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METHODOLOGY OF APPLYING RANKINGS FOR EDUCATION
SPACE STUDIES

The relevance of the research. In modern conditions, the problems of the education quality intensively enter the sphere of public policy interests. They become the sphere of competition and the receipt of global political and socio-economic advantages by states. Educational rankings are used as indicators of the effectiveness of the economy and social policies of states, possibility for ensuring security and sustainable development. In the conditions of the global world, the relevance of rankings application for education space study is evident both in the framework of pedagogic theory and directly in educational practice. Currently, various global rankings are not used systematically to study the education space, determine its qualitative and other characteristics, analyze its formation taking into account various factors and conditions. In the thesis it is proposed to assess the state of the education space on the basis of global rankings complex.

Until now, there is a problem of objectivity in the evaluation of education space in various aspects. Methodological and theoretical bases that would allow for more objective assessment of the education system with the use of rankings have not been developed yet.

The relevance of the research lies in the fact that in modern socio-political conditions, rankings can be considered as one of the tools of “soft” power and even therefore require careful study.

A correct, methodologically verified rankings use to evaluate the state of the education space allows in each specific case to more objectively assess the current state of education space.

For modern pedagogical science, it becomes extremely important to conduct more in-depth studies on a number of socio-humanitarian problems, including rankings in education. The task of increasing the objectivity of

assessing the state of the education system calls for the need to apply large databases, including ranking data.

Large data are successfully used in the analysis of political and economic projects in the short and long term, in advertising and other spheres of human activity, where it is required to identify causal relationships between processes and phenomena, not always clearly connected, their analysis and forecasting further development. The possibilities of big data allow deepening and increase the objectivity of research in the sphere of education. In the thesis, this will be shown by the example of using a multitude of rankings in their various collections to study education space.

Degree of the problem elaboration.

The problems of rankings creating and assessing in the education system began to be considered at the beginning of the 21st century, and in many aspects have not been adequately considered yet. Some problems of ranking as a process and its subsequent results are analyzed in a number of studies. At the same time, it is important to emphasize that as far as we know there are no works which would present a lot of analytical characteristics obtained through rankings and aimed at researching and evaluating the education space. In general, there are not many works of Russian and foreign scientists related to the use of global rankings.

Studies of rankings in the field of university education were conducted by such Russian scientists as A.V. Kincharova, T.L. Klyachko, N.S. Ladyzhets, M.M. Yudkevich.

Various aspects of rankings use were developed by scientists in economics (A.M. Karminsky, A.A. Polozov), in sociology (Robert King Merton), political science (V.G. Ivanov). The theoretical basis for creating rankings was studied by such foreign authors as Altbach P.G., Simon Marginson, H. Hazelkorn, etc.

For this research, the concept of “education space” is important. Analysis of the concept of “education space”, the rationale for its theoretical status was conducted by S.K. Bondyreva, V.I. Ginetsinsky, S.V. Ivanova, A.M. Novikov, G.V. Sorina and others. B.L. Vulfson introduced the concept of “world education space”.

The application of the system approach in the study is based on the research of systems and the system approach, reflected in the works of scientists of various fields: I.V. Blauberg, V.N. Sadovsky, E.G. Yudina, Ludwig von Bertalanffy, A.A. Bogdanov, A.A. Denisov, N.N. Moiseev, D.A. Novikov, Ilya Prigogine. V.P. Bepalko, Philip H. Coombs, G.P. Shchedrovitsky wrote on the features of the application of the theory of systems in pedagogy.

The method of mathematical modeling applied in the dissertation as well as statistical methods are based on the experience of their use in the economy, social sciences (I.V. Bestuzhev-Lada, N.D. Kondratiev). The influence of science-metric criteria on managerial decisions was considered by M.L. Agranovich, V.L. Volokhonsky, V.V. Nalimov, M.M. Sokolov.

It turned out that the answer to the question of why rankings became so popular is possible only within the framework of interdisciplinary research. The answer to this question was found in the works of scientists in the following fields of knowledge: sociology (R.K. Merton), economics (A.M. Karminsky, A.A. Polozov), political science (in particular, of the theory of “soft power” V.G. Ivanov), psychology (in the field of the psychology of trust – A.B. Kupreychenko, in the field of the properties of human memory – G.A. Miller).

