

## MODEL FOR EMPLOYER-SPONSORED EDUCATION OF TEACHERS: OPPORTUNITIES AND CHALLENGES

Aleksandr Aleksandrovich Fedorov<sup>\*</sup>, Galina Aleksandrovna Paputkova<sup>\*</sup>,  
Elena Yurevna Ilaltdinova<sup>\*</sup>, Irina Fedorovna Filchenkova<sup>\*\*</sup> and  
Mikhail Yurevich Solovev<sup>\*</sup>,

---

**Abstract:** The problem of the employer-sponsored education of teachers is quite urgent in the environment of the modernized education system when the requirements for the teaching staff of the comprehensive schools have stepped up. Searching for the solution to the problems of engaging and supporting the most qualified and motivated graduates in the teaching profession, of boosting the prestige of pedagogical activities and clear understanding of the demand for qualified teachers the authors of this study have been driven to develop the variable model for the employer-sponsored education of teachers within the framework of the education field of “Education and Pedagogical Sciences”. The study reveals the principal components and mechanisms for the implementation of the model and describes the characteristics of organizational and pedagogical conditions for the implementation of the employer-sponsored education of teachers as an aggregate of the interrelated circumstances that are prerequisite for efficient selection and further pre-service training of the teachers given the existing demand for the professionals in each region, given the requirements to the set of professional skills and personal qualities that would ensure successful work and career development during the professional cycle.

**Keywords:** Employer-sponsored education, teachers, educational process, teacher qualification requirements, pedagogical preconditions.

### INTRODUCTION

Modern educational paradigm considers a teacher as the key figure in the process of education, as the bearer of values and as the catalysts of students’ self-development (Darling-Hammond, 2011, Kuzminov, 2011, Markova, 2014, Sidorkin, 2013). It is exactly the teacher who models the socio-cultural environment where not only “knowledge is conveyed”, but, where, in the first place, the personality is developed as a citizen and as a subject of intellectual and spiritual self-development, as the bearer of the ideas and norms for the creative transformation of reality.

Increased significance of the personal role of a teacher in the process of education, modernization of educational process at all levels (Bakulina, 2003, Barber, 2013, 2012, Maier, 2012, Online education, 2014, The New York State Teaching Standards, 2011, U.S. Census Bureau, 2011, Sedykh, 2014), introduction of new techniques in the processes of education and development of a student create the objective necessity to educate the teachers who would be willing to develop and

---

<sup>\*</sup> Minin Nizhny Novgorod State Pedagogical University, Nizhny Novgorod, Russian Federation

<sup>\*\*</sup> Correspondence author, Assistant professor, Minin Nizhny Novgorod State Pedagogical University, Nizhny Novgorod, Russian Federation, 603950 Russia, Nizhnii Novgorod, Ulianova St., 1, office 411

improve themselves over the whole span of their professional careers, who would be capable of modeling the intellectual and cultural rise of the students, who would be highly emphatic and psychologically stable.

For over several recent years the training of such a teacher has become the strategic objective of modern educational policy (Decree of the President of the Russian Federation, 2012, Development of the sphere of education and socialization in the Russian Federation in middle-term perspective, 2012, Bedniy, 2012, Gansle, 2012, Livanov, 2012, NCES Fast Facts, 2012, Schleicher, 2011, Shumakova, 2013. Among the most important problems of the pedagogical sector the Ministry of Education and Science of the Russian Federation especially distinguishes a complex of the issues associated with the quality of the teacher training and with the strengthening of teacher's positions in the profession: the lack of the mechanisms to make teaching attractive for the talented graduates, no proper system for rendering professional support and assistance to young teachers, no career prospects, no forecasted demand for teachers by regions (Strategy for Innovative Development of the Russian Federation until 2020, On Measures for the Implementation of State Social Policy, 2012; Concept of Long-Term Social and Economic Development of the Russian Federation for the Period until 2020, 2008; Changes in Social Sphere Aimed at Improvement of Efficiency of Education and Science" approved by Decree of the Government of the Russian Federation dd. December, 2012). Under these conditions the new model for employer-sponsored education of teachers is painfully needed and it should provide for the mechanisms of attaching the teachers to their profession and of creating the conditions to make schools attractive for the graduates who are most talented and motivated for psychological work and pedagogical activities.

