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DEVELOPING THE IMPLEMENTATION OF THE DIGITAL TECHNOLOGIES' TENDENCY IN THE TRAINING OF FUTURE TEACHERS

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The summary: *The article is devoted to the need for professional development and retraining of teachers in the system of continuing education for the preparation of competitive specialists in the modern world.*

Key words: *World education, didactic tools, megatendants, lifelong learning, independent education, information technology, «Digital Uzbekistan – 2030» strategy, IT specialists, IT industry, Action strategy, Continuing education system, imprinting, meraising, authorization, initiation.*

Development trends in the field of world education indicate the relevance of introducing modern didactic teaching aids in the information society and

increasing their effectiveness. «Megatrends» in the context of scientific approaches to the formation of a global educational environment, typical for European countries, show that ensuring the continuity and practical orientation of education, independent education, orientation towards creative development, active use of new formats of education in development. Of particular importance is the creation of modern didactic tools and improving the direction of the introduction of digital technologies in the training of future teachers of computer science, as well as those who are able to apply the mechanisms for their use in the educational process. During the years of independence, a new system of personnel training was created. In our republic, highly qualified, competitive, decisive, meeting modern requirements for the quality of specialists, making a worthy contribution to the scientific, technical, socio-economic and cultural development of the country, consistently training of specialists capable of growth, adaptation to the conditions of rapidly advancing socio-economic development, with high cultural, spiritual and moral qualities is being carried out. In order to achieve better results in the training of personnel, an adequate understanding of the ultimate goals of education, its improvement and modernization of the content, especially the use of interactive teaching methods and modern didactic tools, supertutors (training programs, professional tutors) programs created on the basis of professional activity Conducting a comprehensive targeted work on the application and development of educational programs for computers in the form of «educational materials» is determined by the main directions of strategic tasks in the field of education.

The measures taken to improve the efficiency of the system of professional training and retraining of personnel in the field of information technology create a solid foundation for providing state bodies and network organizations with qualified IT specialists.

In particular, a specialized school for advanced training in information and communication technologies named after Muhammad al-Kharizmi and branches of a number of foreign universities have been launched, digital technology training centers are being gradually created in regions and cities.

At the same time, the shortage of qualified personnel in the labor market of the republic requires the improvement of educational programs and methods in the field of information technology, the strengthening of cooperation between educational institutions and IT companies.

Raise the education of information technology to a new qualitative level, satisfy the need of the labor market for qualified IT specialists, as well as the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in 2017-2021 «Science in order to ensure the fulfillment of the tasks defined in the state program for the implementation of the education and development of the digital economy», respectively, he set many tasks [1].

Today, it is of particular importance to increase the potential of the intellectual resources of our country by improving the software and methodological support for the organization of education in higher educational institutions, the organizational and pedagogical mechanisms for preparing future teachers based on domestic and world educational experience. According to the Action Strategy for the Further Development of the Republic of Uzbekistan [2], «Further improvement of the system of continuous education, increasing the opportunities for quality educational services, continuing the policy of training highly qualified personnel in accordance with modern labor market needs» are important tasks today. In particular, the use of modern didactic teaching aids in the training of computer science teachers is of particular importance. The use of modern didactic tools that allow developing human creativity on a global scale based on a phased (staged) learning model (imprinting – understanding the content of educational material; repetition and memorization; authorization – understanding the content of educational material); educational material and its reproduction; initiation – stages of evaluation and recognition of acquired knowledge); development of new models for the formation of professional competencies using modern learning technologies; integrated use of traditional and modern teaching methods with the help of information and communication technologies; effective use of the possibilities of modern didactic teaching aids in the direction of future teachers of computer science to creative and research work, disclosure of the essence of universal and educational values, as well as regulatory legal documents

used to improve the trend of introducing digital technologies in the preparation of future IT teachers are: decree No. PF-4947 of the President of the Republic of Uzbekistan dated February 7, 2017 «On the Action Strategy for the Further Development of the Republic of Uzbekistan»; April 20, 2017 «On the further development of the higher education system for the development of activities» No. PQ-2909 of June 30, 2017; «On measures to radically improve the conditions for the development of information technologies in the Republic» No. PQ5099, 2017; Decisions PQ-3151 of July 27 «On measures to further expand the participation of industries and sectors of the economy in improving the quality of training of highly educated specialists» and the tasks defined in other legal documents related to this activity solve this problem to a certain extent.

