Information Competence of a Teacher of Higher Education as an Important Component of Modern Educational Process

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Today, there are qualitative changes in Russian education, primarily due to a large-scale process of reforming and informatization of society. Introduction and use of information and communication technologies greatly simplify any processes and create conditions for improving the quality of life in general. Modern information and communication technologies acquire features of an important resource of technological development in educational process of Russian higher education. Socio-pedagogical significance of the topic under study is determined by the solution of an important state task —training of competent specialists, in particular, presence of a key vector in the development of information competence of a higher school teacher, and insufficient solution to the problem of a teacher's information competence development in modern conditions. The purpose of the work is to develop a program of professional development for teachers to increase their level of information competence. The phenomenon of information competence of a technical higher education teacher acquires extraordinary relevance for pedagogical theory and practice, which is due to modern educational trends related to the need to implement tasks of preparing a modern teacher in terms of informatization of education. The teacher should be capable of carrying out professional pedagogical activity productively. The authors developed a model for information competence development of a higher educational institution teacher, as well as a program based on it. The authors have carried out the experiment proving the increase in the level of information competence of teachers after the program introduction. This advanced training program may be used in future for all high school teachers.

***Index Terms*: teacher, higher education institution, information and communication technologies, educational process.**

I. INTRODUCTION

The Concept of the State Information Policy of the Russian Federation notes that achieving the goals of this policy requires improving training, educational system as a whole, ensuring a full life and effective human activity in information society of the 21st century. [25] Informatization of education means not just the use of software and hardware. It should lead to a radical change in the organization and essence of the processes of learning and human development, to the formation of a creative personality. [2] The country's need for teachers who are able to take a human approach towards the students actualizes the problem of increasing their professional competence, which raises the requirements for higher education regarding the introduction of computer technologies into the student learning process, such as organization of cognitive activity that encourages them to ask questions and find answers to them using new information technologies. [3] At the same time, students cognitive activity should be organized taking into account the specifics of mental processes development, which act as primary regulators of human behavior on the basis of which knowledge, skills and ways of activity are formed. [4] Learning process using information and communication technologies should be based on the age and socio-psychological characteristics of the trainees. [5]

II. LITERATURE REVIEW

Despite constant interest of scientists in various aspects of professional training, it is reasonable to believe that there are many unexplored issues in the theory and practice of higher professional education such as formation of information competence of higher education teachers. [1] Currently, it is the competence approach that continues to be introduced into education system. [6] As noted in the draft "Concept - 2020 for the development of Russian education", the main goal is to increase the availability of quality education. [7] For this it is necessary to solve a number of tasks, but the primary task is to highlight the level of quality of educational services by expanding the use of information and communication technologies, which, while maintaining the terms of training, will help expand the number of competencies mastered. [8] According to Ya.I. Kuzminov, new educational paradigm will be successful only if it is focused on shaping the needs for constant replenishment and updating of knowledge, improving skills, their consolidation and transformation into competences. [15] In modern pedagogical literature, categories "competent" and "competence" are widely covered. [9] Analysis of scientists' work allows us to identify several approaches

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to the definition of the concepts of "competent and "competence". [16] According to N.Yu. Taiwanese information competence should be viewed as an integrative personality quality, manifested through the process of selecting, assimilating, and processing information and making it possible to develop optimal solutions in different areas of activity. [10] Competence as a set of interrelated personal qualities, such as knowledge, skills and abilities, is reflected in the works of TE. Isaeva, N.T. Pechenyuk, A.V. Farmhouse. [11] Leading Russian scientists: E.F. Zeer, L.S. Lisitsyna, G.K. Selevko and others form the basis of pedagogical education in the definition of the terms in question. [13] In their opinion, competence is an integral quality of a person which is manifested in the ability and readiness to perform a certain type of activity. [14] Leading domestic psychologists M.B. Kalashnikova and L.G. Regush noted that the computerization of the educational process shapes students' thinking, in particular, such mental features as tendency to experiment and flexibility. [17] That is, importance of information and communication technologies for educational process was also evaluated from the point of view of psychology. [20] The main task of informatization of education, according to L. Pleuhova, is the formation of the need for each member of society to constantly improve their educational level. [18] The task of the teacher is to teach young people to learn independently. [22] Information and communication technologies actively contribute to this process. [19]