### **PROBLEM BACKGROUND**

The analysis of the existing experience (Bakulina, 2011, Fedorov, 2015, 2015, Filyushchenko, 2015, Kutuzov, Nishchev, 2008, Ratovskaya, 2014, Sarimsokov, 2015) shows that there is a mechanism for the employer-sponsored education stipulated by Clause 56 of Federal Law  $\Phi 3-273$  "On Education in the Russian Federation" (2012) that provides for the possibility of the employer-sponsored pre-service training and further employment of a specialist. The process of this employer-sponsored education is systemic, and its jurisdiction covers all levels: federal, regional and municipal. It provides the educational system of the Russian Federation with highly qualified, professionally motivated personnel and helps retain the graduates in the teaching profession.

At the same time, the procedure of the employer-sponsored education of teachers that is presently implemented is rather ineffective: the levels of the employer-sponsored students' qualification and motivation are low, the motivation for teaching is poor; the percentage of the graduates retained in the profession is

insufficient. The process is in need of reforms in accordance with new educational practices (Fedorov, 2013, Zavalko).

The new model for employer-sponsored education of teachers has to be developed within the framework of the educational field “Education and Pedagogical Sciences” (Hanushek, 2010, Lomovtseva, 2012, Neretina, 2013) that would ensure the solutions to the tasks as follows: enrollment of the professionally motivated students into the employer-sponsored training and employment program; support and development of the motivation for professional activities and professional education of students and graduates; ensured conditions for continuous professional pedagogical development of teachers; incentives for retaining the students in the employer-sponsored education program and in their prospective professional occupation by means of establishing the short career path and by providing scientific and methodological support to their activities.

## **METHODS AND DATA**

Minin University has developed the model for employer-sponsored education of teachers. The model is of variable nature; it takes into account the demand for teachers in each region and it is based on the real deficiency in the teaching staff in middle-term planning perspectives. In the course of the research the team of Minin University has undertaken the analysis of normal and real distribution of the number of teachers in the main age groups in 45 regions of Russia. The analysis was founded on the data submitted by the Ministry of Education and Science of the Russian Federation. The results showed that the most serious misbalance was observed in the middle age group. This situation is indicative for the majority of federal districts. In some federal districts (North Caucasian Federal District, Far Eastern Federal District, Northwestern Federal District, Southern Federal District, Central Federal District) there is the misbalance in the junior age group of teachers.

The variable model for the employer-sponsored education of teachers within the education field of “Education and Pedagogical Sciences” is to be implemented in the course of the interaction between the stakeholders of educational process (school graduates, students, university graduates, academic staff, parents, employer companies) in the educational system of the higher education institution assisted by the mechanisms of the network interaction with other educational institutions, with regional education authorities and with other social partners.

The model for the employer-sponsored education of teachers takes into account the needs for the teaching staff in each region and forecasts the target number of the prospective enrollment that is supposed to include the trainees selected on a competitive basis among the students of the higher education institutions. This would require a principally new educational process organization, close interaction with social partners, established systems for quality assessment and for monitoring the processes of the employer-sponsored teacher training as well as special

organizational and financial maintenance and support of the participants of the employer-sponsored education program.

Thus, in most federal districts the model for the employer-sponsored education should focus on educating Masters, while in the federal districts, where there is a junior age group misbalance, it should concentrate on educating Bachelors.

It should be noted that the normalization of the age balance of teachers will largely depend on the real need for teachers in each region, in as much as the demand for teachers in each Subject of the Russian Federation can be equalized only when there are vacant positions in the system of education.

The second important issue of the implementation of the model is represented by the number of vacant positions in the system of comprehensive education. The smooth running processes of forecasting the demand for the teachers in each particular region will make it possible to set quotas for the number of the students in Education who should be enrolled in the employer-sponsored education programs.

Based on the investigations carried out by the Institute of Sociology of the Russian Academy of Sciences and by the Social Forecasts and Marketing Center (Forecast until 2020 end estimation of trends until 2030, 2015) the prospective headcount of the teachers of secondary educational institutions has been estimated for the period until 2020 which made the basis for the calculations of the required adjustments in the age structure of the regional teaching community in a separate subject of the Russian Federation.

The trend has been discovered showing the increased number of teachers in daytime municipal comprehensive educational institutions that will affect the amount of the vacant positions in the system of comprehensive education. The increased number of vacant positions will create the demand for qualified teachers. This demand could be met by means of the implementation of the employer-sponsored education program for Bachelors and Masters.