Therefore, it should be noted that the information society environment, based on the process of global change, the rapid development of science and technology, the development of information technology, has a strong impact on the education system. One of the main tasks of today's regularly implemented educational reforms and innovation processes is full adaptation to the features of the digitalization process. At the international level, the importance of improving the mutual cooperation of social institutions in the management of the education system is becoming more and more obvious. That is why the development of interactive technologies for informatization of educational processes in higher educational institutions, paying special attention to the improvement of pedagogical mechanisms for creating an integrative educational environment, is one of the urgent tasks. The current stage of the development of the world is characterized by a continuous increase in the volume of scientific information. Law of the Republic of Uzbekistan «On informatization» dated March 21, 2012 «On measures for the further implementation and development of modern information and communication technologies» dated June 27, 2013 Decrees of the President on measures for the further development of the national information and communication system of the Republic of Uzbekistan, ensuring the implementation of relevant regulatory – legal documents of the Government, information and communication technologies, the Internet and multimedia resources in the education system, improving the quality of the educational process by increasing the efficiency of use is an urgent task today [1]. In addition, paragraph 165 of the State Program for the implementation of the Action Strategy

for the five priority areas of development of the Republic of Uzbekistan in 2017-2021 in the «Year of Science, Education and the Development of the Digital Economy» directly affects the higher education system related to issues of improvement, in which tasks are defined, related to the informatization of the educational process, and issues of the formation of media competence in accordance with the requirements of the time.

The creation of an electronic information educational environment of an educational institution is not a purely technical issue, but for this it is necessary to use the scientific, methodological, organizational and pedagogical capabilities of the institution based on a systematic approach. The use of modern information and telecommunication technologies in the educational system is carried out in the following areas:

- information and telecommunication technologies as an object of study, that is, students develop general ideas and skills about new information technologies, their components and areas of application;

- information and telecommunication technologies as a means of education, i.e. knowledge is given to students on the basis of modern information and pedagogical technologies, and lectures, practical and laboratory classes are organized on the basis of modern computer software;

- as a means of managing the educational process, i.e. creation of a system of information, analysis and forecasting to improve the efficiency of all activities of an educational institution, including educational, spiritual and educational and research work;

- as a means of conducting scientific and pedagogical research of students and teachers, that is, the creation and implementation of modern information systems to improve the efficiency of scientific research and pedagogical research among teachers and students of educational institutions.

A computer science teacher working with information technology tools must meet the following qualification requirements, firstly, he must embody the qualities of media competence. The concept of media competence is considered a relatively new term in our educational system and includes the ability to communicate and evaluate media information in various forms, learn and communicate. Media education is a process of personal development through the

media [3]. Professor A.B. Fedorov says that media education in the modern world in order to form a culture of communication with mass information, creative, communicative potentials, critical thinking, full perception, interpretation, analysis and evaluation of media texts, self-expression through media Technology considers this as a process of personality development using the tools and materials of mass communication (media) for the purpose of learning in various forms.

Secondly, be able to create electronic textbooks and be able to work freely with them. Thirdly, the ability to work freely in such programs as ZOOM, Google Meet, Google disk, Camtasio studio. And fourthly, the enrichment of the distance education platform with news, etc. Recently, the global coronavirus pandemic has seriously affected the education system, as well as all other industries. Quarantine rules have made many traditional forms and methods of education ineffective. In this situation, the following problems and shortcomings were identified:

- Internet speed is not up to the required level in all regions;
- Insufficient amount of ICT tools in all academic subjects;
- low level of media literacy in academic subjects;
- in the form of distance learning, a number of shortcomings were highlighted, such as the lack of full responsibility for the subjects of study.