The study of the problem and its development revealed a number of **contradictions**:

- between the increase in the heuristic value of the phenomenon and the concept of the education space and the undeveloped theoretical bases of expertise, analysis and forecasting of various aspects of the education space, a

methodologically substantiated ranking approach could serve as a specific tool for studying it;

- between a large number of existing rankings and the lack of their consideration in assessing the state of the education space;

- between the specific application of rankings in the field of education and the lack of methodological and theoretical bases for using rankings for a comprehensive analysis of the educational space;

- between the availability of big data sets as the results of various ranking and statistical studies and the lack of methodological and theoretical bases for assessing their impact on the education space of the countries in the world;

- between the wide use of indicators in the field of education and the absence of distinguishing the indicative and goal-setting functions of any indicators and, in particular, rankings in the pedagogical science.

The research problem lies in the undeveloped methodological foundations of the systematic application of ratings to study the state and design of the development of the education space.

The relevance and contradictions led to the choice of **the research theme “Methodology of applying rankings for education space studies”**.

The object of the study is a number of international and Russian rankings in the education system.

The subject of the research is ranking as the basis for studying modern education space (methodological aspect).

The purpose of the study is to present a methodology for applying rankings for studying and objectively evaluating the education space in various aspects, assess the methodology for preparing various world rankings, and identify the main directions for modern ranking in the education system (based on the rankings approach).

To achieve this goal, **the research hypothesis** suggests that rankings will become a way of studying the education space in case that:

- the rankings approach will be created on the basis of a methodology that includes goals, principles, foundations, methods, means, procedures for its application;

- the existing rankings will be used systematically, allowing to comprehensively and objectively evaluate the education system and the factors affecting it;

- the functions of rankings within the education space will be revealed;

- the indicative and goal-setting functions of the education quality indicators will be divided in pedagogical science.

The hypothesis will be confirmed by approbation of the developed rankings approach for achievement of various goals of studying the state of the education space.

Therefore, **the main objectives of the study** are the following:

1. To evaluate the existing methodologies for the preparation of the most famous world rankings.

2. To identify the differences in the criteria used to compile the rankings.

3. To demonstrate insufficient use of these rankings in the education system.

4. To develop methodological bases for applying rankings to study the education space (the rankings approach).

5. To prove the possibility of rankings use to assess the state of the education space and the prospects for its development.

6. To show the application of the rankings approach in the course of approbation of variative models for the evaluation and analysis of education space in various aspects.

7. To provide classification of rankings by their functions, application techniques, the degree of objectivity and the limits of applicability.

Theoretical and methodological bases of research.

Theoretical and methodological basis for the study were:

- certain provisions of research in the field of university rankings (A.V. Kincharova, T.L. Klyachko, N.S. Ladyzhets, H. Hazelkorn, M.M. Yudkevich);
- ideas concerning the study and formation of education space (B.L. Vulfson, O.B. Ivanov, S.V. Ivanova, A.M. Novikov, G.V. Sorina, I.D. Frumin);
- methodology of system analysis (A.A. Bogdanov, Ilya Prigogine, N.N. Moiseev, A.A. Denisov);
- developments in the field of methodology of pedagogy, methods and methodology of pedagogical research (V.I. Zagvyazinsky, V.V. Kraevsky, M.A. Lukatsky, A.M. Novikov, D.A. Novikov, V.M. Polonsky, V.V. Serikov, M.N. Skatkin);
- comparative analysis in the education system (B.L. Vulfson, A.N. Dzhurinsky, S.V. Ivanova, I.A. Tagunova);
- scientific foundations of mathematical modeling methods, statistical and mathematical methods for collecting data (I.V. Bestuzhev-Lada, N.D. Kondratiev).

Research methods.

Structuring research methods in terms of their use, it is possible to distinguish several groups:

- 1) as research methods the author used: questioning and documents study, comparative analysis, factor analysis, conceptual analysis;
- 2) as methods of information processing and analysis: correlation, expert-analytical methods and sequential substitution method;
- 3) methods of forming solutions within the framework of the study were the method of system analysis and the modeling method;
- 4) also the methods of substantiating solutions in this work (analog methods, comparative methods) and the method of modeling the existing and desired state of the object under study are also applied.