The analysis of the teaching staff distribution in pre-school educational institutions in the federal districts of the Russian Federation revealed the trend for the decreasing number of teachers in pre-school institutions that will lead to the lower number of vacant positions in the system of pre-school education.

As regards the distribution of the teaching staff of the organizations for secondary vocational education by the programs of mid-ranking specialist training there is also a trend for the reduced number of teachers of the secondary vocational institutions covered by the programs of mid-ranking specialist training for the period till 2018, 2019; though, by 2019 – 2020 the opposite upward trend is expected.

In Siberian and North Caucasian Federal Districts the balanced distribution of the teaching staff will be observed since 2016 till 2020; in Privolzhsky Federal District, on the contrary, there is a trend for the decrease in number of teachers. The increase in number of vacant positions in the institutions for secondary vocational

education covered by the programs of mid-ranking specialist training is expected in some regions no sooner than by 2019-2020.

## RESULTS AND DISCUSSION

Thus, the regional specifics of each subject of the RF have been taken into account given the age-based analysis of the teaching staff distribution in the regional pedagogical communities and based on the analysis of the number of vacant positions in the system of pre-school, comprehensive and secondary vocational education in the region that provides the foundations for forecasting the number of vacancies in the systems of pre-school, primary, secondary comprehensive and secondary vocational education and predetermines the efficiency of the implementation of the variable model (of adaptive nature) that makes it possible to take into account the specifics of each subject of the Russian Federation in the process of employer-sponsored education of teachers within the framework of the educational field “Education and Pedagogical Sciences”.

The variable model of the employer-sponsored education of teachers should be implemented within the framework of the education field of “Education and Pedagogical Sciences” with due interaction between different participants of educational process (school graduates, students, university graduates, academic staff, parents, employers) in the educational system of the higher education institution through the mechanisms of the network interaction (Strongin, 2013, Yeleneva, 2013) with other educational institutions, regional education authorities and other social partners (see Figure 1)

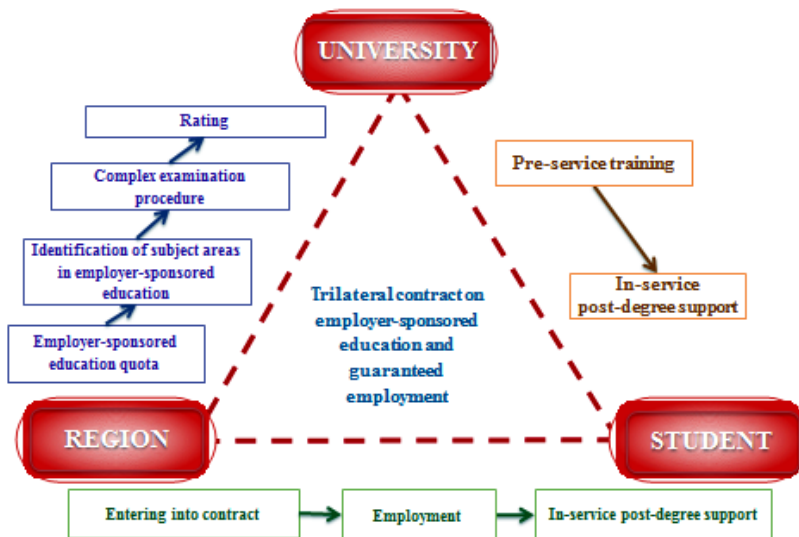


Figure 1: Participants of the employer-sponsored education process

The mechanism of the interaction between the main stakeholders of the employer-sponsored education of teachers can be presented as three stages.

Stage one – a school graduate enters the higher educational institution (Nikitina, 2015). At this stage the interaction between the school graduate/parent and the university occurs.

Stage two of the implementation of the employer-sponsored education process is represented by pre-service teacher training in the higher education institution.

At the third stage of the employer-sponsored training there occurs the interaction between the graduate and the regional educational authorities that is documented by entering into the additional agreement to the contract for the employer-sponsored education stipulating the specific position of future employment and ensuring the favorable admission terms for the Master's degree program. Then there is the interaction between the graduate and the employing organization documented by the contract of employment.

To implement the employer-sponsored education of teachers successfully the organizational and pedagogical conditions have to be determined that would ensure the efficiency of this process.

The conditions would mean the circumstances and factors that affect a process of reality. In teaching profession the conditions, although they do not represent the causes of the events, make the effects of these causes either stronger or weaker. From these perspectives the conditions are understood as factors, circumstances, or as an aggregate of measures on which depend the efficiency of the education system. Modern didactics interprets conditions as an aggregate of factors and the components of the process of education that ensure the success of learning (Dvukichanskaya, 2011).