The general pedagogical principles of training personnel for the informatization of education can be called:

- invariance of basic training in relation to computer science, its focus on information, communication, general cultural aspects, compatibility with the current level of development of the information society;
- specialization in the training of specialist teachers, i.e. orientation to the introduction of the possibilities of information and communication technologies in a specific subject;
- differentiation of teaching staff training, its focus on personal preferences, professional needs and characteristics of students.

In order to implement the principles of vocational training for computer science teachers and implement the principles of a differentiated approach, when developing the structure of the curriculum, it is necessary to reflect:

- the state of the process of informing students. Society in educational programs;

- theoretical bases of informatization of education;

- the main organizers of the activities of the specialists of the teaching staff on the use of information and communication technologies in a specific subject in educational programs;

- methodical support of independent educational activity.

The reasons for the relevance of the issue of professional competence of personnel also affect the above, these are (see Fig. 1): computerization process; development of market relations and training of competitive personnel; bringing the national education system up to international standards.

Figure 1. The reasons for the relevance of the issue of professional competence of personnel

At present, the teaching of subjects using computers is becoming increasingly important. Informatics teachers use a computer not only to prepare methodological materials for the lesson, but also use the necessary computer programs when teaching a subject, using it as a means of individual work with students. The convenience of the interface, which is part of the computer software,

enables teachers to effectively master modern information technologies. Thus, it is possible to effectively use the possibilities of information and communication technologies in the development of student-centered education and in the formation of students' creative abilities. Another important aspect of the reasonable use of computer technology in the educational process is the creation of a computer model of real processes and experiments. Computer data processing, modeling and display of results often replaces the need for expensive experimental equipment, in some cases (atomic and quantum physics, semiconductors, chemistry, biology, astronomy, medicine, process modeling related to sciences such as history) is considered the only way to demonstrate these processes. Modern information technologies teach phenomena and processes in the micro – and macrocosm, complex devices, biological systems based on the use of computer graphics and modeling, represent physical, astronomical, chemical, biological processes occurring at a very high or low speed, in a convenient form. The time scale helps to solve new didactic tasks. Therefore, one of the promising areas for the introduction of modern information technologies in education is computer modeling of events and processes. Computer models help the teacher harmonize the content of the traditional lesson and display a variety of effects on the computer screen, organize new, non-traditional learning activities for students.

In the process of educational reforms being carried out in our country, the use of modern information and communication technologies in the educational process, the world educational resources of the teaching staff of higher educational institutions and young researchers, the use of electronic sources of modern scientific literature, as well as modern sociological research on the introduction of pedagogical technologies and the study of problems related to the principles of informatization of educational processes in higher educational institutions. In particular, regarding the situation in the higher education system during the pandemic, there is a discrepancy between the current level of development of science, engineering and technology in the higher education system and the process of improving the quality of professional training of future computer science teachers. The issue of large-scale implementation is becoming more and more relevant. The creation of an electronic information educational environment of an educational institution is not a purely

technical issue, but for this it is necessary to direct the scientific, methodological, organizational and pedagogical capabilities of the institution based on a systematic approach. Based on this, the concept of «electronic information and educational environment» can be defined as a set of software, information technology, educational and methodological systems that provide a specific purposeful educational process. As a result of analytical studies, it was determined that the electronic information and educational environment can be described according to the following typological features:

1) An electronic information and educational environment of any level is considered as a complex structured object of a systemic nature.

2) The integrity of the electronic information and educational environment, as well as the concept of achieving consistency, meaning their harmony, embodies the educational goals of implementing the personal and professional model of a graduate of an educational institution.

3) The electronic information and educational environment is a factor influencing the effectiveness of education and training, as well as its tool.