III. METHODOLOGY

We have developed a model for the formation of information competence of a teacher of a higher educational institution, which contains pedagogical conditions that contribute to more rapid and qualitative formation of teachers' information competence. On the basis of the model, we have developed a program of advanced training for teachers on the topic "Information and communication competence in the professional activities of a teacher of higher education." We checked the level of formation of information competence among high school teachers (60 people) before the introduction of the program developed by us. We have identified: the initial level (0-54%); baseline (55-70%); search engine (71-85%); creative (86-100%). Prior to the implementation of the program, 5 people out of 60 had an initial level of formation of information competence. Search level - 30 people and only 10 people had a creative level. The number of people with a creative level of information competence has increased. The effectiveness of the program proves that it can be used for teachers of any higher educational institution.

IV. ANALYSIS AND DISCUSSION

The main goal of modernizing education is to improve the quality of educational process. [12], [14] Modern labor market creates a demand for professionals who have the skill to quickly find necessary information, who are able to systematize and assimilate information at a high level and at high speed, find a way in information space and be ready for continuous improvement. [21] The contradiction between the need of modern information society in shaping the information competence of future specialists and the lack of a systematic approach to solving the problem of building information competence through computer training has predetermined the need to create and substantiate an appropriate experimental model of a structural-functional type. [23] Under the model, we understand organization of educational process, aimed at information competence development, which is a simplified version of the simulated educational process and sufficiently repeats its properties and structural elements. [24] The model developed by us has a goal to develop information competence of a higher school teacher. The target block also contains methodological approaches and principles. Principles: science, continuity, subjectivity, variability, systematic; interactivity. Among the approaches: system; activity; competence; personality-oriented. The essence of methodological approaches and the content of basic principles aimed at information competence of a higher school teacher development constitute the basis for designing and creating a structural and informative model conducive to successful formation of general cultural and professional competences of teachers, taking into account characteristics and pedagogical conditions of continuous learning and teacher development. The content block is represented by a set of content of advanced training programs for mastering information competencies. The technical block contains methods, tools and forms. We have included theoretical-prognostic (design method, problem-based methods), practice-oriented (training, practical courses) methods to effectively develop information competence of a higher school teacher. Forms: lectures, seminars, individual lessons. The performance unit presents the levels and criteria for the formation of the information competence of a high school teacher. Professional qualities of a modern teacher substantially depend on the readiness and ability to independently master, use information and communication technologies in their professional activities to solve a range of educational tasks, integrate them with professional experience in order to increase educational process efficiency, taking into account the degree of compliance with the requirements of information society. The need of society for competence-based specialists, in particular, teachers who own means and methods of integrated use of information technologies, is increasing and becoming a leading factor in the field of teacher training. The question arises of the development of information competence of the Russian teacher. The study determined that the effectiveness of the process of developing information competence of a teacher is ensured by the following set of organizational and pedagogical conditions. One of the main factors influencing the development of a teacher's information competence is purposeful design and availability of a modern computer infrastructure in a higher educational institution for use in learning process of information and communication technologies as well as educational information products. A distinctive feature of the