Sources used during research are:

1. University websites, global university rankings sites, the World Bank website and other major organizations that create global rankings and publish statistical information in open access.

2. Official normative legal documents and agreements upon the state of the education space.

3. Reports and analytical materials of national and international organizations, independent analytical expertise, rankings related to the issues under study.

4. Scientific publications on the problems of global rankings and strategies for the development of a modern university.

The scientific novelty of the research results is as follows:

1. The author identifies and justifies previously unknown possibilities for rankings in the studies of various aspects of the education space, the dynamics of its development, changing its development strategies. The characteristics of rankings in this perspective are given.

2. The methodology of the rankings approach to education space study in various aspects is developed, including goals, hypotheses, foundations, principles, methods and means.

3. The author presents types and forms of using the rankings approach for assessing various aspects of the education space. Mechanisms, models, procedures of complex comparison of various aspects of education space of countries, regions and educational organizations are created.

4. The author discloses methodological techniques and technologies of using existing ranking data for carrying out comparative studies of the education space. It is shown that the applied methods and technologies make it possible to obtain results that positively correlate with the conclusions of international research groups, build correct forecasts, and conduct retrospective studies.

5. The main principles of the rankings approach (dual objective and subjective nature of rankings, the priority of rankings for education space

studies and the need to distinguish between indicative and goal-setting functions of rankings) are formulated and substantiated, which allows determining the limits of applicability of the rankings data used, taking into account the methodologies for their creation.

Theoretical significance.

A scientific contribution has been made to theoretical pedagogy, a new approach has been developed, which, in particular, contributes to the further development of methodology of comparative education studies.

The theoretical and methodological foundations of the system use of rankings for research and design of the education space of the university, region, and the world are revealed.

A new trend in pedagogical science is theoretically substantiated that is the use of a multitude of rankings for assessing the state of the education space.

A classification system for rankings describing various aspects of the education space is presented.

A methodology for studying the goals, objectivity and limits of applicability of these rankings is created.

Practical significance of the study.

Techniques and procedures were developed and tested allowing the use of the rankings approach for the assessment of universities, countries, regions; specific examples of the use of created techniques and variative models are given.

The main provisions of the study can be applied in the development of strategies and concepts for the development of universities, higher education in general, in educational programs for the development of managers' skills, in carrying out studies based on large amounts of data in order to improve the objectivity of results.

Provisions to be defended:

1. The use of rankings allows determining the conditions, principles and possibilities for using rankings to study, model and form the education space. The possibilities of rankings for determining the comparative effectiveness of universities in various aspects (scientific, educational, socio-economic, personnel, etc.) are substantiated. The principles of using rankings, ensuring effectiveness and reliability (the principle of distinguishing indicative and goal-setting functions of rankings, the principle of advantage of rankings used to study the education space, the widely used for this purpose questioning, the principle of duality of rankings) are developed.

2. As a result of the analysis of rankings describing the education space and the factors influencing the quality of education, the rankings approach has been created that allows using rankings in a complex, purposeful manner, taking into account their functional purpose and real possibilities. Complex use of rankings, in contrast to the previously used unilateral one, makes it possible to take into account the connections and interaction of various processes that form the educational space.

3. The goals and hypotheses of application developed in the course of research, the principles, methods and tools of the rankings approach form the methodology of the rankings approach, which allows to study the education space in its various aspects, to assess its state and development forecasts.

4. The application of models, methods, procedures of the rankings approach shows the influence of various political, socio-economic factors of the education space on the quality of education. By approbation of variative models on specific examples, the capabilities of the rankings approach are shown, in particular, in the analysis of education space in terms of the economic and legislative aspects.

5. The revealed principles and factors of effectiveness of ranking procedures, the definition of indicative and goal-setting functions of rankings create conditions for studying and assessing the state of the education space. It is

important that the mechanism for determining the goals of the ranking creators is developed. Analysis of the goals and methodology of the leading rankings allows formulating the principle of dual character of rankings, which should be taken into account when using the rankings approach.

