

## THE TRAINING OF TEACHERS FOR PROFESSIONAL ACTIVITY WITHIN DIGITAL EDUCATION

Ju. M. Tsarapkina<sup>1</sup>, T. B. Lemeshko<sup>1</sup>, A. G. Mironov<sup>2</sup>

<sup>1</sup> *Russian State Agrarian University — Moscow Timiryazev Agricultural Academy*  
127550, Russia, Moscow, ul. Timiryazevskaya, 49

<sup>2</sup> *Krasnoyarsk State Agrarian University*  
660049, Russia, Krasnoyarsk, prospect Mira, 90

### Abstract

The article considers the competence approach as a key one in the formation of readiness of pedagogical personnel for professional activity in the conditions of digital education. The purpose of the article is to consider the digital competence of teachers in the digital educational environment of the university. Priority directions of training of pedagogical personnel in the conditions of digital training are presented. The essence of the category “digital learning”, its pedagogical potential is substantiated. The requirements for a teacher of digital learning are formulated. The conclusions make it possible to formulate recommendations for experimental work on the creation and implementation of the concept and model of training teachers in the electronic information and educational environment of Russian State Agrarian University — Moscow Timiryazev Agricultural Academy. The article is of interest for further research of the problem of training teachers for professional activity in the conditions of digital education.

**Keywords:** digital competencies, digital education, digital educational environment, pedagogical personnel.

**DOI:** 10.32517/0234-0453-2020-35-2-48-52

### For citation:

*Tsarapkina Ju. M., Lemeshko T. B., Mironov A. G. The training of teachers for professional activity within digital education. Informatika i obrazovanie — Informatics and Education, 2020, no. 2, p. 48–52.*

**Received:** October 28, 2019.

**Accepted:** December 12, 2019.

### Acknowledgments

The reported study was funded by Krasnoyarsk Regional Fund of Science, project No. 2019031904596.

### About the authors

**Julia M. Tsarapkina**, Candidate of Sciences (Education), Docent, Associate Professor at the Department of Pedagogy and Psychology, Russian State Agrarian University — Moscow Timiryazev Agricultural Academy, Russia; julia\_carapkina@mail.ru; ORCID: 0000-0002-3807-4211

**Tatiana B. Lemeshko**, Senior Lecturer at the Department of Applied Informatics, Russian State Agrarian University — Moscow Timiryazev Agricultural Academy, Russia; tatianl@rambler.ru; ORCID: 0000-0003-2381-4042

**Aleksei G. Mironov**, Candidate of Sciences (Agriculture), Docent, Associate Professor at the Department of Psychology, Pedagogy and Human Ecology, Krasnoyarsk State Agrarian University, Russia; lexamir13@mail.ru; ORCID: 0000-0003-4076-493X

Modern society places high demands on the training of teachers in the field of digital education, since it is from teachers that the educational level of society as a whole depends and the possibility of creating conditions for its further development in the conditions of digital transformation, digital economy and digital learning. Accordingly, the development of digital society becomes a priority problem for the development of digital education.

Today, the teacher should be mobile, creative, initiative, able to competently implement modern innovative programs and digital technologies in professional activities.

The teacher of digital training is a teacher who provides methodological and organizational assistance to students within the framework of a specific program of electronic (digital) training course, who has knowledge in the field of information technology, taking into account the specifics of distance learning and psychological features of interaction with students in the process of digital learning. This is a specialist who owns traditional educational technology and is able

to adapt it to use in a digital educational environment [1–4].

It is obvious that in the conditions of the emerging digital educational environment, the technology of teacher training is changing significantly. A radical rethinking of the goals, content, forms and methods of training is required. In this context, the problem of training teachers for professional activities in the conditions of digital education, which is impossible without the use of information and communication technologies, digital educational environment, becomes urgent [5–7]. The problem of application of the latest technologies both in the system of training of specialists (bachelor's, master's, postgraduate levels) and in additional professional education becomes more and more urgent [8–11]. At different levels of education the characteristic tendencies of formation and development of professional digital competences of future teachers are determined.