design and availability of information and educational environment of higher education is the access of students and teachers to high-quality local and global information networks and databases. Also, the selection of teachers, curators, responsible for maintenance of electronic courses is very essential; development of a program, training tasks based on distance learning technologies and e-learning tools should be also considered. The second pedagogical condition is the purposeful use of information and communication technology tools in educational process and the subsequent presentation of its results, as well as the demonstration of teachers' readiness for pedagogical support of this process. The third pedagogical condition is the creation of situations in educational process in the organization of timely and high-quality diagnostics according to predetermined parameters, criteria and levels of development of the information competence of the teacher, as well as opportunities for professional self-realization of teachers and technical high school students in an information-educational environment. [29] Evaluation of information competence can be done by conventionally highlighting three levels - value, creative and practical. Evaluation can be carried out in the following forms: questioning, observation, interviewing; report of the responsible (curators) on the implementation of tasks; teacher's self-esteem; reconciliation with teacher development plan (adjustment if necessary). [26] Results may be evaluated, in particular, the educational products created; content and structure (logic, sequence) of the educational project; the quality of planning and organization of their work; performance of professional duties in accordance with established standards of the educational organization; self-assessment of the results of professional work; looking for ways to increase the efficiency of professional labor; improvement of production in the field of professional activity. The informational and educational environment of a higher school performs the following functions of the process of implementing the information competence of a teacher in a Russian higher school: a motivational function (an installation is being created for continuous independent professional development focused on the development of information competence of a teacher); function of designing and designing educational process using information and communication technologies (includes the formation of strategies and tactics of information educational activities); informational and educational function (an educational organization provides teachers with educational information necessary for the formation of components of information competence, contributes to the perception, awareness, implementation in the professional activities of the teacher of the theoretical and informational content of the educational program); consulting and supporting function (advising teachers on the development and self-development of information competence, providing them with assistance and individual support in their professional activities). It is proposed to implement the process of developing information competence of teachers without interruption from pedagogical process. The formation of the information competence of a higher school teacher is ensured by the organizational and pedagogical conditions, among which a special role is played by purposeful design and the presence in the higher educational organization of modern computer infrastructure; targeted application of information and communication technology in the educational process; conducting timely and high-quality diagnostics of information competence of higher school teachers. The study of teachers of higher school information technology contains the possibility of developing almost the entire set of competencies. And if the main content of the modules is focused on informational and cognitive competence, then the activities organized in the framework of the module are communicative (social) and autopsychological. [28] The substantive and procedural unity of the module contributes to the development of special (methodical) competence. In the context of the course being presented, cognitive competence is considered by us as the knowledge foundation of the whole complex of competences. [27] It includes the development of new knowledge and skills, the development of skills in the field of information technology. Information competence includes implementation of activities in the new information environment; communicative or social - interaction in microgroups and network communities; special or methodical - the effective application of information technology in the discipline being taught. The goal of the program is to master basic knowledge in the field of information and communication technologies (cognitive competence); awareness of the inexhaustible possibilities of the information space (information competence); establishing contacts and communication between course participants - teachers of various disciplines (communicative); understanding the possibilities to use information technologies in the teaching of any subject (special or methodical); fixation and reflection of the subjective state when immersed in the module space (reflexive or autopsychological competence).

Table 1 Types of classes, the number of training hours

Lectures	32
Workshops	40
Total	72

Module 1. Informatization of education as a factor in the development of society. The objectives of the module: mastering the knowledge of informatization of education (cognitive competence); deeper awareness of the use of information and communication technologies in education (information competence); establishing contacts and communication between course participants (communicative); understanding of the didactic functions of information technologies in their activities (special or methodical) Module 2. Information and communication technologies in implementation of information and information-activity models in training. The objectives of the module are: mastering knowledge of computer networks and the Internet, distance learning, educational electronic publications and resources (cognitive competence); deeper awareness of the capabilities of information technology and computer networks

(information); active exploration of the information space through communication not only with fellow students, but also with remote users via e-mail, forums, chat rooms, online communities (communicative); development of skills to work with educational resources using effective methods of searching and selecting educational and methodical information; approbation of ways to organize self student work through Internet technologies. Module 3. Educational electronic publications and resources. The objectives of the module are: mastering knowledge in the field of educational electronic publications and resources (cognitive competence); awareness of the possibilities of digital educational resources (informational); active mastering of the methodology of using the CRS in collective activities (communicative); development of skills to use the DIS in their own discipline using computer multimedia capabilities (special competence). Module 4. Information and communication technologies in educational process. The objectives of the module are: mastering knowledge of psychological and pedagogical assessment based on computer testing, on the principles of combining pedagogical and computer learning technologies (cognitive competence); deeper awareness of the capabilities of information technologies that implement diagnostic assessment procedures (informational); active exploration of the information space through communication with colleagues (communicative); development of skills to create tests for the education system (special competence).

To identify the effectiveness of the program we have developed, we identified the level of information competence of higher education teachers (60 people) before and after its implementation. The results are presented in Figures 1 and 2. The initial level - general ideas on computer science, a manifestation of interest in working with a computer; possession of the simplest methods of work, lack of a holistic view of the possibilities of using computer software; As a rule, an underestimate of their capabilities. Basic level - mastering work methods and software products through communication with a consultant and more experienced colleagues; awareness of the importance of information technology for professional activities; self-assessment allows you to determine the direction of self-improvement. Search level - interest in the use of information technology in professional activities; independent mastering of various software products is possible; conscious use of information technology; self-assessment sets the direction of development in the professional field. Creative level - targeted selection of information technology for professional activities; information technologies are used as a means of professional self-improvement; self-assessment of the use of information technology in the personal-professional development. In percentage terms, the levels look like this: the initial level (0-54%); baseline (55-70%); search engine (71-85%); creative (86-100%).