Research stages.

The study was conducted in the period 2011-2018: 2011-2014 - studies of the systems for assessing the education quality in Russia and abroad, studies of the multilateral impact of education space state on the quality of education; 2015-2016 - selection of rankings describing education space state, development of methodology and approbation of the rankings approach; 2017-2018 - analysis and generalization of research findings, design of dissertation work and its abstract.

The reliability and validity of the results of the study are ensured by the use of reliable sources appropriate to the study, as well as a complex of various methods adequate to the research objectives; the creation of the rankings approach using a special methodology, which was tested by the author of thesis during the research.

The personal contribution of the applicant consists in the independent conduct of the research, the development of the methodology, which served as a proof of the hypothesis. The created models, methods and procedures of the ranking approach are presented, which, based on the application of existing rankings, makes it possible to prove the objective, actual influence of various political, socio-economic factors of the formation of the education space on the quality of education and, consequently, to provide a forecast, to show ways of solving problems related to similar influence. Specific examples show how the rankings approach is used. A serious personal contribution has been made to the selection of research methods that are of an interdisciplinary nature.

Approbation of the research materials was carried out at the meetings of the Center for Comparative Education, the Academic Council of the Institute

for the Strategy for the Development of Education of the Russian Academy of Education, the meetings of the Scientific Council for Comparative Education under the Department of Philosophy of Education and Theoretical Pedagogy of the Russian Academy of Education, round tables and seminars. The materials of the research are approved in presentations at international theoretical and scientific and practical conferences: “SCIENCE ONLINE” (Andorra, 2015, Spain, 2016), EEIA (Moscow, 2016, Moscow, 2017, Moscow, 2018), “Strategy for the development of the education space in the conditions of global risks” (Moscow, 2017); as well as at the 3rd All-Russian Conference on Science Metrics (Moscow, 2015) and several others.

The researches carried out by the author in the process of preparation of the thesis were supported by the Russian Humanitarian Scientific Foundation (project No. 14-06-00650 “Development of Education in the Post-Soviet Area (1991-2011)”), included in the reporting materials on the state assignments of the Institute for the Strategy for the Development of Education in 2015-2018.

The applicant **has published** 41 scientific papers, including 15 articles in journals included in the List of the Higher Attestation Commission of the Russian Federation, 4 papers in the international database of the Web of Science, 2 articles in the international Scopus reference database, 3 collective and 1 author’s monographs.

The structure of the dissertation is determined by the logic and intent of scientific research. The thesis consists of an introduction, three chapters, conclusion, a list of references (316 titles), a list of illustrations (110 titles), a list of tables (31 titles) and 5 appendices consisting of 59 tables. The thesis without appendices consists of 346 pages, with appendices - 518 pages.

THE MAIN PART

The **introduction** explains the relevance of the theme, identifies the problem, the object and subject matter of the study, its goal, tasks and methods,

reveals the academic novelty, the theoretical and practical significance of the work and formulates the main provisions put up for defense.

The first chapter entitled “The History of the Emergence and Description of Rankings. The Case for the Rankings Approach to the Study of Education Space,” shows that the global rankings of universities, a recent development, determines the reputational potential of universities gradually turning into an essential element of education policy and competition for investments as well as the best students, teachers and researchers.

Paragraph One, “The History of the Emergence of Rankings and Their Application Today,” shows that despite their short history, rankings describing various spheres of society’s life have been proliferating. In the field of education, university rankings outnumber the rankings of other education institutions.

There exist many rankings of universities of various scales, including the global scale, of which three are the best known and most significant.

1. QS World University Rankings is provided by Quacquarelli Symonds.
2. The Academic Ranking of World Universities (ARWU) comes from Xiao Tong University in Shanghai.
3. The world university rankings Times Higher Education (THE) has been created by the British publishing house Times Higher Education (THE).

Making it to the top hundred universities in these rankings has become the key indicator of the program of upgrading leading Russian universities (5-100).