According to N.N. Dvulichanskaya, organizational and pedagogical conditions are the aggregate of the content and structure of education, of educational methodological support and innovative educational environment that would ensure successful solutions to the learning and teaching tasks (Dvulichanskaya, 2011).

In the context of this research organizational and pedagogical conditions are the aggregate of the interrelated factors and circumstances prerequisite for efficient competitive selection, enrollment and further pre-service training of teachers, given the existing demand for the professionals in each region and taking into account the requirements to the set of professional skills and personal qualities that would ensure successful work and career development during the whole professional cycle.

The following six main organizational and pedagogical conditions for the implementation of the employer-sponsored education of teachers are identified.

Condition of meeting regional demand and requirements for teacher training is primarily predetermined by the aggregate of the external factors and circumstances that shape the demand for teachers in the middle-term perspective. Evaluation of

current needs of the regional community for the teaching staff should be performed by separate age groups with an incremental step of no less than 5 years. Thereat, the adjustments to either increase or decrease in the number can be done by estimating the difference between the calculated headcount of the teachers in this particular age group under the conditions of normal distribution and the real value of the headcount for at least three high-level age groups: junior (aged 25 – 35), middle (aged 40 – 50), elder (aged 55 and older).

The adjustment of the age misbalance of young teachers can be performed by introducing the employer-sponsored Bachelor programs.

The adjustment of the age misbalance of middle-aged teachers and the adjustment of the quality of professional qualifications of teachers of this age group can be performed by introducing the employer-sponsored Master's degree programs for those covered by this age group.

Apart from the method of extrapolation of the demand for teachers in the region, the methods of pedagogical process simulation should be applied taking into account the leading trends in pedagogical science and in educational policy and introducing more precise adjustments of employer-sponsored enrollment in each particular region. Meeting this condition will ensure guaranteed employment of graduates according to the subject area of the education program and will considerably improve their further professional attachments.

Condition of implementing principles of pedagogical management in the system of employer-sponsored education of teachers. This condition ensures the organization of the process of competitive selection and further pre-service employer-sponsored training securing the advantages for the students who are most motivated for teaching positions. Based on the experience of the Russian Federation in this area the action plan has been developed as described below. Competitive selection of the students for the program of the employer-sponsored education of teachers within the framework of the education field of "Education and Pedagogical Sciences" is performed by applying the procedure of ranking based on the results of the successful complex professional qualification examination upon the accomplishment of the second year of studies. When enrolled for the program of the employer-sponsored education of teachers, the Bachelor degree students who have already accomplished the program of secondary vocational training are granted the opportunity to take these examinations within the period stipulated by the individual curriculum of studies. Thus, the model ensures variability depending on the time of commencing studies at the program of the employer-sponsored education.

Complex professional qualification examination should be held by the higher education institution engaging the representatives of the regional educational authorities and the representatives of the employing organizations. This examination is aimed at informed selection among the students who are most motivated for

pedagogical profession and who claim to participate in the program of the employer-sponsored education followed by employment.

Complex examination includes the following component elements: test on Pedagogy and Psychology, examinee's portfolio, the term-paper on the subjects associated with future pedagogical activities.

The student who successfully passed the contest and who, based on the results of the competitive selection, has been enrolled to the employer-sponsored education program (at the level of Bachelor degree) is entitled to enter into the trilateral contract for 5 years of pre- and in-service training and support concluded between the regional educational authority, the university and the student.

Condition of the normative support to the employer-sponsored education process assumes that there should be a complex of factors that would guarantee the implementation of the process of the employer-sponsored education in conformity with the standards described in this model: the package of legislative and normative documents that would regulate the program of employer-sponsored education at the level of Bachelor degree and the further employment; availability of a single database that reflects the demand for teachers in the region; the procedure of the enrollment into the employer-sponsored education program established and unified across all regions and a single information system; availability of normatively adopted variable terms for enrollment into the employer-sponsored education program; development of the resource base of the employer-sponsored education program; establishment of the force-majeure insurance system for the participants of the employer-sponsored education and employment program.

