

**RPTSS 2018**  
**International Conference on Research Paradigms**  
**Transformation in Social Sciences**

**SMART-TECHNOLOGIES IN CREATION OF OPEN SYSTEM OF  
PROFESSIONAL EDUCATION IN RUSSIA**

I.A. Baygusheva (a), A.N. Danilov (b), G.G. Zabudsky (c), I.V. Kalnitskaya (d)\*,  
A.P. Shmakova (e)  
\*Corresponding author

- (a) Astrakhan State University, 414056, Tatishcheva Street, 20a, Russia, e-mail: iabaig@mail.ru, +79053604845  
(b) Financial University, 125993, Leningradsky Avenue, 49, Moscow, Russia, e-mail: 21369@mail.ru,  
+79136166934  
(c) Financial University, 125993, Leningradsky Avenue, 49, Moscow, Russia, e-mail: zabudsky@ofim.oscsbras.ru,  
+79136663484  
(d) Financial University, 125993, Leningradsky Avenue, 49, Moscow, Russia, e-mail: IVKalnitskaya@fa.ru,  
+79136239789  
(e) Financial University, 125993, Leningradsky Avenue, Moscow, 49, Russia, e-mail: shmackova.alex@yandex.ru,  
89514138134

***Abstract***

In the context of this study, the term ‘open system of professional education’ has been clarified. Open professional education is considered as a system of a new type based on the use of Smart-technologies. This system is aimed at getting knowledge, skills and competencies which are required for the solution of professional tasks in a changeable socio-economic and technological environment. The key stages of the development of the open professional education have been distinguished. They include an extramural form of study based on remote training; the wide expansion and development of distance learning; the stage of e-Learning focused on the creation of open educational institutions and the use of networking cooperation; the recent period – Smart e-Learning as flexible training in the interactive educational environment by means of the content from all over the world which is in free access. According to the authors, the open system of professional education contributes to the sustainable development of a society in changing socio-economic circumstances. The creation of an environment for the formation of a person who is capable of self-education and self-development is of particular importance. In turn, this gives the possibility to develop students’ transformative intelligence as a decision-making ability within the conditions of multivariance and uncertainty. The study reveals the role of Smart-technologies in the creation of an open system of professional education in Russia. The functional components of this system have been defined. The controversial problems of using Smart-technologies in Russian education have been considered.

© 2018 Published by Future Academy [www.FutureAcademy.org.UK](http://www.FutureAcademy.org.UK)

**Keywords:** Education, open system of professional education, Smart- technologies. ’



## **1. Introduction**

The modern world society lives in the time of globalization in all fields of human activity (politics, law, economy and science) that is fast-moving and irreversible. In the context of the favorable and unfavorable implications of this phenomenon, one should note the importance of the 2030 Agenda for Sustainable Development adopted by the UN General Assembly on September 25, 2015. This document defined the guidelines of the global policy in social, economic and environmental dimensions.

The education system preparing specialists for all spheres of life plays a key role in sustainable social development (Burmistrova, Kormiltseva, Shmakova, & Loshchilova, 2017). Integration processes and technological progress necessitate the training of specialists who are able to effectively solve professional tasks in a rapidly changing environment, improve their skills, and implement innovative technologies and creative ideas into professional activities. As a result, the traditional concept of knowledge transfer has been replaced by an open system of professional education which is the product of globalization.

### **1.1. An open system of professional education**

The open system of professional education takes into account a set of changes in a modern education: a new frame of references, the growth of scientific potential of teaching staff and others. The results of the analysis of different definitions of the term 'open system of professional education' make it possible to detail its content as a system of new type based on the use of Smart-technologies. This system is aimed at getting knowledge, skills and competencies which are required for the solution of professional tasks in a changeable socio-economic and technological environment. The researchers single out four key stages in the development of the open professional education: 1) an extramural form of study based on remote training; 2) the wide expansion and development of distance learning; 3) the stage of e-Learning focused on the creation of open educational institutions and the use of networking cooperation; 4) the recent period – Smart e-Learning as flexible training in the interactive educational environment by means of the content from all over the world which is in free access.