The Russian history of rankings, like the history of world rankings, began in 1998. Russian universities attained a new level of rankings after Russian President Putin on the day of his inauguration on May 7, 2012 signed Decree № 599 On Measures to Implement Government Policy in the Field of Education and Science, which charged the Government of the RF with developing and approving a plan of measures to develop the leading Russian universities.

There are beginnings of a trend to assess the development of social conditions as part of assessing the performance of a university. An example is the Three Missions of University rankings, which assess the interaction between the university and society. A successful example is Shanghai University whose program from the start took into account the socio-economic development of the region.

In the education sphere rankings are used to assess the state of the education system in a city, region, and there are some rankings of individual schools and universities which do not, however, take into account the socio-economic conditions that have a direct impact on the education space.

Paragraph Two, "Definitions and Terms of the Rankings Approach," shows what factors influence the quality of education, what is the education space and what elements it comprises. The education space, according to an updated definition given by S.V.Ivanova, is "the object world, the totality of objects pertaining to education that create and fill this space, and simultaneously an object of subjective activity consisting in the perception, operation and impact of the subjects within this space".

The use of rankings to upgrade the quality of the education process offers an opportunity for an impartial assessment by qualified experts of the strengths and weaknesses of a university and revealing its possible growth areas. The activity to upgrade the quality of all the aspects of the education process is the key way to build sustainable competitive advantages. It can be argued that an improvement of quality indicators even on one of the quality criteria entails improvement of other indicators. However, many rankings in various combinations may be instrumental in tackling a more ambitious task of studying the education space.

Paragraph Three, "Classification of the Main Rankings Used in Assessing the Education Space," analyzes the rankings which may be used to assess the education space and presents the existing classifications. Rankings are

so diverse that there is no single classification of rankings in general and in the education space in particular. In planning to use rankings for an all-round study of the education space, it is important to work out a mechanism of rankings classification, followed by a methodology of correct use of rankings.

The study of regulatory acts and of scientific sources shows that the problem of interaction between global rankings and the education space has not been studied from this angle. This work may be helpful in sorting out what the most significant world rankings are and for what purpose they were created in the first place. Consequently, we may be able to give a fairly definite answer to the question: how and in what cases should rankings be resorted to, and consider them to be a measure of the quality of education in a concrete country and in concrete socio-economic conditions.

Many rankings yield results that can be used in assessing the state of the education space. However, we can safely say that a great many global rankings (not only education-related rankings) are not taken into account in assessing the state of the education space. For this reason, managerial decisions often contradict the results of comprehensive use of various rankings in assessing the state of the education space (in the world, in a country or region).

As a result of the analysis of the literature on the education space and analysis of the use of rankings in the education system the author has shown that a methodological approach that makes it possible to comprehensively assess the education space, objectively take into account the social, economic and socio-cultural conditions of its formation has yet to be developed. The study has revealed that global rankings (in various combinations and separately) may provide an instrument for such a comprehensive assessment. Within the framework of the pedagogical science, it is necessary to develop methodological principles, an approach that makes it possible to use global rankings to study the education space.

The development of a rankings approach on the basis of a special methodology enables the following tasks to be solved:

- to objectively assess the state of the education space;
- based on objective scientific data to forecast the development of the education space as a whole and of concrete education institutions, including universities;
- in managerial practice take decisions, develop strategies, project the formation of the education space, carry out modernization projects with due account of the real state of the education space and forecast its development.

The rankings approach ensures:

- all-round assessment by varying the results of various rankings;
- validity as proven validity of these known world rankings and through mathematical calculations in processing large data bases;
- objectivity of assessment by providing methodological grounding.

The approach based on the potential of world rankings in assessing the state of the education space is systemic in character, and the variant models of its use may potentially take into account many circumstances and conditions of the modern world: globalization, digitization, global risks, problems of the media epoch, etc. It has to be stressed that state programs developed from the results of rankings are aimed at improving the performance of a concrete university in a concrete ranking and usually do not assess the education space beyond one university. Yet it is obvious that it is impossible to change the quality of education without changing the education space.

In that sense the potential of rankings has practically never been used, however, the dissertation shows that rankings are an actor, an object of the education space and an instrument of exercising “soft power” to influence the education system. Therefore, there is a need to create an approach to the use of rankings that taps their potential to study and assess the state of the education space.