In this article, the methodology of the study is the competence approach and the analysis of sources on the problem of training of teachers in the conditions of digital learning [11, 12].

Professional training of pedagogical personnel should be carried out by means of the most advanced technologies in the conditions of the electronic information and educational environment (EIOS) [13, 14]. An important component of EIOS is the digital education environment (DSP). On the basis of the use of DSP in the conditions of digital learning, continuous education is carried out – the process and result of interaction of subjects and objects of education. The components of the DSP are electronic (digital) educational resources having a hypertext logical structure with multimedia applications, provided with navigation systems for the course and management of its various components, including the teacher, with the possibility of organizing and conducting intermediate and final certification [9, 15]. Include databases of electronic educational systems, personal account of the student, links to online courses, database of test questions. For example, Russian State Agrarian University — Moscow Timiryazev Agricultural Academy on the digital portal <http://opdo.timacad.ru> / the teacher lays out the necessary information on the course: the work program, lectures, presentations, control questions, tasks, conducts testing [8]. In Figure one of the examples of such a course is presented — “Pedagogical technologies”, developed by Julia M. Tsarapkina. This is the basis for creating a digital environment of the educational institution.

The creation of a digital educational environment is carried out with the introduction of modern digital technologies in specialized laboratories of Krasnoyarsk State Agrarian University. Cooperation with PJSC “ROSBANK” allowed to create a training class — a model of a modern bank, which significantly increased

the quality of training of students in economic areas and their further employment in the industry; LLC “Maltat”, one of the largest fishing and fish processing enterprises of the Krasnoyarsk territory qualitatively changed the approach to practice-oriented training due to the introduction of a specialized laboratory in ichthyology with digital learning technologies in the university. Obtaining practical skills of working on agricultural machinery with digital control became possible thanks to the opening of the class “Modern agricultural machinery by the enterprise “Rostselmash””. Combining the capabilities of business and science creates a basis for the implementation of the principles of sustainable development of Russia and the training of highly professional personnel [14].

EIOS forms readiness of pedagogical personnel for professional activity in the conditions of digital training, consisting in mastering digital literacy as ability to use and create content on the basis of digital technologies, including: search and information exchange, answers to questions, interaction with other people; ability to use big data, smart technologies for the purpose of training, ability to design educational process in the digital educational environment; ability to choose and apply modern technologies allowing to carry out the solution of new tasks in professional practice.

Thus, readiness for professional activity on the basis of competence approach in the conditions of digital training is defined as successful possession of digital tools, digital technologies in professional activity. The competence approach is considered by us as the key in formation of readiness of pedagogical personnel for professional activity.