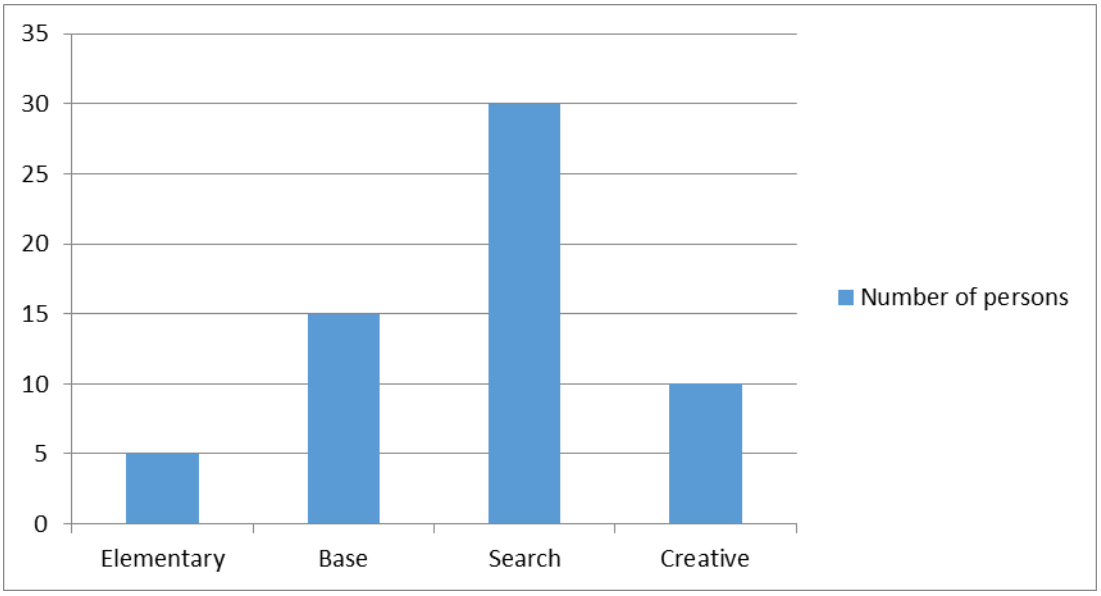

Figure 1 Level of formation of information competence before the implementation of the program

Before the introduction of the program, as we can see, 5 out of 60 people had an initial level of formation of information competence. Search level - 30 people and only 10 people had a creative level.

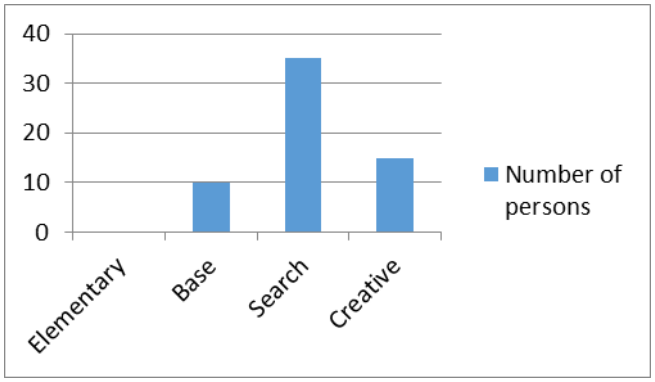

Figure 2 Level of formation of information competence after the implementation of the program

The number of people with a creative level of information competence has increased. The advanced training program developed by us on the theme "information and communication competence in the professional activities of a higher school teacher" can be used for all university professors.