Chapter two entitled “Methodology of the Rankings Approach to the Study of the Education Space,” presents a methodology of the rankings approach as a totality of goals, hypotheses, principles, methods, means and procedures used to study the education space.

Paragraph one, “The Goals and Hypothesis of the Application of the Rankings Approach to Study the Education Space,” identifies the goals of studying the education space in the most general way: revealing the general regularities of the development of the world education space through a comparative, retrospective, causal, correlational analysis of the world’s countries and regions at various periods. The study of the education space on the basis of rankings may be an element of expert-analytical study of a theoretical or applied character or it may be a goal in itself. The hypothesis consists in that by applying the rankings method it is possible to study various aspects of the education space (depending on the goal set). Correct use of rankings to study the education space requires the use of the principles of the rankings approach that include the principles of the philosophical and general scientific levels and the principles of the concrete scientific level reflecting the features of the rankings approach proposed by the author.

Paragraph two, “Methodological Foundations of the Application of Rankings to Study the Education Space,” shows that in designing, creating and using the education space subsystems, like in all other man-made systems, there arise tasks stemming from the functioning of the education space as a whole as well as a wide range of managerial tasks solved through a systemic approach. The diverse opportunities offered by the rankings approach involving the assessment of various aspects of the functioning of the education space and requiring various combinations of methods dictates the use of an interdisciplinary approach. The rankings approach to study the education space cannot be based solely on the systems and interdisciplinary approach and calls for the development of its own principles.

Paragraph Three, "The Principles of the Rankings Approach to the Study of the Education Space," identifies and describes the principles of the rankings approach:

- the need to distinguish the indicative and goal-setting functions of rankings;
- the dual character of rankings;
- the advantages of the use of rankings to study the education space over the widely used questionnaire-based method.

The principle of distinguishing the indicative and goal-setting function of rankings. For universities and their superior organizations the rankings may be fictitious areas of growth that run counter to the immediate tasks. In a situation of shortage of resources, preference is likely to be given to the tasks that ensure the achievement of indicators on whose fulfilment the entire further functioning of the universities may hinge. To prevent the indicators from becoming areas of growth the achievements should be systematically checked against the planned goal. Ideally, when indicators match the target, the optimum way to achieve the goal is correspondence to indicators. The results of an assessment of a university by ranking agencies may be considered to be a valid assessment of the state of a university if they assess the university in its natural state. In a situation of purposeful efforts to achieve positions in rankings this is the leading goal, we are talking rather about the competition format. Conditions may be revealed under which an assessment of a university in its natural state is possible. Analysis of the performance of the Shanghai rankings shows that university rankings are good indicators, but bad pointers to areas of development.

The principle of the advantage of rankings used to study the education space over the widely used questionnaire-based methods. The use of rankings instead of the more widely used method of designing and analyzing

questionnaires to confirm the model developed during the course of the study has a number of advantages.

The principle of duality of rankings. We have shown that rankings have a dual objective-subjective essence. They are objective in the area of calculations in terms of mathematics and statistics, but represent the subjective opinion of an individual or group of individuals who choose the indicators and their weight. Is it possible to have a more objective ranking on a worldwide scale that would ensure an authentic assessment of information from several dozen universities across the world bolstered by expert assessment? The study of the features of known rankings has shown that this is unlikely. For this reason, this or that ranking should not be unreservedly accepted or rejected.

The study has revealed three variants of the use of rankings data arranged in order of complexity of implementation.

1. To have an informed understanding, a correct interpretation of the aim of the ranking and in this connection to use it more precisely.

2. To use general objective to make one's own ranking which is quite labor-intensive.

3. To question the quality of data on condition that part of the data cannot be reproduced or are the result of manipulation of the sample of individuals and develop one's own ranking without using others' initial data.

This feature of rankings prompted the development of an alternative method of assessing the objectivity of rankings.

Paragraph four, "Methods of the Use of Rankings to Study the Education Space," shows how the method of assessing the objectivity of rankings helps to expose the subjective aspects of rankings and accordingly to be able to correct the information in using the rankings data. It has become one of the methods of the rankings approach along with the earlier methods created in the framework of the systems and interdisciplinary approaches such as the methods of

mathematical logic and statistics, the games theory, the theory of algorithms, the information theory, the combinational theory and some other areas of science.

