the University (Prioksky Regional Multidisciplinary Business Incubator of Orel State University, the Computing Center, the astronomical observatory, the typography of Orel State University, the Research and Education Center of Nanotechnology). [8]

At present, such programs of postgraduate education as internship (12 areas of specialization) and residency training (14 areas of specialization) are operating at the University.

A lot of emphasis is placed on the development of professional academic staff. The University offers a postgraduate training programme (73 areas of specialization) and postdoctoral training (7 areas of specialization). There are also dissertation advisory committees for the defense of theses of Candidates and Doctors of Sciences.

48 scientific schools are functioning effectively at the University. Their scholars have contributed to the development of science in almost all fields of science. The University research departments focus on top priority areas of science and technology: nanotechnology and nanomaterials, technologies of distributed computing and distributed systems, software production technologies, monitoring of hydrosphere forecasting, environmental management, risk reduction and reduction of the consequences of natural and man-made disasters, genomic and post-genomic technologies, bioengineering technologies, biomedical technologies of life support and human protection, health-saving pedagogical technologies. One of the problems that calls for urgent attention is recertification of scientific schools in line with new certification requirements and a new criterion for assessing university performance: the availability of pedagogical and didactic schools.

Training and professional development the University academic staff is carried out on a regular basis.

Annually University scholars publish more than 80 monographs, more than 100 textbooks and study guides and more than 1,000 articles. They regularly participate in more than 300 scientific conferences. Among University scientists there are authors of federal textbooks for universities and secondary schools.

Another institution that is functioning successfully is the Orel branch of the Scientific and Methodological Council on Mathematics under the Russian Federation Ministry of Education and Science.

The Council of Young Scientists is also effectively working at the University. The Council is a public association of young scientists and University

specialists sharing similar interests and pursuing common goals and objectives. The Council carries its activities on the basis of the principles of voluntariness, equality of its members, self-management, legitimacy and transparency.

Every year the Council of Young Scientists takes an active part in organizing and conducting the "Science Week" of Orel State University. According to the results of the "Science Week" collections of lecturers', students' and post-graduate students' research papers are published. The best works are published in the scientific journal "Scientific Notes of Orel State University."

The Council seeks to encourage young scientists to participate in competitions for grants of the Russian Federation President as well as grants of the Russian Foundation for Basic Research and the Russian Foundation for Humanities which aim to provide support for young Russian scientists who are Doctors and Candidates of Science. The University young scholars are also actively involved in the analytical departmental target program "Development of Higher Education Scientific Potential" and the Federal Target Program "Scientific and academic personnel of innovative Russia".[9]

Every year young University scholars become winners of regional competitions for young scientists (e.g., the regional competition "Young scientists' best research work"; the Award named after the Orel region Governor A.P. Kiselev).

One of the most important work areas of the University is the organization of students' research and innovation activities. Every year all students participate in various forms of research work: conferences, competitions, contests for the best research work, grant competitions in various fields of knowledge. University students publish about 400 scientific papers, 350 of which are not co-authored.

A crucial part in the organization of research and innovation activities of the University is played by the Student Research Society (SRS).

The research activities of the University student society are carried out in the following areas:

- Conceptual framework for the development and operation of the students' scientific research activities (SSRA) based on the education, research and regional policy.
- Optimization of the SSRA system structure, facilitation of its performance, development of interdepartmental and regional cooperation.
- Participation in the creation of regulatory and legislative acts aimed at the development of the SSRA system at Orel State University and in the Russian Federation.[10]

Among all the contemporary University activities an increasingly significant role is played by international cooperation presupposing implementation of a common goal which is comprehensive integration of the Russian higher education in the global education community through scientific research. By now Orel State University has signed cooperation agreements with Anhui State University and Beijing University of Technology. The subject of these agreements is a comparative study of the two educational systems through the exchange of academic staff and student groups, the development of joint projects that contribute to the improvement of students' training and establishing of oriental languages department at Orel State University.

The ties with Germany are also expanding. The contacts of the German language department with Goethe Cultural Center at the Embassy of Germany in Moscow, with the German Academic Exchange Service (DAAD) and with the Robert Bosch Foundation have become traditional. They include the organization of language courses, professional development training, seminars and conferences.

At the moment there is an urgent need to create a unified system for reporting on the research work of different structural units of the University.

Methods

To collect and analyze information about the research activities of the University [7,10] a unified structure of the report on the research work of a faculty, a department (laboratory), a research institute, a research center, a research and education center has been developed.

The structure of the report on the research work of a faculty, a department (laboratory), a scientific research institute (SRI), a scientific research center (SRC), a scientific and educational center (SEC) is based on monitoring of the documents submitted to the Ministry of Education and Science of the Russian Federation (the annual reports on the scientific work of the University, the annually filled passport of the University (organization), the report on performance of an educational institution necessary to determine its type, the results of monitoring of higher education institutions effectiveness, the open public tender for figures of admission to higher education institutions), as well as statistical reports of various levels.

In designing the structure of the report, we used the analytical method, the method of analysis and synthesis of information, the method of systematization, the method of structural analysis.