### **1.2. The peculiarities of the creation of an open system of education in Russia**

The Federal law dated 29.12.2012 'On education in the Russian Federation' pays special attention to the development of an open system of education. The law regulates the network form of the implementation of educational programs (article 15) and the use of e-learning and distance learning technologies in education (article 16). Nowadays distance learning technologies and e-learning are introduced in the educational process in all Russian universities. At the same time the network form of the implementation of educational programs is in a formative stage. The network form gives students an opportunity to use the resources of several academic institutions, including the foreign ones. This makes it possible to develop unique interdisciplinary educational programs using the best resources (material, intellectual and others).

In 2015 eight leading universities established the National Open Education Platform Association which created the portal 'openedu.ru'. Work continues on developing academic courses of the basic part of the curriculum for all training programs of a higher education system. The higher education institutions that

signed an agreement with the National Open Education Platform Association can use this service in their degree programs with an option to transfer credits.

Within the framework of the state project 'Development of export potential of the Russian system of education' the government supports international network universities that work cooperatively with the Russian universities. The examples of the multilateral network universities are: the University of the Shanghai Cooperation Organization which was founded in 2008 and comprises 78 universities from 6 countries (21 of them are Russian universities); the network University of the Commonwealth of Independent States which was organized in 2009 and includes 31 universities from 9 countries (8 of them are Russian universities); the BRICS Network University which was created in 2014 and consists of 31 universities from 9 countries (12 of them are Russian universities). These universities offer multilateral short-term training, modular courses, master's and PhD programmes along with joint research projects in various knowledge fields according to common standards and quality criteria. Specialized network universities with a small number of participating universities are actively developing these days.

Successful development of network forms of the implementation of educational programs is impossible without the use of Smart-technologies (smart boards, smart textbooks, software for learning content, Social Media) which create the interactive educational environment that changes the role of universities from the providers of ready-made knowledge to laying the groundwork for self-education of students. Russia lags behind many countries in Smart education (for example, South Korea where such education has been turned into reality). To bridge the gap, it is necessary to promote the opportunities of using Smart-technologies by Russian teachers and students in getting new information from open educational resources.

## **2. Problem Statement**

The urgency of the task of creating an open system of professional education necessitates the development of Smart-technologies as its methodological tools. Nowadays, the theory and practice of using Smart technologies in the process of education are presented by e-learning, online learning and mobile learning. We will give their main characteristics.

### **2.1. E-learning**

The theoretical background of e-learning is modern pedagogical technologies which include the theory of gradual formation of mental action, developmental teaching, problem-based learning, advanced education, learning through play, modular learning, project-based learning and others. The characteristics of e-learning components, criteria-based assessment and future development are studied in the works of Li, Qi, Wang, & Wang (2014); Wang (2014); Batalla, Rimbau, & Serradell (2014).

The main way of e-learning is the use of electronic learning resources that support the educational process. Depending on application, electronic resources in a particular educational situation can be either a source of information or a means of communication. They can be used to hone skills and simulate the studied processes. The advantages of e-learning are an effective interaction between students and teachers, the accessibility of information, reducing the cost of education and a person-centered approach to learning (Quadri, Muhammed, Sanober, Qureshi, & Shah, 2017).

LMS Moodle (modular object-oriented dynamic learning environment) is the most common technology employed in the educational process. Moodle is an instrumental environment for the creation of educational websites and online courses. The project is based on the theory of social constructivism and it is in continual evolution (Hoda Baytiyeh, 2013). Moodle offers a wide range of opportunities to support the educational process, focuses on interaction and facilitates the cooperation of teachers and students in real-time mode (Manzo, 2016)

The results of the analysis of the scientific studies show that it is necessary to improve e-learning taking into account the problems of social interaction and the development of cognitive skills of students.