Condition of organizational and pedagogical support of the student in the process of education. The process of the employer-sponsored education of teachers is aimed at meeting the needs of the educational sphere for highly-qualified professionals selected among the students who have won the competition and who are the best in their area of activities. To form the personality of a teacher who would be capable for innovative thinking, who would be professionally competent and who would possess the complex of professionally important personal qualities, there should be a complex of measures and activities that would ensure proper organization of the process of education. The requirements set by the educational standards to the quality of specialist qualification, the requirements of the professional standards of teachers and the requirements of the employers rule out the traditional educational process of knowledge transfer as ineffective in the context of the modern tasks. There should be a complex of organizational and pedagogical support to the student in the course of his studies both at the level of Bachelor degree program and at the level of Master's degree program that should include the following: individual learning path based on personal experience and knowledge of the student, balanced combination of individual and group forms of studying, extensive use of information technologies that would enable simulations of real pedagogical activities, integration



of the content of pedagogical training by introducing module studies, combining educational and awareness-rising technologies to form the professional culture of the prospective teacher, organization of continuous submergence of the student into the environment of the educational organization through the clinical training, complex of the activities aimed at forming the project thinking. Special significance in this case is attached to the number and quality of the personnel of the employer-sponsored education program: the conditions of the organization of the process of education and the very idea of the employer-sponsored education not only suggest that the disciplines are to be taught by the most experienced professors of the higher education institution but also that the process of education should engage famous scientists and practitioners and that the experience of the partner institutions should be applied widely which can be easily implemented through the existing means of information technologies.

Condition of monitoring and assessment over the quality of employer-sponsored education of teachers. Monitoring of the quality of the employer-sponsored education is represented by continuous assessment over its conditions and by forecasting based on the systematic diagnostics procedures, the future level of teachers' qualification and the level of development of their professional and personal qualities according to the requirements set by Federal State Educational Standards and in conformity with the professional standards of teachers. Assessment procedures should ensure the feedback interaction between a teacher and a student at each stage of the employer-sponsored selection and education. This is about monitoring and assessment over the quality of the work performed in the course of education, measuring and reporting procedures. This process of assessment should reveal the specifics of understanding and assimilating the material, the precision, the depth and the longevity of knowledge, the width of the outlook, the development of cognitive capabilities, the accomplishment of knowledge and skills.

Given the serious nature of the set task, the procedures of monitoring and assessment are called upon to minimize the risks of "defects" in the process of the implementation of the employer-sponsored education program and to ensure meeting the requirements to the teacher set by the educational standards.

The system of monitoring and quality assessment in the employer-sponsored education program should be up and running at every stage of the participants' training. Thereat, the following principal forms can be distinguished: complex examination to determine professional qualifications and capabilities for the activities under the employer-sponsored education program; rating evaluation of the students in the process and upon the accomplishment of the education program within the framework of the employer-sponsored education; internal subject related assessment of students in particular disciplines; monitoring the project activities of the participants of the program; monitoring the development of professionally significant personal qualities through studying the reflexive self-evaluation.

Condition of organizational and financial assistance and support to the participants of the employer-sponsored education program. Employer-sponsored education program in its essence and from the very beginning implies the selection and training of the students, who are the most motivated for pedagogical profession, the future elite of the system of education. This is the aim of the whole process of education and awareness-rising, it is exactly for this purpose that the program encompasses the most advanced pedagogical techniques, methodologies and forms of educational process organization. As a result, the community obtains the specialist with the highest level of pedagogical culture, good communicational skills and psychological and pedagogical qualifications. Such a graduate shares moral and professional value and can find the area to apply capabilities not only in the system of education but also in social sector in general, he/she expects further career growth and dignified remuneration.

To organize the employer-sponsored education program in a really efficient way, the complex of measures and activities would be required to ensure the graduate's successful entering and further retention in the profession, as well as the continuous support in the process of education that would boost the status of the employer-sponsored education student. These measures can be as follows: concluding trilateral contract (the region, the student, the university) for the employer-sponsored education and guaranteed employment, there can be an option to specify the definite place of work and additional social benefits and guarantees for the graduate at this stage; additional guaranteed stipend support during studies; guaranteed extra payments within two years of employment under the contract; guaranteed better opportunities to enter Master's degree program.

Besides, the legislative and normative regulation basis should be established to settle any disputes and situations in the process of the employer-sponsored education that would reassure the main stakeholders (the student, the higher education institution, the region). The authors of this study come to the conclusion that one of the successful forms could be represented by the insurance scheme covering all participants of the process for all cases of potential unfavorable situations: the absence of a vacant position for the graduate, failure to graduate, no possibility of employment due to personal reasons, force-majeure, etc. This procedure would enhance the level of responsibility of all the participants of the process and would predetermine the legitimate ways to resolve any potential contradictions.