Paragraph five, “Instruments of the Rankings Approach for the Study of the Education Space,” determines that the instruments of the rankings approach to the study of the education space are the data of rankings whose quality needs to be determined by the rankings approach method if they are to be used correctly. The use of several criteria of classification of rankings for the purposes of our study may be sufficient to solve the tasks set in this study. Depending on the goals of rankings classification, different classification grounds are important. These may be special for each specific case or they may include many different grounds in the shape, for example, of a diagnostic matrix.

Chapter Three, “The Application of the Rankings Approach: Models, Methods, Procedures,” cites concrete and very diverse examples of the use of the rankings approach developed during the course of the study of the rankings approach used depending on the differences in the goals of the study of this or that aspect of the education space.

In the framework of this study, the rankings of countries and universities are used practically for global comparison by the methods of mathematical statistics in order to reveal regularities between the dynamics or ratios of numerical values of the indicators describing various aspects of the education space. The results of such application of the rankings approach may be used as an end in themselves or serve as the basis for further research: a) comparison of world and regional trends; b) retrospective study of individual aspects of the education space.

The application of the rankings approach in combination with expert methods of analysis made it possible to carry out the following studies:

1. Revealing by the Delphi method or other expert methods additional factors that explain unexpected trends and verification of the proposed versions by statistical methods.

2. Identifying the list of countries which have optimal indicators or the balance thereof for the purpose of further expert study. For example, countries with a high quality of education with minimum financial inputs (in the share of GDP or on a per capita basis).

3. Analysis by the methods of mathematical statistics of the trends earlier revealed by expert methods.

4. Combined analysis of the data of global and other rankings, for example, rankings of universities or bibliometric rankings.

Paragraph One, “Verification of the Procedure of Assessing the Quality of Rankings when Studying Internal Factors of Universities on the Basis of the Duality Principle,” shows the work of one of the methods of the rankings approach, i.e. the algorithm of assessing rankings quality. The use of the internal factors of universities by the authors of global rankings and accredited agencies is described. Comparative analysis has shown that rankings focus more on reputation, fame, openness of universities, their attractiveness in terms of conducting world-level studies, while accreditation assesses the size and standard of the faculty, the correspondence of the goals and content of the education program and its equipment, research and much else.

In *Paragraph Two*, “The Application of the Rankings Approach to Assess the Distribution and Effectiveness of the Use of Socio-Economic Resources for Education,” the author for the first time provides a combined analysis of all the main authoritative rankings in the field of the use of socio-economic resources for education, which enabled thoroughly argued and sometimes unexpected conclusions to be drawn.

First, the index of the level of education provided in two independent rankings does not depend on its financing both in absolute as well as relative

terms for the countries of the world and the countries of the post-Soviet space. In other words, the number of people acquiring an education of all levels does not depend on government or private spending on education, including grants and donations of international institutions and non-governmental organizations.

Second, the existence of a strong correlation of the education index with healthcare and entrepreneurship suggests that the level of education depends not so much on investment in education as on the quality of life, and this is a single trend as well.

Paragraph Three, “The Specificities of Assessment of Effectiveness of the Application of Socio-Economic Resources for Education in the Rankings Approach,” offers a comparative analysis of the impact of external factors on the education system in the world and in the post-Soviet space and draw several conclusions:

- there is obviously a high degree of correlation between all the indicators for R&D in comparison with education. Wealthier countries spend a larger percentage of their GDP on R&D in spite of the high absolute values, and the standard of R&D corresponds to investments;

- education depends far more than the development of science and healthcare on the general level of the social sphere, but the case of R&D shows that countries with high GDPs and GNPs may raise the level of education by raising the social standards of the population and not by increased funding of education. It is highly likely that investing in promoting the prestige of science, healthcare, entrepreneurial culture and effective management would yield better results;

- indicators of the economics of knowledge are interesting in that they correlate more with social (human, social development) rankings than with education and R&D rankings.