## **2.2. Online learning**

Nowadays, online learning is developing fast. This offers exciting possibilities for the creation and the use of appropriate teaching methods, determines the need for the development of educational Internet technologies. Technological innovations should be sensitive to an interdisciplinary, community-oriented culture that requires advanced intelligent electronic products and the new ways of their usage.

Online learning is a learning process that relies on the Internet resources. Online learning provides the freedom of learning anywhere and at any time, the flexibility of creating individual learning environment, the interaction with instructors and fellow learners, the feedback and the access to open educational resources (Ifenthaler, Sampson, & Spector, 2015). Online learning gives an opportunity for individual and cooperative learning by means of social networks and a wide breadth of online courses. The relevance of the problem of the use of social networks in higher education has led to a wide range of scientific publications, which can be classified as follows:

1. The investigation of the problems of using social media in education at large (Hernández-García, González-González, Jiménez-Zarco, & Chaparro-Peláez, 2016).
2. The research of the problem of the use of Facebook in education (Daher, 2014; Shraim, 2014).
3. The study of the problem of the use of Twitter in education (Juhary, 2016).

The results of the analysis of theoretical and empirical studies show that social networks perform communicative functions and serve as an active environment of virtual interaction on the discussion boards, in user communities and groups knit by common interests, as well as on the platforms for the resource interchange. Professional social networks that are created by employers and applicants, the networks for professionals are of significance in networking cooperation. The participation of students in these communities not only provides an opportunity to publish the results of their research, but also does the groundwork for employment and career advancement.

The technology of open online courses enables students, universities and organizations to find new solutions. Students get access to online learning services, universities gain access to the Internet audience interested in learning, organizations obtain information about the students and their achievements. MOOCs (Massive Open Online Courses) are an example of the technology of open online courses. MOOCs have emerged as an innovative idea of generally accessible higher education. The phenomenon of MOOCs becomes a subject of a lively debate that raises issues about the future of higher education. The current and prospective types of MOOCs, their problems and the possible evolution, the innovative potential of MOOCs and their influence on the development of the system of education are studied in the works of foreign

researchers (Sadhasivam, 2014; Torres-Coronas & Vidal-Blasco, 2017). The economic viability of open online courses is also discussed. It is feared that MOOCs may become a destructive innovation that is able to destroy academic training. The issue of recognition and accreditation of knowledge gained during training by means of MOOCs technology remains undetermined. Nevertheless, it should be noted that MOOCs are popular with the consumers and the interest to this technology is constantly growing.

We consider MOOCs as a Smart-technology in the creation of an open system of professional education. In this regard, the urgent problem is to increase the learning motivation of the students who choose individual courses or undergraduate and graduate programs. The solution of this problem requires experimental studies conducted by scientists from different countries. Within this framework, the follow-up studies that are focused on the pedagogical analysis of MOOCs should be done, since the available approaches are based on the educational concepts which are typical for the traditional e-learning.

### **2.3. Mobile learning**

Mobile learning is a matter of considerable debate in the scientific circles. The presented research studies can be classified as follows:

1. The study of the problems and the development trends of mobile learning (MacCallum, Day, Skelton, & Verhaart, 2017).
2. The development of technologies aimed at the improvement of the use of mobile learning.
3. An empirical approach to the development of mobile learning (Ishtaiwa, 2014).

Summarizing the results of the studies, it can be concluded that mobile learning is learning that takes advantages of the learning opportunities and benefits of mobile devices. Mobile devices have various distinctive features such as customized interfaces, real-time access to information, instant feedback. Integration of mobile devices with educational strategies allows you to maximize the impact on learning outcomes. In turn, the main difference between mobile learning and e-learning is that the content for mobile learning is usually delivered in small portions, each of which relates to a specific issue. In addition, mobile learning is informal, and as a result, the goal of the teacher in the educational process is different.