## **CONCLUSION**

Thus, it is evident that the employer-sponsored education program stipulated the implementation of the model of training and systemic implementation of the complex of organizational and pedagogical conditions that would ensure the high efficiency in developing professional qualities of teachers in the environment of innovative educational university system. Obviously, these are exactly the measures that would

help solve the major task of providing the sphere of education with the teachers of the new type who would adequately satisfy the demand for the teacher staff in each region and who would tackle the new challenges of pedagogical practice.

### **Acknowledgments**

The authors are especially grateful to Director of the Department of Governmental Policy in the Sector of Higher Education A.B. Sobolev and to the representative of Federal Educational and Methodological Association in the Sector of Higher Education for High-Level Group of Disciplines and Occupational Training 44.00.00, Education and Pedagogical Sciences, V.A. Bolotov for insight and expertise that assisted the research.

### **Disclosure statement**

No potential conflict of interest was reported by the authors.

### **Notes on contributors**

**Aleksandr Aleksandrovich Fedorov:** Ph.D. in Philosophy, Professor, Rector of Minin Nizhny Novgorod State Pedagogical University

**Mikhail Yurevich Solovev:** Cand. Sc. in Chemistry, Assistant Professor, Vice-rector for network cooperation and social partnership, Minin Nizhny Novgorod State Pedagogical University

**Galina Aleksandrovna Paputkova:** Ph.D. in Pedagogy, Professor, Vice-rector for academic affairs, Minin Nizhny Novgorod State Pedagogical University

**Elena Yurevna Ilaltdinova:** Ph.D. in Pedagogy, Assistant Professor, Head of the Department of General and Social Pedagogy, Minin Nizhny Novgorod State Pedagogical University

**Irina Fedorovna Filchenkova:** Cand. Sc. in Pedagogy, Assistant Professor, Head of the Academic Services Office, Minin Nizhny Novgorod State Pedagogical University.

### **References**

- Action plan ("roadmap") (2012). "Changes in Social Sphere Aimed at Improvement of Efficiency of Education and Science" approved by Decree of the Government of the Russian Federation dd. December, 30, 2012, 2620.
- Bakulina S. S, Muzychenko E.A, Chernoskutov V.E. (2011). Employer-sponsored enrollment under modern conditions. *Higher Education in Russia*. 8-9. 14-22.
- Bakulina S. S, Muzychenko E.A. (2003). Practices and issues of the formation of governmental regional order for training specialists with higher professional education. *Factors and mechanisms of business sustainability: Collection of scientific papers*. Novosibirsk: SibAGS, 207p.

- Barber M, Donnelly K, Rizvi S. (2013). *An avalanche is coming. Higher education and the revolution ahead*. Institute for Public Policy Research.
- Barber M, Donnelly K, Rizvi S. (2012). *Oceans of innovation: The Atlantic, the Pacific, global leadership and the future of education*. London: IPPR <http://www.ippr.org/publication/55/9543/oceans-of-innovation-the-atlantic-the-pacific-global-leadership-and-the-future-of-education>.
- Bedniy B.I, Chuprunov E.V. (2012). On some areas of development in the system of training academic staff in higher education institutions. *Higher Education in Russia*, 11, 3–15.
- Chen, P. H. et. al. (2012). Portable real-time digital noise radar system for through-the-wall imaging. *Transactions on Geoscience and Remote Sensing*, 50(10), 4123-4134.
- Concept of Long-Term Social and Economic Development of the Russian Federation for the Period until 2020. Approved by the Decree of the Government of the Russian Federation dd. November, 17, 2008, 1662-p.
- Darling-Hammond L, Rothman R. (eds.) (2011). *Teacher and Leader Effectiveness in High-Performing Education Systems*. Washington, DC: Alliance for Excellent Education; Stanford, CA: Stanford Center for Opportunity Policy in Education.
- Decree of the President of the Russian Federation dd. May, 7, 2012 No. 599 “On Measures for the Implementation of State Policy in the Sphere of Education and Science”.
- Decree of the President of the Russian Federation dd. May, 7, 2012 No. 597 “On Measures for the Implementation of State Social Policy”.
- Frumin, I.D., Kasprzhak A.G. et. al. (2012) Development of the sphere of education and socialization in the Russian Federation in middle-term perspective. Report of the expert group. *Issues of Education*. 1, 6–73.
- Dvukichanskaya, N.N. (2011). Organizational and pedagogical conditions for improving professional competence of students in the system of continuous natural science education. *Science and Education*., 3. <http://technomag.edu.ru/doc/170201.html>.
- FZ-273 (2012). Federal Law “On Education in the Russian Federation” dd. 12.29.2012 No. 273-FZ.
- Fedorov A.A. Sedykh E.P. (2015). *Model of independent quality assessment of the activities of educational organizations* (monograph). Nizhniy Novgorod: Minin Nizhniy Novgorod State Pedagogical University Press, 185.
- Fedorov A.A. Sedykh E.P. (2015). Simulating the processes of employer-sponsored education and employment in the system of pedagogical education, *Psychological Science and Education*. 20, 5, 93-98.
- Fedorov AA. (2013). Three steps toward public educational corporation, *Accreditation in Education*. 7 (67), 26-28.
- Filyushchenko L.I. (2015). Employer-sponsored education and enrolment: legal aspects. *Law and Education*. 1, 25-35.
- Gansle K.A, Noell G. H, Burns J.M. (2012). Do student achievement outcomes differ across teacher preparation programs? An analysis of teacher education in Louisiana. *Journal of Teacher Education*, 63, 304–317.
- Hanushek E.A. (2010). The economic value of higher teacher quality. Working Paper No. 56, National Center for Analysis of Longitudinal Data in Education Research. <http://www.urban.org/UploadedPDF/1001507-Higher-Teacher-Quality.pdf>.

