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PEDAGOGICAL GUIDANCE OF THE PROCESS OF FORMING INFORMATION TECHNOLOGICAL COMPETENCE OF FUTURE COMPUTER SCIENCE TEACHERS: A PRACTICAL ASPECT

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The article reveals the current problem of organizing pedagogical guidance in the process of forming information technology competence of future computer science teachers in a practical aspect:

It is noted that technological training in the conditions of the modern information and educational space of higher education` pedagogical institutions is implemented by performing a significant part of educational activities using communication technologies.

In the article it is presupposed that mandatory presence of initial information and technological literacy of students, is manifested not only in their mastery of the skills and abilities in using their activities of a set of technical means and devices, but also in the ability to understand when this information is needed, find it how to evaluate and use it effectively.

Therefore it is necessary to improve the ways of forming and developing information technology competence of specialists as a necessary component of their general professional competence. It is a value guideline of modern higher pedagogical education; the practical component of the process of forming information technology competence of future computer science teachers. It is revealed in the context of the activities of the studio of pedagogical excellence to improve the methodological and technological literacy of higher education teachers, which provided for work in two directions: «Modern Educational Technologies» and «Fundamentals of Computer Telecommunications». It is concluded that the use of information and communication technologies in the educational and information environment of a pedagogical institution of higher education and the optimal management of this process made it possible to provide students with additional theoretical and methodological material on electronic media in the disciplines of basic training in the field

of informatization of education, which made it possible to repeat the educational material of the studied problems and use it in a new context.

Keywords: *information technology literacy, information technology culture, information technology competence, formation and development of information technology competence, computer science teacher.*

Statement of the problem in general terms and its connection with important scientific and practical tasks. Changes in the system of modern higher pedagogical education and changes in the educational paradigm as a whole determine the solution of complex problems, on which the success and comfort of the activities of both teachers of the system of pedagogical institutions of higher education and the future specialists they train largely depend (Горбатюк, 2017).

One of these tasks is the task of forming and developing the information technology competence of specialists as a necessary component of their future professional activity. At the same time, the essence of the competence-based approach is determined not only by the set of principles, structure and content of professional education, but also by the features of the educational process of a pedagogical institution of higher education. The process of forming and developing professional competencies is considered as a means of achieving a new quality of professional education (Гуржій та ін., 2016). In turn, information technology competencies are a mandatory component of professional competencies. And this circumstance emphasizes the need to form and develop the competence of graduates of the system of pedagogical institutions of higher education. Let us dwell on the practical aspect of forming the information technology competence of future computer science teachers in the process of professional training, in particular future computer science teachers.

Analysis of recent research and publications that initiated the solution to this problem and on which the author relies. Computer technical means play a special role in this, defining a separate category of information technologies and communications. This category is the basis of global, regional and local networks, including the worldwide computer network Internet.

It should be noted that promising means of information and communication technologies of the new generation are actively being introduced into the educational process of the system of modern higher education institutions in the near future, should completely replace traditional technical means of training future specialists (Буйницька, 2012). At the same time, one of the main criteria for the effectiveness of the activities of teachers and students in the conditions of the modern information space will be their information and technological literacy, interpreted by us as a set of knowledge, skills and abilities necessary for the use of modern information and communication tools and technologies to solve educational and other problems.

In turn, the level of information and technological literacy will determine the information and technological culture of future specialists, as a reduction of rules of conduct in technosystems, that is, in that part of the noosphere that is covered by the influence of technical means and devices (Карташова, 2011).

In the most general sense, information technology competence can be interpreted as a measure and method of creative self-realization of the individual in all types of creative activity and communication aimed at mastering the most rational and effective methods, as well as optimal methods of transforming matter, energy and information for the benefit of man, society and protection of nature (Биков, 2011). We mean by information technology competence of a specialist his ability to practically implement information and communication technologies in his daily professional activities.

Scientific studies that outlined the trends of changes in the teacher's professional sphere due to the processes of informatization, determined the importance of the introduction and use of information and communication technologies in the practice of work of modern educational institutions, were conducted by domestic (V. Andrushchenko, G. Ball, N. Balik, V. Bespalko, V. Bykov, V. Gershunskyi, S. Honcharenko, R. Gurevich, M. Zhaldak, M. Kademiya, Yu. Mashbyts, I. Robert, S. Sysoeva, O. Spivakovsky etc.) and foreign scientists (A. Tofler, I. Broun, J. Bruner, S. Papert Papert, D. Belshaw, B. Hirsh, G. Creeber and R. Martin, L. Manovich, J. Stommel).