The results of the analysis of teaching technical, technological and specialized subjects in the process of teaching computer science in higher educational institutions, existing pedagogical software and the state of pedagogical practice showed a number of disproportions. Including:

- information and communication technologies, in particular, between the social order for the training of highly qualified computer science teachers who are able to use modern didactic tools in the educational process, and insufficient didactic, educational and methodological support for use in the educational process;

- between training based on traditional educational methods and means and modern requirements for the level of information culture, professional skills and knowledge of a specialist;

- between the need for modern didactic teaching aids and the insufficiency of such means in the process of teaching technical, technological, general professional and profile subjects to computer science teachers of higher educational institutions.

Based on the above considerations, we can say that although a lot of research work has been carried out on the problem of organizing and improving the process of training personnel in higher educational institutions, the creation of modern didactic tools for teaching computer science to teachers and psychological, pedagogical and didactic capabilities, methodology, scientific foundations of application are not fully disclosed, and the problem of their improvement has not been specially studied. This necessitates research into the technology of creating and using modern didactic teaching aids in the training of future computer science teachers. In order to fulfill this urgent task, it is necessary to solve the problem of developing the main directions of modernization of educational and methodological activities in education, which in turn should include the following (see: Fig. 2): training of highly qualified specialists; improvement of the regulatory legal framework; implementation of innovations in the educational process; improvement of the material and technical base; improving personnel competence.

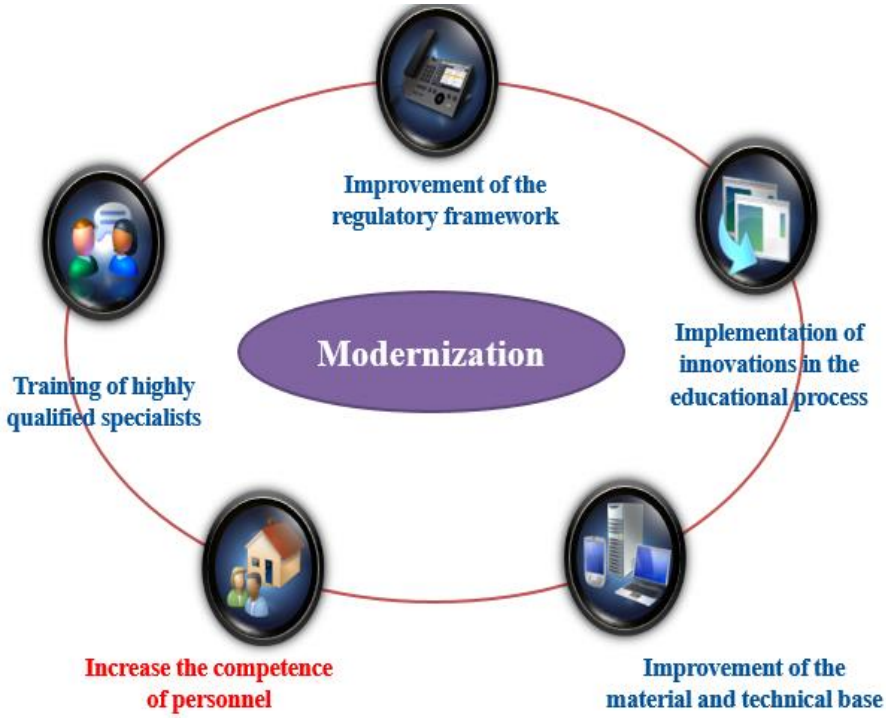

Figure 2. The main directions of modernization of educational and methodological activities in teaching

Here modernization means (Latin - modern - newest) improved, improved, able to meet new requirements. In turn, modernization is divided into two types: a) organic -

in which it carries out transformation at the expense of internal reserves; b) inorganic - in this case, the transformation takes place with the participation of external reserves.