- Ipatov, V. P. (1979) Ternary sequences with ideal periodic autocorrelation. *Radio Engineering and Electronic Physics*, 24(10), 75-79.
- Ipatov, V. P. (1992) *Periodic discrete signals with optimum correlation properties*. Moscow: Radio i Svyaz, 152 p.
- Kutuzov V.M, Semenov N.N, Shestopalov M.Yu. Forms and methods of interaction between higher education institutions and employment market. Market of employment and educational services. Regions of Russia: *Proceedings of Third All-Russian Scientific and Practical Internet Conference "Demand and Supply in the Market of Educational Services in Regions of Russia"*, pp. 54-59. labourmarket.ru/conf3/reports/kutuzov.doc.
- Kutuzov, V. M. (1996) Synthesis of non-regular multitone signals and algorithms of their processing. *3rd International Conference on Signal Processing*. Beijing, China 14-18 oct.
- Kuzminov Ya.I. (2011). Academic community and academic contracts: challenges and responses of recent time. *Contracts in academic world*. M.M. Yudkevich (Ed.). Moscow: VshE Press, 13-30.
- Levanon, N., Mozeson, E. (2004) *Radar Signals*. New York, USA: Wiley, 427 p.
- Liu, J. et. al. (2015) Change detection in synthetic aperture radar images based on unsupervised artificial immune systems. *Journal of Applied Soft Computing*, 34, 151-163.
- Livanov D.V, Volkov A.E. (2012). University of the future: Putting new contents at stake. *Vedomosti*. 165 (3179). [http://www.vedomosti.ru/opinion/articles/2012/09/03/stavka\\_na\\_novoe\\_soderzhanie](http://www.vedomosti.ru/opinion/articles/2012/09/03/stavka_na_novoe_soderzhanie)
- Lomovtseva O.A, Shumakova I.A, Pakhomova I.Yu. (2012). Managing the formation of innovation focused staff in higher education institutions. *Regionology*. 2, 124-131.
- Maier A. (2012). Doing good and doing well: Credentialism and teach for America. *Journal of Teacher Education*. 63. 10-22.
- Markova S. M, Sedykh E.P, Tsyplakova S. A. (2014). Upcoming trends of educational systems development in present-day conditions. *Life Science Journal*, 11. 11, 489-493.
- Nathanson, F.E. (1969) *Radar Design Principles*, 1st Ed. New York: McGraw-Hill, 720 p.
- NCES (2012) NCES Fast Facts. Teacher Trends. <http://nces.ed.gov/fastfacts/display.asp?id=28>.
- Neretina E.A. (2013). Network interaction as the basis for dynamic development of higher education institutions. *Higher education in Russia*. 4, 128-133.
- Nikitina V.V. (2015). Studying professional profiles of school graduates when entering higher education institutions in the framework of employer-sponsored education programs. *Modern Problems of Science and Education*. 3, 406.
- Nishchev K.N. (2008). Employer-sponsored education of specialists in the system of the interaction between educational and production structures. *Integration of Education*, 4, 104-106.
- Social forecasts and marketing center (2015). Number of students, teachers and academic staff, number of educational organizations in the Russian Federation. Forecast until 2020 end estimation of trends until 2030. Moscow: Institute of Sociology of the Russian Academy of Sciences, 76, 77.
- King, C., Robinson, A., Vickers, J. (2014) Online education: Targeted MOOC captivates students. *Nature*, 505(7481): 26. doi:10.1038/505026a Retrieved 2014-03-19.
- Pralon, L., Pompeo, B., Fortes, J. M. (2015) Stochastic analysis of random frequency modulated waveforms for noise radar systems. *Transactions on Aerospace and Electronic Systems*, 51(2), 1447-1461.