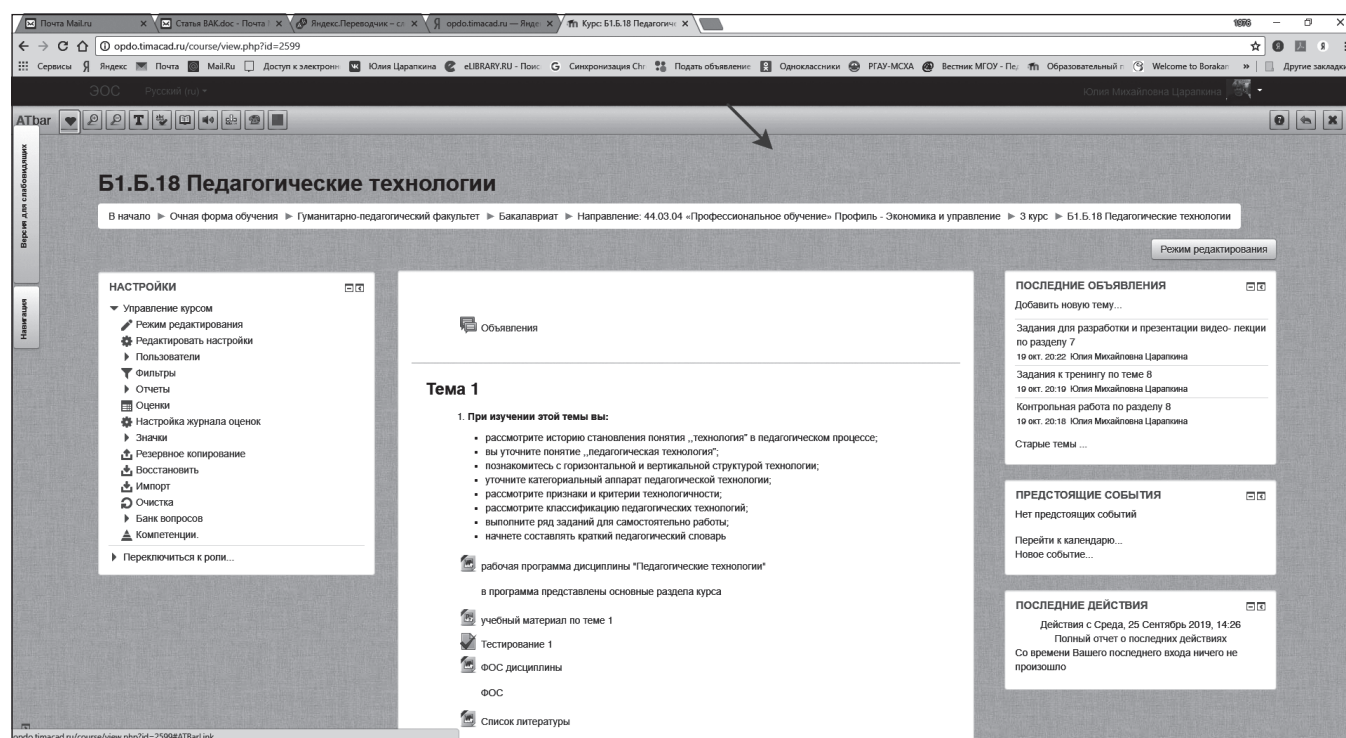


Fig. Visualization of course “Pedagogical technologies”

It is obvious that the digital competence of teachers is not formed spontaneously, and requires targeted systematic (complex) work and appropriate methodological support.

In the process of research, we analyzed the features of the formation of professional digital competencies in the university, on the example of students of the humanitarian and pedagogical faculty of the direction “Vocational training” in the walls of Timiryazev Academy:

1. Training of future teachers is organized on 2-level system of education (bachelor’s, master’s).
2. Information competence is formed on the basis of integration of pedagogical and information technologies.
3. The curriculum allows to integrate the discipline “Informatics”, “Information technologies in education” with natural science and general professional disciplines.
4. Within the course “Information technologies in education” students develop interactive structure, content of digital educational resources; with the help of Internet services form test tasks, surveys with their approbation in practice, create their own scenarios of video lectures, based on the basic principles of didactics; use quest technologies, mobile and cloud technologies, interactive tools of formative assessment.
5. Learn the functionality and capabilities of the distance learning system Moodle.
6. They take part in scientific and practical conferences, developing educational Web-applications, using Internet services to solve educational problems.

However the study identified some problems that do not allow the formation of digital competencies at a higher level. Improvement and updating of material and technical base, creation of modern cloud infrastructure, formation of digital educational environment, application of the mixed and adaptive training are required. A comprehensive solution of infrastructural, managerial, behavioral and cultural nature is needed.

It can be argued that at present there is a need to develop a concept and model of multi-level training of teachers for professional activities in the conditions of digital learning and its practical implementation in Russian State Agrarian University — Moscow Timiryazev Agricultural Academy.

The methodological prerequisites for the development of training of teachers in modern EIOS are: the theory of communicative interaction; the ideas of system, conceptual, andragogical, environmental, competence-based, futural and activity approaches, allowing to objectively identify and study the essence and content of professional training of teachers in the conditions of digital learning [15].