Completing the review of Smart-technologies that are used in the educational process, it should be noted that the orientation to intellectualization can be seen in their development. The primary reason for this trend is the dynamics of the processes of socio-economic development in an individual state and the society at large.

## **3. Research Questions**

The interaction of the functional components of an open system of professional education plays an important part. An open system of professional education operates by means of these components.

### **3.1. The functional components of an open system of professional education**

The functional components of an open system of professional education are identical to the components of Smart-education: a Smart-university, a Smart-teacher, and a Smart-student.

A Smart-university is a university in which the combination of technological innovations and the Internet leads to the new quality of processes and results of educational, research, social and other activities

in accordance with the requirements of a Smart-society. First of all, it concerns the knowledge creation to respond to social challenges such as sustainable development, the possible solutions for 'smart' mobility and others (Unger & Polt, 2017). In the context of globalization, the sustainability of universities is a major challenge due to competition for funding, students, teachers and meeting the requirements of the quality of education. In this sense, researchers of higher education should take into account the long-term vitality of universities (Fumasoli & Stensaker, 2013).

The role of the student and the teacher is changing in an open system of professional education. In the past, the student attended classes, made notes, because lectures were the only source of knowledge. Nowadays, the student possesses information technologies, knows how to deal with the search tools of the Internet and it is not necessary for him / her to write down the lecture material. However, the student needs a coordinator, and that is the function of the teacher. The new role of the teacher involves the following activities: presentation of the course, online support, preparation for examinations, checking out the assignments, conducting consultations, seminars and others. The main activity of the teacher is the trans-discipline integration. This allows designing the content of the curriculum, the content of education received by the student in the system of supplementary education, as well as the content of self-education of the student. A Smart-teacher is engaged in research and is interested in the development of his / her area of knowledge or activity. A Smart-teacher is a researcher, an experimental teacher, an author and developer of new educational programs, a creative personality, a person who possesses digital competencies.

Summarizing the above-mentioned, we can underline that the Smart-teacher and the Smart-student are the participants of the educational process, who use Smart-technologies to achieve the new quality of education in accordance with the requirements of a Smart-society.

## **4. Purpose of the Study**

In order to identify the challenging opportunities of Smart-technologies in the creation of an open system of professional education, we consider methodological and organizational issues of the use of Smart-technologies.

### **4.1. Discussion issues of the use of Smart-technologies**

The significant problems of the use of Smart-technologies include the following:

1. The problem of the use of Smart-technologies by teachers in the educational process. The problem is a consequence of the increased requirements to the teaching staff in the field of information technologies. This, in turn, leads to a lack of qualified IT personnel. Pedagogical dilemmas caused by digital environments, the attitude of teachers to online education are discussed in Glass (2017); Zhang & Li (2017).

2. The problem of the acceptance of Smart-technologies by students. Many researchers have traditionally relied on the effectiveness of computer technologies or the accuracy of the algorithms rather than on the psychological experience focused on the user. How to simulate and evaluate the user experience considering the psychological and cognitive attributes of the user is the most relevant issue of the studies (Wu, Liu, Zheng, Zhang, & Li, 2015).

3. An imperfect system of evaluation. According to the results of the work performed, a student receives a computer-generated rating with the help of Smart-technologies. The assessment of the tasks of

thousands of students is an important problem. However, despite the fact that computers render invaluable assistance in the evaluation of tests, the assessment of scientific research of students remains an open problem. As a result, the feedback from the teacher to the student is of great importance, especially, when it is necessary to give a detailed and timely review, but it is a lengthy process. The solution of the problems in the field of electronic assessment of students is given in the works of Baneres, Baró, Guerrero-Roldán, & Rodriguez (2016); Khlifi & El-Sabagh (2017).

4. The reduction of the role of human communication in the educational process. We can lose our selfhood in the Internet network and forget how to maintain a dialogue. The main thing is that the spiritual potential of the student, his moral guides in the changing world do not degrade. One of the solutions of this problem is the use of a model of blended learning, that is, the combination of e-learning with the intramural form of study, the integration of traditional teaching methods with Smart-technologies (Van Laer & Elen, 2017)..