- Ratovskaya S. A. (2014) Employer-sponsored education in higher education institutions. *Counselor in the Sphere of Education*. 6, 63-68.
- Richards, M. (2005) *Fundamentals of Radar Signal Processing*. New York: McGraw-Hill, 513 p.
- Sarimskov F.V. (2015) Employer-sponsored education: economic and legal aspect. *Bulletin of Omsk State Pedagogical University, Investigations of Humanities*. 4 (8), 120-123.
- Schleher, D. C. (1991) *MTI and Pulsed Doppler Radar*. Boston: Artech, 639 p.
- Schleicher A. (2011) *Building a high-quality teaching profession*. Lessons from around the world, OECD Publishing. <http://dx.doi.org/10.1787/9789264113046-en>.
- Sedykh E.P. (2014) Managing the development of pedagogical staff in the system of higher education. *Urgent problems of modern education: experience and innovations. Proceedings of scientific and practical conference (by-correspondence) with international participants*. Ulyanovsk, 464-467.
- Sheen, D. M. (2015) Noise analysis for near-field 3D FM-CW radar imaging systems. *SPIE Defense+ Security. International Society for Optics and Photonics*, 946206-946206-11.
- Shumakova I.A. (2013) Preparing innovation motivated personnel under the conditions of developing economy of the region. Scientific bulletin of Belgorod State University. Series: History. Political science. *Economics. Informatics*. 1-1 (144), 25, 46-51.
- Sidorkin A.M. (2013) Professional training of teachers in the USA: lessons for Russia. *Issues of Education*, 1, 136-155.
- Skolnik, M. (2001). *Introduction to Radar Systems*, 3rd ed. McGraw-Hill, New York, 513 p.
- Skolnik, M. I., (2008) *Radar Handbook*. New York, USA: McGraw-Hill Professional, 1352 p.
- Strategy for Innovative Development of the Russian Federation until 2020 (Decree of the Government of the Russian Federation dd. December, 8, 2011. No. 2227-p).
- Strongin R.G. (2013) The role of project management in ensuring educational and scientific interaction between the subdivisions of the higher education institution and its partners. *Proceedings of Engineering education for new industrialization: agenda and the collection of reports of international scientific school* (Kazan, Sept. 23–28, 2013). Edited by V.G. Ivanov, V.V. Kondratyev;. Kazan: Kazan State Research and Technology University Press, 243–253.
- The New York State Teaching Standards. (2011) <http://www.highered.nysed.gov/tcert/pdf/teachingstandards9122011.pdf>.
- U. S. Census Bureau. (2011) Profile America: Facts for features. [http://www.census.gov/newsroom/releases/archives/facts\\_for\\_features\\_special\\_editions/cb11-ff15.html](http://www.census.gov/newsroom/releases/archives/facts_for_features_special_editions/cb11-ff15.html).
- Yao, K., Lorenzelli, F., Chen, C. E. (2013) *Detection and Estimation for Communication and Radar Systems*. Cambridge University Press, 336 p.
- Yeleneva Yu.Ya, Yelenev KS. (2013) Network interaction as the factor of innovative development of higher education institutions. *Modern Problems of Science and Education*. 1. URL: [www.science-education.ru/107-8508](http://www.science-education.ru/107-8508) 10.
- Zavalko N.A. (2011) Integration processes in the chain “Science, higher professional education, production” as the foundation for developing efficient mechanism for preparing a competitive specialist. *Economics*, 149-152: <http://journals.tsu.ru/uploads/import/858/files/345-149.pdf>