The analysis of educational trends at the present stage allows to determine the priority directions of training of teachers in the conditions of digital education:

- formation of digital competence in the professional activity of the teacher;
- the development of digital education;
- formation and use of digital educational environment at all levels of continuing education;
- development of electronic educational and methodical complexes in the educational process of higher education;
- preparation for innovation in education.

Considering approaches and directions in training of pedagogical personnel, we will stop on substantiation of essence of the category “digital training” important in our research.

The main components of digital learning are: electronic information and educational environment (EIOS), digital processes of educational process organization, digital processes of knowledge verification, digital technologies of training organization, digital content, digital technologies of interaction, digital resources.

The essence of the pedagogical potential of digital education consists in: orientation of teachers to innovations, open education, individual development trajectory, training in the environment of future professional activity; implementation of anthropocentric individual approach to training; development of technology of professional training of teachers based on innovative project orientation; application of the latest technologies at all levels of continuing education; formation of global information infrastructure; increase of intensity, activation and optimization of pedagogical process of training and communication at use of digital technologies; creation of a new product in the digital form with new opportunities.

Training of teachers in the conditions of digital education involves the complete immersion of the student in the digital educational environment and the widespread use of modern technologies in the learning process, such as STEM-technologies in the process of training bachelors of pedagogical direction. STEM education is an innovative technique that allows to train personnel capable of forming students’ competencies that will allow them to live and work in a high-tech society.

Digital learning involves the interaction between student, environment and technology (student-digital learning environment-technology). In digital learning, the content component and interaction is transferred to the digital educational environment, and the scheme has the form: educator-learner-digital educational environment. In digital learning, the planning of a lesson (course, discipline) begins with the coordination of the goals and objectives of the teacher and students in accordance with their request and the selection of digital tools that contribute to the solution of the didactic tasks of the lesson.

In digital learning, the main task of the teacher is to direct the activities of students to the assimilation of educational material, answer questions, support independent work. The emphasis of learning is focused on the process of learning and self-learning.

Thus, it can be noted that the activity of the teacher of digital education is changing: functional responsibilities are distributed differently, the level of digital competence becomes an important component of his professional activity, the organization of innovative pedagogical process cannot but include digital tools, platforms for training, creation and use of digital educational resources, opportunities of the Internet environment.

Given the specifics of the organization of digital learning, we can identify some requirements for the teacher of digital learning:

- the ability to continuously self-education and self-improvement;
- professional and subject competence;
- digital competence: fluency in applied software, multimedia and network technologies; ability to use the Internet environment for the organization of independent work of students; skill in the development of electronic educational resources; ability to use learning management systems (Moodle, etc.), allowing to present content, multimedia training materials, conduct automatic evaluation, save and track learning results; platforms for training (for example, EdX, aIspring, Lectorium, etc.), allowing you to develop training courses with tests, surveys, videos;
- possession knowledge of methods of development and creation of interactive exercises, e-courses and training programs.

Thus, the training of teachers in the conditions of digital education is a complex problem associated with the unity of the development of science and technology and society itself, as well as digital technologies, the formation of digital competencies, digital educational environment, development of electronic information and educational environment of the university. The training system should be adaptive, with feedback.

Features of formation of professional competences of pedagogical personnel at the university are determined by the specifics of future professional activity of the teacher and subject to the conditions of digitization (informatization) of the university, creation of modern information infrastructure, the use of digital tools and learning management systems.

Further research is needed in the areas of teacher training in digital learning. It is recommended to conduct experimental work on the creation and implementation of the concept and model of training of teachers in the electronic information and educational environment of Russian State Agrarian University — Moscow Timiryazev Agricultural Academy.

The focus of many studies remains the issues of training of teachers for professional and pedagogical activities and changes in their functionality in the information and educational environment. Unexplored are the issues of organization and content of training both future and current teachers in the system of continuous pedagogical education to work in the new learning environment.