V. CONCLUSION

In the course of our work, we have achieved our goal - a program for training teachers is developed to increase the level of information competence. Examined pedagogical conditions implementation will contribute to teachers' successful adaptation to higher education information-educational environment, filling of gaps in new areas of knowledge and successful resolution of any professional issues that may arise. In accordance with existing requirements a program of advanced training was developed for those with "information-communication competence in professional activity of high school teacher." Information competence of a higher school teacher development is ensured by organizational and pedagogical conditions, among which a special attention is played to purposeful design and presence in higher educational organization of modern computer infrastructure; targeted application of information and communication technology in educational process; conducting timely and high-quality diagnostics of information competence of higher school teachers. Thus, implementation of examined pedagogical conditions will contribute to successful adaptation of the teacher to information and educational environment of higher education, filling gaps in new areas of knowledge, successful resolution of any emerging professional issues, quality training of the modern teacher in accordance with currently existing requirements for him, as well as its most complete implementation in professional activities. We have developed a program of advanced training on the topic of "information and communication competence in professional activities of a higher school teacher," which is aimed at developing information competence of a higher school teacher. After conducting an experiment to identify the level of information competence of teachers development, it was found out that with the help of the program we developed, the number of people who increased their level was much higher.

REFERENCES

1. M. Barber, K. Donnelly, S. Rizvi, L. Summers (2013). An avalanche is coming. Higher Education and the revolution ahead, 73. http://www.studynet2.herts.ac.uk/intranet/lti.nsf/0/684431DD8106AF1680257B560052BCCC/$FILE/avalanche-is-coming_Mar2013_10432.pdf
2. N.S. Abramova, O.I. Vaganova, L.I. Kutepova (2018) Development of educational and methodological support in the context of the implementation of information and communication technologies. *Baltic Humanitarian Journal*, t. 7. no. 2 (23). pp. 181-184.
3. D. Ajeenkya, Y. Patil, N. Gagandeep, R. Gopal (2014) A Study on Total Quality Management in Higher Education. *International Journal of Management*, Vol. 5(5). pp. 1-6.
4. M.V. Arkhipova, E.E. Belova, Y.A. Gavrikova, N.A. Lyulyaeva, E.D. Shapiro (2018) Blended learning in teaching EFL to different age groups. *Advances in Intelligent Systems and Computing*, Vol. 622, pp. 380-386.
5. A.Z. Ibatova, N.V. Ippolitova (2018) Structuring the Content of Disciplines in Higher School Using a Block-Modular Rating System for Future Oil and Gas Engineers, *International Journal of Civil Engineering and Technology*, Vol. 9(3), pp. 394–399.
6. I.B. Bicheva, O.M. Filatova (2017) Formation of the teacher-leader in the educational process of the university. *Vestnik of Minin University*, no. 3(20); pp. 5.
7. G. Braine, (2013). Non-native educators in English language teaching. Routledge. https://doi.org/10.4324/9781315045368
8. M.N. Bulaeva, O.I. Vaganova, M.N. Gladkova (2018) Activity technologies in a professional educational institution. Baltic Humanitarian Journal, t. 7. no. 3 (24). pp. 167-170.
9. M.N. Bulaeva, O.I. Vaganova, M.I. Koldina, A.V. Lapshova, A.V. Khizhnyi (2018) Preparation of bachelors of professional training using MOODLE. Popkova E.G. (ed.) The Impact of Information on Modern Humans. Springer, Vol. 622, pp. 406-411. https://doi.org/10.1007/978-3-319-75383-6_52
10. L.K. Ilyashenko, M.P. Prokhorova, O.I. Vaganova, Z.V. Smirnova, E.A. (2018) Aleshugina Managerial preparation of engineers with eyes of students. *International Journal of Mechanical Engineering and Technology*, Volume 9, Issue 4, pp.1080-1087.
11. L.K. Ilyashenko, Z.V. Smirnova, O.I. Vaganova, M.P. Prokhorova, N.S. Abramova (2018) The role of network interaction in the professional training of future engineers. *International Journal of Mechanical Engineering and Technology*, Volume 9, Issue 4, pp. 1097-1105.
12. L.K. Ilyashenko, O.I. Vaganova, Z.V. Smirnova, M.P. Prokhorova, M.N. Gladkova (2018) Forming the competence of future engineers in the conditions of context training. *International Journal of Mechanical Engineering and Technology*, Volume 9, Issue 4, pp. 1001-1007.
13. M.M. Kutepov, O.I. Vaganova, A.V. Trutanova, (2017). Possibilities of health-saving technologies in the formation of a healthy lifestyle. *Baltic Humanitarian Journal*, Vol. 6(3), 210-213.
14. L.K. Ilyashenko (2018) Pedagogical Conditions of Formation of Communicative Competence of Future Engineers in the Process of Studying Humanitarian Disciplines, *International Journal of Civil Engineering and Technology*, Vol. 9(3), pp. 607-616.
15. S.M. Markova, A.K. Narcosiev (2018) Professional education of vocational school students. *Vestnik of Minin University*, Vol. 6, no. 3. P.3. DOI: 10.26795/2307-1281-2018-6-3-3.
16. S.M. Markova, E.P. Sedykh, S.A. Tsyplakova, V.Y. Polunin (2018) Perspective trends of development of professional pedagogics as a science. *Advances in Intelligent Systems and Computing*, Vol. 622; pp. 129-135.
17. E.V. Myalkina, E.P. Sedhyh, V.A. Zhitkova, V.A. Vaskina, O.I. Isaykov (2018) University resource center as an element of social development of the region. *Vestnik of Minin University*, Vol. 6, no. 3. P. 1.
18. A. Pavlov, A. Kindaev, I. Vinnikova, E. Kuznetsova, (2016). Crop insurance as a means of increasing efficiency of agricultural production in Russia. *International Journal of Environmental and Science Education*, Vol. 11(18), pp. 11863-11868.
19. T. V. Perova, E. A. Kuznetsova, I. S. Vinnikova, S.N. Kaznacheeva, E.A. Chelnokova (2017). Essence of the role and characteristics of the operating conditions of enterprises before and after the transition to market relations from a macroeconomic position. *International Journal of Applied Business and Economic Research*, Vol. 15(12), pp. 103-112.
20. M.P. Prokhorova, A.A. Semchenko (2018) Involving of trainees-future teachers of professional training in project activities in the discipline.