Results

The report structure:

1. General characteristics of the research work of a faculty, a department (laboratory), SRI, SRC, SEC in the accounting period:

- the research objectives set by a structural department in the accounting period;
- University topics of scientific research projects;
- chair topics of scientific research projects (SRI, SRC, SEC scientific research projects);
- scientific and academic staff;
- supporting staff.

2. The results of the research work:

- grants, projects, programmes, contests (project №, project name, project supervisor, forms of participation, financing);
- economic agreements (topics, financing);
- material and technical resources (equipment, space, materials, etc.);
- the faculty dean's work (work of the director of the Institute, SRI, SRC, SEC), work of the head of chair (laboratory) responsible for the organization of scientific research.

3. Research work according to individual plans.

4. The results of publishing work in the accounting period: (all the names of monographs, textbooks, study guides, research papers, etc.). The data is entered in Table # 1. [7]

Table # 1

Table row		Total	The number of staff showing the results listed, people
1.	Total number of articles published in peer-reviewed journals - total		
2.	Including articles published in scientific journals indexed in SCORPUS database		
3.	Articles published in scientific journals indexed in Web of Science databases		
4.	Including articles co-authored by foreign authors		
5.	From page 1 – Articles published in scientific journals included in Russian Science Citation Index (RSCI) database		
6.	Articles published in scientific journals included in Higher Attestation Commission database		
7.	Total number of published monographs		
8.	Including articles published abroad		
9.	From page 7 – articles co-authored by foreign authors		
10.	Publications co-authored with foreign scholars		

5. Scientific reviewing.
6. Opponency, participation in the work of dissertation advisory committees.
7. Coordination contacts (specify: country, city, full name of the institution).
8. Academic trips, conferences, seminars and other scientific events (according to Table # 2). [7]

Table # 2

	The event (text) *(specify: full name of the event, venue, date)*	Results (text) *(specify: full name of the article (author), output data, title of the presentation (report), certificate, diplomas, etc.)*
Academic trips		
Conferences		
International conferences		
Seminars		
Forums		
Exhibitions		
Academic contests		
Competitions		
Other events		

9. Advanced professional development (in its different forms: advanced training, work/study placement, research leave, post-graduate course, doctoral course).
10. Students' research work (forms of organization).
11. Students' research work, results:

A) winning a competition; B) winning an academic contest; C) winning at an exhibition; D) publishing activities, etc.

It is necessary to indicate the name of the project and its venue (a copy of the diploma, certificate, etc. must be provided to confirm the information).

12. The work of applicants for a degree, postgraduate and doctoral students.

13. Working efficiency of scientific schools. The data is entered in Table # 3.

Table # 3

Order number	Specialty number	Name of the scientific school	Head of the scientific school	Description of the scientific school	Results
1.		Name	Full name	line of work, content of work	Number of the defended theses of Candidates and Doctors of Sciences (specify: the title of a thesis, full name of the author, date and venue of the defense) - -
					Number of postgraduate students / applicants for a degree in the accounting period - -
					Number of published monographs, textbooks, study guides (the author, the title, output data) - -
					Number of published articles (the author, the title of the article, output data) - -
					Number of articles published in scientific journals included in the Higher Attestation Commission database (the author, the title of the article, output data) - -
					Number of articles published in foreign journals (the author, the title of the article, output data) - -
					Participation in grant programmes (the title, number and topic of the research project, Federal Target Programme, departmental programme, regional programme within which the project has been carried out) - -
					Implementation of economic agreements. - -
					Patent activity - -
					Number of articles published in world scientific journals indexed in the SCORPUS and Web of Science databases (the author, the title of the article, output data)

14. Availability of laboratory equipment, measuring and control instruments and devices. The data is entered in Table # 4. [7]

Table # 4

Sequence number		Number (avaliability)
	Electronic microscopes	
	Mass spectrometers	
	Chromatographs	
	Analyzers	
	Calorimeters	
	X-ray apparatuses	
	Ultracentrifuges	
	Other types *(describe briefly)*	

15. Patent activity. The data is entered in Table # 5.

Table # 5

	Table row	The number of patent (certificates) applications submitted in		The number of patent (certificates) applications received in		The number of active (supported) patent (certificates) applications received in	
		Russia	abroad	Russia	abroad	Russia	abroad
Inventions	01						
Useful models	02						
Industrial models	03						
Trademarks	04						
Databases	05						
Integrated circuit topographies	0-6						
Computer programs	07						
Selection results	08						

16. Availability of unique stands and facilities for research, development and engineering.

Conclusions

Such annual monitoring makes it possible to analyze the quality and efficiency of the scientific work and its problematic aspects as well as the effectiveness of individual indicators, and then lay out a plan (arrange an event) to optimize the scientific activities of the University. The structure we have worked out is a basis for creation and realization of the system for preparing the electronic reporting about scientific work in the higher education institution.

It should be noted that the development of the University depends on the advancement of the scientific ideas of its scholars, the improvement of all forms and methods of its research work and innovation activities.

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