## References

1. Andryushkova O. V., Grigoriev S. G. Kombinirovannoe obuchenie kak rezul'tat konvergentsii v usloviyakh informatizatsii obrazovaniya [Blended learning as the result of convergence under conditions of education informatization]. *Informatika i obrazovanie — Informatics and Education*, 2017, no. 2, p. 23–27. (In Russian.)
2. Grigoriev S. G., Grinshkun V. V. Informatizatsiya obrazovaniya. Fundamental'nye osnovy [Informatization of education. Fundamentals]. Tomsk, TML-Press, 2008. 286 p. (In Russian.)
3. Kuznetsov A. A., Grigoriev S. G., Grinshkun V. V. Obrazovatel'nye ehlektronnye izdaniya i resursy [Educational electronic publications and resources]. Moscow, Drofa, 2009. 156 p. (In Russian.)
4. Bystrova N. V., Konyaeva E. A., Tsarapkina J. M., Morozova I. M., Krivonogova A. S. Didactic foundations of designing the process of training in professional educational institutions. *The Impact of Information on Modern Humans*. Cham, Springer, 2018, p. 136–142. DOI: 10.1007/978-3-319-75383-6\_18 (In Russian.)
5. Vaganova O. I., Odarich I. N., Popkova A. A., Smirnova Z. V., Lebedeva A. A. Independent work of students in professional educational institutions. *Amazonia Investiga*, 2019, vol. 8, no. 22, p. 295–304. Available at: <https://amazoniainvestiga.info/index.php/amazonia/article/view/447>
6. Tsarapkina Ju. M., Petrova M. M., Mironov A. G., Morozova I. M., Shustova O. B. Robotics as a basis for informatization of education in children's health camp. *Amazonia Investiga*, 2019, vol. 8, no. 20, p. 115–123. Available at: <https://www.amazoniainvestiga.info/index.php/amazonia/article/view/70>
7. Vaganova O. I., Smirnova Zh. V., Abramova N. S., Tsarapkina Yu. M., Bazavlutskaya L. M. Current requirements for assessing the results of student training. *IOP Conference Series: Materials Science and Engineering*, 2019, vol. 483, no. 1. DOI: 10.1088/1757-899X/483/1/012002
8. Voogt J., Lai K. W., Knezek G., Christensen R., Forkosh B. A., Grinshkun V., Grigoryev S., Shonfeld M., Smits A., Henrikson D., Henderson M., Uvarov A., Philips M., Webb M., Niederhauser D., Mishra P., Leahy M., Butler D., Strijker A. Part 1: rethinking learning in the digital age — implications for teacher education. *Proc. Society for Information Technology & Teacher Education Int. Conf.* Washington, D.C., AACE, 2018, p. 1075–1079. Available at: <https://www.learntechlib.org/primary/p/182658/>
9. Vaganova O. I., Konovalova E. Yu., Abramova N. S., Lapshova A. V., Smirnova Z. V. Increasing the level of teachers' readiness for pedagogical project. *Amazonia Investiga*, 2019, vol. 8, no. 22, p. 286–294. Available at: <https://www.amazoniainvestiga.info/index.php/amazonia/article/view/445>
10. Klinkov G. T. Person-oriented learning as an educational and behavioral paradigm. *Balkan Scientific Review*, 2019, vol. 3-1, p. 35–37.
11. Vaganova O. I., Sirotkyk S. D., Popkova A. A., Smirnova Z. V., Bulaeva M. N. Additional education in higher professional educational institution. *Amazonia Investiga*, 2019, vol. 8, no. 22, p. 305–310. Available at: <https://www.amazoniainvestiga.info/index.php/amazonia/article/view/448>
12. Plushch V. M. Students' independent study as a factor for improving quality of education. *Balkan Scientific Review*, 2018, vol. 1, p. 69–71.
13. Tsarapkina Ju. M., Dunaeva N. V., Kireicheva A. M. Application of BYOD technology in education on the example of Lecture Racing mobile application. *Informatika i obrazovanie — Informatics and Education*, 2019, no. 9, p. 56–64. (In Russian.)
14. Tsarapkina Yu. M., Lemeshko T. B., Mironov A. G. Tsifrovye tekhnologii v podgotovke studentov agrarnogo vuza

[Digital technologies in the training of students of agricultural university]. *Problemy sovremennogo pedagogicheskogo obrazovaniya — Problems of Modern Pedagogical Education*, 2018, no. 61-3, p. 331–334. (In Russian.)