The process of informatization of the educational system is qualitatively rising to a new level, that is, the issue of using modern didactic teaching aids to build the educational process and organize the interaction of all participants in this process is successfully solved. However, the emergence of new types of modern didactic teaching aids and updating their content do not always meet the ever-changing requirements for the educational process in the context of digital information. Therefore, there is a need to prepare future teachers of informatics not only for the use of modern didactic teaching aids, but also for the development of electronic educational and methodological materials used in the process of designing and conducting training sessions. In modern conditions, the following professional and personal qualities are required from future teachers of computer science:

- the ability to quickly adapt to changing life situations, the ability to communicate and work in a team;

- good knowledge of modern production technologies, the ability to independently acquire new knowledge;

- Ability to use information technology.

Among them, you can add the following:

- activation of the creative activity of students and taking into account their individual preferences, the formation of the readiness of the future computer science teacher to solve professional problems using modern didactic teaching aids;

- training of competitive specialists with high professional competencies and creative abilities that determine the planned result of mastering general professional subjects;

- application of knowledge on providing information about various types of technical objects in the process of creating working documents;

- application of the acquired knowledge and methods of modeling and design in the performance of design work [8].

The important socio-political, economic, legal, and cultural changes currently taking place in our society require an integrated approach to the problem of training future computer science teachers. With this in mind, a systematic approach was applied to the organization of work on the creation of modern didactic teaching aids. The systematic approach made it possible to determine the sequence, order and stages of creating modern didactic teaching aids. Each stage of work (except organizational) ended with the creation of a specific educational and program document. The following activities were included in the implementation of each stage:

- definition and detailed description of the goals and objectives of training qualified specialists;

- analysis of the conditions, means and methods for achieving the goals set; scheduled work 18;

- organization and performance of work;

- self-control and verification of results.

Clarification of the program of the subjects «Computer Science», «Computer Science and Information Technology», «Information Technology in Education» and «Information Technology» includes an assessment of the issues identified in its thematic components, quantitative characteristics and content of structural units determined by the hierarchical levels of educational material, the necessary identification. The names of the structural units of modern didactic teaching aids are chosen in accordance with the hierarchical levels of educational material [5].

The possibilities of modern didactic teaching aids in the preparation of a future computer science teacher, «Computer science», «Computer science and information technology», «Information technology in education» and «Information technology» and in their study, the content of the preparation of the future computer science teacher for teaching these subjects and its logical-structural scheme [8]. In the process of studying at higher educational institutions «Computer Science», «Computer Science and Information Technology», «Information Technology in Education» and «Information Technology», the study programs «Informatics», «Computer Science and Informatics», «Modern didactic tools in

teaching information technology» are provided, «Information technologies in education» and «Information technologies» allow:

- manage the educational process using automated databases, providing information tools and technologies;

- improving the technology of choosing the content of education, methods and organizational forms;

- to create methods aimed at the mental development of future teachers of computer science, the formation of their ability to independently receive education, search for information, conduct experiments, conduct research;

- development of tests and diagnostic methods that allow to objectively, systematically and promptly monitor and evaluate the level of knowledge of future computer science teachers;

- the creation of pedagogical technologies aimed at developing the training of future teachers of computer science, independent acquisition of knowledge, and the formation of information processing skills [7].

If the above requirements are met and digital technologies are fully applied to them, then the direction of training future teachers of computer science will improve, and at the same time, the technological foundations, ideas, principles, pedagogical conditions for creating modern didactic teaching aids will improve. To improve the conditions for training future teachers of informatics, the technology for creating multimedia electronic textbooks and virtual laboratories, the model for preparing a future teacher of informatics for professional activities based on modern didactic teaching aids using digital technologies, electronic, it is necessary to reveal the stages of designing an educational and methodological complex (see Figure 3).