Paragraph Four, “Dispersion as a Factor in the Analysis of Effectiveness of Education Financing,” looks at the potential of dispersion in the framework of

the rankings approach. A separate study has been carried out of the countries with the highest level of education. The countries were identified where the difference between the level of education and its absolute financing figures is greatest. The second stage of the study involved only the countries in the post-Soviet space. This instance of the use of the rankings approach has shown that in studying the education systems in the post-Soviet space countries attention should be paid to the education systems of Georgia and Kazakhstan because their dispersion indicators attest to more effective use of the funds allocated for education.

Paragraph Five, “Modeling the Principles of Education on the Basis of the Rankings Approach,” considers the general strategic features of legislations in the CIS countries on education, explains the importance of principles for the education system in the legislation of CIS countries, and describes individual countries in terms of existence of principles in education legislation.

Paragraph Six, “An Instance of Modeling as a Method of Analysis of the Legislative Principles of Various Countries,” shows that all the eleven CIS countries have many common features of education legislation, which makes it possible to carry out a detailed comparative analysis.

Paragraph Seven, “Methods of the Rankings Approach in the Analysis of the Education Space in the CIS countries,” cites an example of modeling of the principles of education laws and codes in the CIS countries, which in turn made possible a comparative analysis of the frequency of the use of these principles, the building of profiles of countries using global rankings, a review, including in retrospect, of the links between the use of principles in legislation and the real strategic development of countries in this area.

Paragraph Eight, “Retrospective Analysis of the Financing of Education Depending on the Availability of Natural Resources,” shows how the correlation between the funding of education and the share of natural resources in more than

two hundred countries changed in the period from 1970 to 2014. The financing of education in countries with different availability of natural resources differs.

In *Paragraph Nine*, “Projecting the Influence of External Factors on the Education Space (the Case of Corruption),” the rankings approach made it possible to use global rankings as an instrument to fill gaps in the links between scientific studies (above all comparative ones), to develop a model for checking the hypothesis that corruption is a major factor behind the lack of correlation between financing of education and the quality of education.

CONCLUSION

In conclusion it has to be said that the main aim stated in the dissertation – to develop a methodology of the application of rankings to study the education space, determine its qualitative and quantitative characteristics, objectively assess its current state, analyze and assess the effectiveness of the formation of that space with due account of various factors and conditions – has on the whole been achieved.

It is shown in the dissertation that up until now there have been no comprehensive studies of the state of the education space with the use of global rankings. State programs based on the results of rankings seek only to improve the performance of concrete universities in a concrete ranking while not assessing the state of the education space on a broader scale than a single university. Yet it is obvious that the education space cannot be changed without changing the quality of education.

The author has proved that rankings can be used to assess the state of the education space and the prospects for its development and reveal the conditions for a systemic use of rankings. This made it possible to develop methodological foundations of the application of rankings to study the education space, to create a rankings approach that uses the rankings potential as a method and instrument of assessing the state of the education space.

The rankings approach developed includes the goal and the hypothesis, methodological grounds, the methods, means, models, methodologies and procedures.

The rankings approach to the study of education space taking into account the applicability of ranking has been tested in setting various tasks in the study of aspects of the education space, the applicability of the rankings approach has been demonstrated by citing examples of the study of the education space from various angles (legislative, socio-economic, financial, etc.).

In choosing rankings and building their combinations capable of being instruments for describing the education space certain classifications of rankings based on their functions and application methods have been presented, for which purpose an algorithm of assessing the degree of objectivity and the boundaries of applicability of rankings have been presented.

A correct solution for neutralizing the subjective element in rankings can be a classification built for every study. The set of classification criteria includes criteria of assessing the quality of rankings. This would make it possible, within the framework of the rankings approach, to study both the countries and regions of the world in different periods and to adjust university development strategies.

The dissertation presents specific examples of the opportunities of applying the rankings approach to assessing the state of the education space for various purposes. A description is given of how the subjective factor in the ranking methodology is taken into account and how to avoid subjectivity by correctly choosing the combination of rankings and methods of study. It is also important that based on the results, ways of solving the problems revealed are proposed.

These tasks can be the basis of deepening and broadening this study and open new ways for the use of rankings and the study of the education space.