Vestnik of Minin University, Vol. 6, no. 2. p. 6.
21. ZH.V. Smirnova, M.L. Gruzdeva, O.G. Krasikova (2017) Open electronic courses in the educational activities of the university. *Vestnik of Minin University*, no. 4(21), p. 3.
22. Zh.V. Smirnova, O.G. Krasikova (2018) Modern tools and technologies for assessing learning outcomes. *Vestnik of Minin University*, Vol. 6, no. 3. P. 9.
23. ZH.V. Smirnova, O.I. Vaganova, A.V. Trutanova (2017) Final state certification as a way to comprehensive assessment of competences. *Karelian Scientific Journal*, Vol. 6, no. 3(20), pp. 74-77.
24. Z.V. Smirnova, M.V. Mukhina, L.I. Kutepova, M.M. Kutepov, O.I. Vaganova (2018) Organization of the research activities of service majors trainees. *Advances in Intelligent Systems and Computing*, Vol. 622, pp. 187-193.
25. S.A. Tsyplakova, M.N. Grishanova, E.A. Korovina, N.M. Somova (2016) Theoretical bases of designing of educational systems. *Azimuth of Scientific Research: Pedagogy and Psychology*, Vol. 5. No. 1 (14). Pp. 131-133.
26. O.I. Vaganova, A.V. Gladkov, A.V. Trutanova (2017) Formation of professional competencies of bachelors in the conditions of e-learning. *Baltic Humanitarian Journal*, Vol. 6. no. 2 (19). pp. 190-193.
27. O.I. Vaganova, L.K. Ilyashenko (2018) The main directions of implementation technologies of student-centered education in high school. *Vestnik of Minin University*, Vol. 6, no. 3. p.2.
28. O.I. Vaganova, M.I. Koldina, A.V. Trutanova Development of the content of vocational and pedagogical education in the context of the implementation of the competence approach. *Baltic Humanitarian Journal*, 2017, vol. 6, no. 2(19), pp. 97-99 (in Russian).
29. O.I. Vaganova, Zh.V. Smirnova, S. M. Markova, Zh. V. Chaikina, M. N. Bulaeva, (2019). Organization of partnerships for additional educational services on the example of the interaction of the educational institution with the health and cultural centre. *Perspektivy nauki i obrazovania – Perspectives of Science and Education*, 39 (3), pp. 500-514.