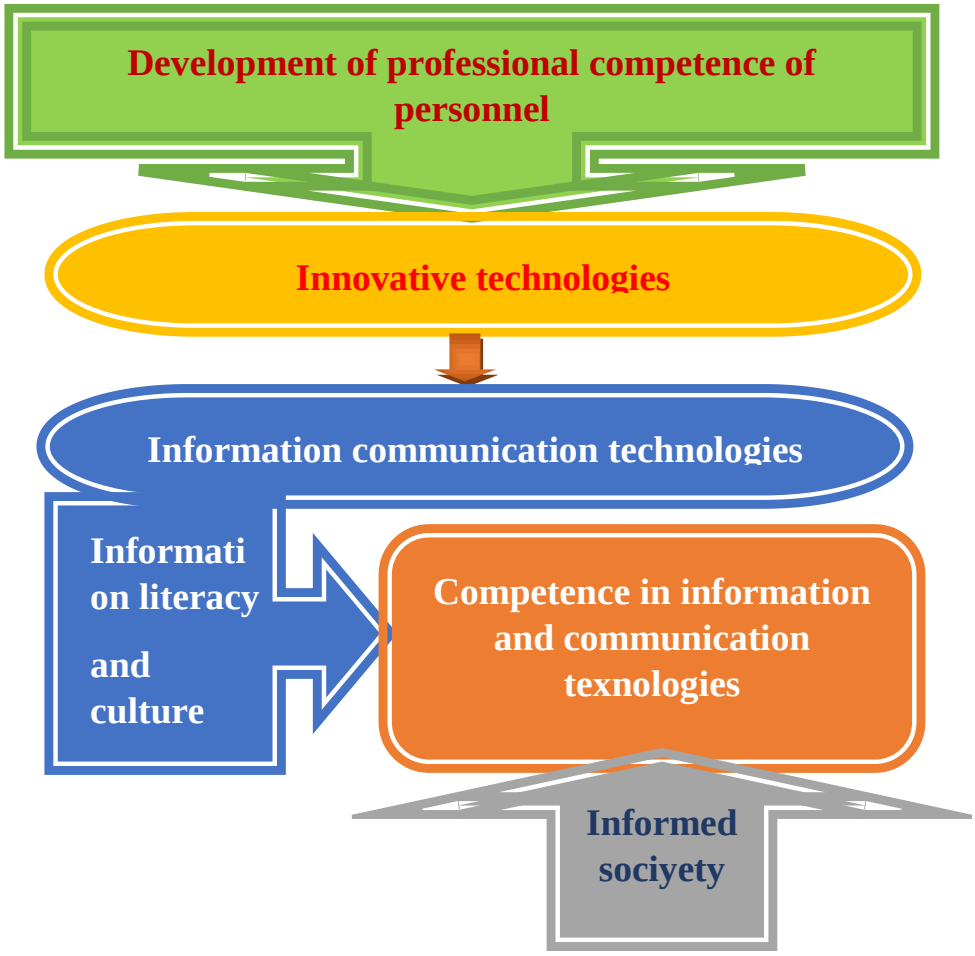

Figure 3. Development of professional competence of personnel.

Modern didactic teaching aids are software tools, or (software complex) a software and hardware complex designed to solve certain pedagogical problems, having subject content and aimed at interacting with the student. Taking into account various approaches in modern pedagogical psychology and didactics, we are developing a technology for creating and using modern didactic teaching aids in the training of future computer science teachers, defining it as a holistic developmental education that combines components. The motivational-value component reflects the orientation of students towards the use of modern didactic teaching aids in their future excellent professional activities, their need for education, motives, aspirations, abilities, and interest in their creation [6] (see Figure 4).

The cognitive component reflects students' knowledge of the possibilities of practical and instrumental software used in the creation of modern didactic teaching aids, and the level of theoretical preparation for the creation of modern didactic

teaching aids (see Figure 4). A motive is an internal impulse that induces a person to fulfill a certain goal in human activity and acts as the highest form of need.

Figure 4. How do we acquire knowledge?

The cognitive component reflects students' knowledge of the possibilities of practical and instrumental software used in the creation of modern didactic teaching aids, and the level of theoretical preparation for the creation of modern didactic teaching aids. The professional competence of personnel is formed on the basis of: 1)worldview (starts with the family and changes throughout life); 2) is formed on the basis of knowledge, skills and qualifications; 3) professional skills are formed on the basis of professional and life experience; 4) occurs on the basis of professional and human motives. A motive is an internal impulse that induces a person to fulfill a certain goal in human activity and acts as the highest form of need.