## 5. Research Methods

To achieve the goal of the study, the theoretical analysis of scientific works within the investigated problem has been carried out. It enabled us to show the role of Smart-technologies in the creation of an open system of professional education in Russia.

## 6. Findings

The authors have revealed the role of Smart-technologies in the creation of an open system of professional education. The functional components of an open system of professional education have been defined. The discussion issues of the use of Smart-technologies in the educational process have been considered.

## 7. Conclusion

The results of the study have shown the multifaceted aspects of the problem under consideration. The discussion issues in the field of the use of Smart-technologies for the creation of an open system of professional education are relevant and require further theoretical and empirical research. Directions for future research are connected with the study of the development of the network forms of the realization of educational programs.

## References

- Baneres, D., Baró, X., Guerrero-Roldán, A., & Rodriguez, M. (2016). Adaptive e-Assessment System: A General Approach. *International Journal Of Emerging Technologies In Learning (IJET)*, 11(07), 16-23. doi:<http://dx.doi.org/10.3991/ijet.v11i07.5888>
- Batalla, J. M., Rimbau, E., & Serradell, E. (2014). E-learning in Economics and Business. *RUSC. Universities and Knowledge Society Journal*, 11(2). pp. 3-11. doi <http://dx.doi.org/10.7238/rusc.v11i2.2168>
- Burmistrova, N. A., Kormiltseva, E. A., Shmakova, A. P., & Loshchilova, M. A. (2017). An Innovative Approach to Education in the Context of Sustainable Development. *The European Proceedings of Social & Behavioural Sciences*, XXVI, 122-129. doi:<http://dx.doi.org/10.15405/epsbs.2017.07.02.16>