15. Grigoriev S. G., Shabunina V. A., Tsarapkina Yu. M., Dunaeva N. V. Elektronno-bibliotchnaya sistema kak sredstvo samorazvitiya studentov tsifrovogo pokoleniya Z (na

primere izucheniya kursa “Osnovy vozhat'skoj deyatel'nosti”) [Digital library system as a means of self-development of generation Z university students (the case study of the learning course “The basic knowledge for summer camp leaders”)]. *Nau nye i tehni eskie biblioteki — Scientific and Technical Libraries*, 2019, no. 7, p. 78–99. (In Russian.) DOI: 10.33186/1027-3689-2019-7-78-99

## ПОДГОТОВКА ПЕДАГОГИЧЕСКИХ КАДРОВ К ПРОФЕССИОНАЛЬНОЙ ДЕЯТЕЛЬНОСТИ В УСЛОВИЯХ ЦИФРОВОГО ОБУЧЕНИЯ

Ю. М. Царапкина<sup>1</sup>, Т. Б. Лемешко<sup>1</sup>, А. Г. Миронов<sup>2</sup>

<sup>1</sup> Российский государственный аграрный университет — МСХА имени К. А. Тимирязева  
127550, Россия, г. Москва, ул. Тимирязевская, д. 49

<sup>2</sup> Красноярский государственный аграрный университет  
660049, Россия, г. Красноярск, пр-т Мира, д. 90

### Аннотация

В статье рассматривается компетентностный подход как ключевой в формировании готовности педагогических кадров к профессиональной деятельности в условиях цифрового обучения. Целью статьи является рассмотрение цифровой компетентности педагогических кадров в цифровой образовательной среде вуза. Представлены приоритетные направления подготовки педагогических кадров в условиях цифрового обучения. Обоснована сущность категории «цифровое обучение», ее педагогического потенциала. Сформулированы требования к преподавателю в цифровом обучении. Выводы позволяют сформулировать рекомендации к проведению опытно-экспериментальных работ по созданию и реализации концепции и модели подготовки педагогических кадров в электронной информационно-образовательной среде РГАУ — МСХА имени К. А. Тимирязева. Статья представляет интерес для дальнейшего исследования проблемы подготовки педагогических кадров к профессиональной деятельности в условиях цифрового обучения.

**Ключевые слова:** цифровые компетенции, цифровое обучение, цифровая образовательная среда, педагогические кадры.

DOI: 10.32517/0234-0453-2020-35-2-48-52

### Для цитирования:

Царапкина Ю. М., Лемешко Т. Б., Миронов А. Г. Подготовка педагогических кадров к профессиональной деятельности в условиях цифрового обучения // Информатика и образование. 2020. № 2. С. 48–52. (На англ.)

**Статья поступила в редакцию:** 28 октября 2019 года.

**Статья принята к печати:** 12 декабря 2019 года.

### Финансирование

Работа выполнена при поддержке Красноярского краевого фонда поддержки научной и научно-технической деятельности. проект № 2019031904596.

### Сведения об авторах

Царапкина Юлия Михайловна, канд. пед. наук, доцент, доцент кафедры педагогики и психологии, Российский государственный аграрный университет — МСХА имени К. А. Тимирязева, г. Москва, Россия; julia\_sarapkina@mail.ru; ORCID: 0000-0002-3807-4211

Лемешко Татьяна Борисовна, ст. преподаватель кафедры прикладной информатики, Российский государственный аграрный университет — МСХА имени К. А. Тимирязева, г. Москва, Россия; tatianl@rambler.ru; ORCID: 0000-0003-2381-4042

Миронов Алексей Геннадьевич, канд. с.-х. наук, доцент, доцент кафедры психологии, педагогики и экологии человека, Красноярский государственный аграрный университет, Россия; lexamir13@mail.ru; ORCID: 0000-0003-4076-493X