For the manifestation of operational abilities, an informatics teacher needs to educate students with a set of knowledge, skills, personal qualities necessary to create

modern didactic means of component learning. Based on the foregoing, it can be noted that the technology of training future teachers of computer science based on the technology of creating and using modern didactic teaching aids can include: organization and management of the educational process; theory of formalization and coding (digitization) of information; assigning part of the teacher's function of providing information to computer teaching aids, the main thing is to manage the cognitive activity of students with the help of automated systems.

The technology for creating modern didactic teaching aids was based on the following ideas taken from various fields of science [4]: control theory (algorithmization of students' activities, modern teaching methods for teaching certain tasks of a teacher.

List of used literature:

1. Decree of the President of the Republic of Uzbekistan dated 06.10.2020 Decree No. PQ-4851 «On the further improvement of the education system in the field of information technology, the development of scientific research and measures for integration with the IT industry». PQ-4851 dated 10/06/2020. https://lex.uz/docs/5032128.

2. Decree of the President of the Republic of Uzbekistan «On the strategy of action for the further development of the Republic of Uzbekistan».// Collection of legal documents of the Republic of Uzbekistan. -T., 2017. -S.39. https://buxgalter.uz/uz/doc?id=491659_2017-2021_years_of_the_five_priorities_of_the_development_of_the_republic_of_Zzbekistan &prodid=1_vse_zakonodatelstvo_uzbekistana.

3. G. Zaripova, A. I. Hikmatov, O.K.Temiro, D.B.Salimova. IN THE CONTINUOUS EDUCATION SYSTEM, UPGRADING AND RETRAINING OF PEDAGOGIC PERSONNEL IS THE CURRENT DEMAND. // «ACADEMICIA: An International Multidisciplinary Research Journal». ISSN: 2249-7137. Vol. 12, Issue 06, June 2022 SJIF 2022 = 8.252. A peer reviewed journal. – Page. 8. http://journal.buxdu.uz/index.php/journals_buxdu/article/view/7954/5040

4. G. Zaripova, A. I. Hikmatov. EDUCATION OF YOUTH IN CONDITIONS OF NATIONAL INDEPENDENCE USING THE WORKS OF OUR GREAT SCIENTISTS // «Asian Journal of Multidimensional Research». ISSN: 2278-4853. Vol. 11, Issue 6, June 2022

SJIF 2022 = 8.179. 38-44-page. http://journal.buxdu.uz/index.php/journals_buxdu/article/view/7955

5. G. Zaripova, Sayidova N.S. Use of interactive means in the course of training of students to computer technologies in the higher education system. // Bukhara State University Proceedings of the Scientific-Practical Conference on «Culture and Education: Dialogue of Times», December 24-25, 2015. Pages 128-130.

6. G. Zaripova, N.S.Sayidova, F.F.Norova, A.A.Abduakhadov. FEATURES OF THE CREDIT AND MODULAR SYSTEM IN HIGHER EDUCATION. // «Academy». Russian impact factor: 0.19. Scientific and methodical journal. No. 10 (61), 2020. 25-29-p.

7. G. Zaripova, Sh.Sh.Baxronov, M.M.Muxammedova. The role of theory and application of information systems in the field of information technology. // SCOPE ACADEMIC HOUSE. 11th International Conference. «SCIENCE AND PRACTICE: A NEW LEVEL OF INTEGRATION. IN THE MODERN WORLD».November 30, 2020, Sheffield, UK. – Б. 101-102.// DOI: http://doi.org/10.15350/UK_6/11.47. https://scope-science.com/uk_6_11.html.

8. G. Zaripova, F.Kh.Khazratov, N.Sh.Namozova, E.L.Qobulova. Fundamental classification of electronic commerce in the development of information technologies of the digital economy. // Collection of materials of the international scientific-practical conference on «Modern problems of applied mathematics and information technologies» BUKHORA State University April 15, 2021, pages 405-408.