- Daher, W. (2014). Students' Adoption of Social Networks as Environments for Learning and Teaching: The Case of the Facebook. *International Journal of Emerging Technologies in Learning (IJET)*, 9(8), 16-24. doi:<http://dx.doi.org/10.3991/ijet.v9i8.3722>
- Fumasoli, T., & Stensaker, B. (2013) Organizational Studies in Higher Education: A Reflection on Historical Themes and Prospective Trends. *High Educ Policy*, 26(4), 479-496. doi:10.1057/hep.2013.25
- Glass, C. R. (2017) Self-Expression, Social Roles, and Faculty Members' Attitudes towards Online Teaching. *Innovative Higher Education*, 42(3), 239-252. doi:10.1007/s10755-016-9379-2
- Hernández-García, Á., González-González, I., Jiménez-Zarco, A., & Chaparro-Peláez, J. (2016). Visualizations of Online Course Interactions for Social Network Learning Analytics. *International Journal Of Emerging Technologies In Learning (IJET)*, 11(07), 6-15. doi:<http://dx.doi.org/10.3991/ijet.v11i07.5889>
- Hoda Baytiyeh (2013) Users' Acceptance and Use of Moodle: The Community Influence. *International Journal of Information and Communication Technology Education*, 9(4), 40-57, doi:10.4018/ijicte.2013100103
- Ifenthaler, D., Sampson, D. G. & Spector, J. M. (2015). Interactions Between Cognitive Psychology, Educational Technology, and Computing in the Digital Age. *Technology, Knowledge and Learning*, 20(2), 129-131. doi:<http://dx.doi.org/10.1007/s10758-015-9259-3>
- Ishtaiwa, F. (2014). Integrating Mobile Learning in an Undergraduate Course: An Exploration of Affordances and Challenges for Learners in UAE. *International Journal of Mobile and Blended Learning (IJMBL)*, 6(3), 1-17. doi:10.4018/ijmbl.2014070101
- Juhary, J. (2016). Revision Through Twitter: Do Tweets Affect Students' Performance? *International Journal Of Emerging Technologies In Learning (IJET)*, 11(04), 4-10. doi:<http://dx.doi.org/10.3991/ijet.v11i04.5124>
- Khlifi, Y., & El-Sabagh, H. (2017). A Novel Authentication Scheme for E-assessments Based on Student Behavior over E-learning Platform. *International Journal Of Emerging Technologies In Learning (IJET)*, 12(04), 62-89. doi:<http://dx.doi.org/10.3991/ijet.v12i04.6478>
- Li, F., Qi, J., Wang, G., & Wang, X. (2014). Traditional Classroom vs E-learning in Higher Education: Difference between Students' Behavioral Engagement. *International Journal of Emerging Technologies in Learning (IJET)*, 9(2), pp. 48-51. doi:<http://dx.doi.org/10.3991/ijet.v9i2.3268>
- MacCallum, K., Day, S., Skelton, D., & Verhaart, M. (2017). Mobile Affordances and Learning Theories in Supporting and Enhancing Learning. *International Journal of Mobile and Blended Learning (IJMBL)*, 9(2), 61-73. doi:10.4018/IJMBL.2017040104
- Manzo, M. (2016). Design and performance evaluation of a virtualized Moodle-based e-learning environment. *Journal of e-Learning and Knowledge Society*, 12(3). doi:<https://doi.org/10.20368/1971-8829/1103>
- Quadri, N., Muhammed, A., Sanober, S., Qureshi, M., & Shah, A. (2017). Barriers Effecting Successful Implementation of E-Learning in Saudi Arabian Universities. *International Journal Of Emerging Technologies In Learning (IJET)*, 12(06), 94-107. doi:<http://dx.doi.org/10.3991/ijet.v12i06.7003>
- Sadhasivam, J. (2014). Educational Paradigm Shift: Are We Ready to Adopt MOOC? *International Journal of Emerging Technologies in Learning (IJET)*, 9(4), 50-55. doi:<http://dx.doi.org/10.3991/ijet.v9i4.3756>
- Shraim, K. (2014). Pedagogical Innovation within Facebook: A Case Study in Tertiary Education in Palestine. *International Journal of Emerging Technologies in Learning (IJET)*, 9(8), 25-31. doi:<http://dx.doi.org/10.3991/ijet.v9i8.3805>
- Torres-Coronas, T., & Vidal-Blasco, M. (2017). MOOC and Blended Learning Models: Analysis from a Stakeholders' Perspective. *International Journal of Information and Communication Technology Education (IJICTE)*, 13(3), 88-99. doi:10.4018/IJICTE.2017070107
- Unger, M., & Polt, W. (2017) The Knowledge Triangle between Research, Education and Innovation – A Conceptual Discussion. *Foresight and STI Governance*, 11(2), 10–26. doi:10.17323/2500-2597.2017.2.10.26



- Van Laer, S. & Elen, J. (2017) In search of attributes that support self-regulation in blended learning environments. *Education and Information Technologies*, 22(4), 1395-1454. doi:10.1007/s10639-016-9505-x
- Wang, Y. (2014). Technology and Products Supporting E-learning by Knowledge Management - A Review. *International Journal of Emerging Technologies in Learning (IJET)*, 9(4), pp. 56-59. doi:http://dx.doi.org/10.3991/ijet.v9i4.3625
- Wu, X., Liu, M., Zheng, Q., Zhang, Y., & Li, H. (2015). Modeling User Psychological Experience and Case Study in Online E-learning. *International Journal of Emerging Technologies in Learning (IJET)*, 10(6), pp. 53-61. doi:http://dx.doi.org/10.3991/ijet.v10i6.5114
- Zhang, M., & Li, Y. (2017). Teaching Experience on Faculty Members' Perceptions about the Attributes of Open Educational Resources (OER). *International Journal Of Emerging Technologies In Learning (IJET)*, 12(04), 191-199. doi:http://dx.doi.org/10.3991/ijet.v12i04.6638