Thus, the conceptual principles of professional training of future specialists were studied by scientists O. Galus, R. Horbatyuk, R. Gurevich, O. Dubasenyuk, A. Ligotskyi, H. Ponomaryova, V. Polishchuk, L. Romanyshina, O. Sukhovirskyi, L. Khomych, I. Shorobura and others. Such scientists as: V. Bykov, L. Bilousova, R. Horbatyuk, M. Lapchyk, N. Morse, S. Rakov, Yu. Ramsky, M. Rafalska, S. Semerikov, E. Smirnova-Trybulska, O. Spirin, Yu. Tryus, M. Umryk and others, in particular, the theoretical and methodological principles of designing and using cloud-based training for teachers of informatics and mathematics, the methodical system of training future teachers (Yu. Bilyai, T. Valyuk, O. Korotun); professional training of future computer science teachers based on modern network information technologies (L. Breksina, S. Litvynova); the Moodle system as a means of developing the subject competencies of informatics teachers in the conditions of distance postgraduate education (K. Kolos); ensuring information security of high school students in a computer-oriented educational environment (V. Kovalchuk); method of using distance learning technologies of computer sciences (I. Geramisenko); the use of network technologies of open systems in the education of future bachelors of informatics (T. Vdovychyn). However, the problem of forming the technological culture of future informatics teachers has not been sufficiently covered in scientific works.

The purpose of the article is to highlight the practical aspect of the formation of information technology competence of future computer science teachers and the main stages of pedagogical management of this process.

Presentation of the main material. It is known that the professional competence of a specialist is based on his mastery of the relevant knowledge base, skills and abilities necessary to perform his functional and job responsibilities. At the same time, a modern specialist, in order to be competitive and in demand in the labor market, must have a certain set of professional cultural values, which are currently not only in his professional field, but also in culture, art, and science in general. This condition determines the required level of CG competence of such a specialist for his awareness of the need for information, determination of the means, technologies and directions of its search, assessment of efficiency and reliability, as well as methods of its use (Аніськин, 2003).

To solve the above-mentioned problems in the modern information society, a professional specialist simply cannot do without technologies for using the necessary electronic communication tools for prompt search, processing, storage and transmission of information that affect his professional competence. Therefore, the information technology competence of a specific specialist is one of the first plans of the level of general professional competence and is a particularly valuable guideline for his training in the system of pedagogical higher education. The tasks of developing the information technology competence of a specialist include: enrichment of knowledge and skills in the field of computer science and information and communication technologies; development of communicative, intellectual abilities; development of communication skills in a single information space. The tasks of developing information technology competence are reflected in such specific functions as: cognitive, communicative, normative, evaluative, developmental functions. All of the above functions closely interact with each other, passing one into another and are actually an integral process or a certain system for developing the information technology competence of a specialist (Кочарян, 2016).

Technological training in the conditions of the modern information and educational space of higher education institutions, implemented by performing a significant part of educational activities using information and communication technologies (ICT), presupposes the mandatory presence of initial information and technological literacy of students, which is manifested not only in their mastery of the skills and abilities to use their activities in a set of technical means and devices, but also in the ability to understand when this information is needed, find it, evaluate and effectively use it. The preparatory stage for the formation of information and technological competence was to improve the methodological and information and technological competence of teachers so that they could acquire

innovative knowledge in the field of using information and communication technologies and interactive teaching tools in professional and pedagogical activities. The work was carried out in the form of open seminars in the context of the activities of the Studio of Pedagogical Mastery Information and Technological Competence of a Computer Science Teacher, in the work of which, in addition to teachers, teachers of basic comprehensive schools were involved, where students – future computer science teachers – underwent pedagogical practice (Роганов, 2019).

The developed program of the Studio's activities ensured the quality and effectiveness of this process by a set of conditions, such as:

- continuous learning through the use of modern information and communication technologies, including mobile and network ones;
- constant methodological support in organizing online seminars of both formal and informal formats;
- strengthening the professional focus of advanced training programs by involving teachers in research and project activities;
- taking into account the specifics of teaching adults information and communication technologies from the standpoint of andragogy.

The program of the Studio of Pedagogical Excellence, based on the information and methodological demand for mastering educational programs for improving pedagogical excellence, provided for work in two areas: «Modern Educational Technologies» and «Fundamentals of Computer Telecommunications» (Роганов, 2019).

The work in the direction of «Modern educational technologies» consisted of holding seminars and workshops: «Technologies of pedagogical support and support of the individual trajectory of development and self-development of the individual in teaching computer science», «Technologies of pedagogical support for gifted children and youth in the field of information technology», «Technologies of individualization of training», «Organization of project activities in an educational institution», «Organization of scientific research activities of pupils and students», «Development of original programs of elective courses for work in a specialized school», «Methods of active learning», «Professional and technological culture of a computer science teacher», «Game technologies», «Project technologies. Types of projects», «Experience and methods of interactive learning», «Problem-based learning», «Case study technology», «Research technologies», «Professional portfolio technology». The work in the direction of «Fundamentals of computer telecommunications» involved holding seminars and workshops on the topic: «Technological Thinking: A Requirement of Modern Education» (using Google Suite for Education), master classes on mastering PowerPoint, Windows, Movie Maker programs, webinars

(«Electronic Learning Tools in Pedagogical Education», «Website Development Technologies»), a workshop on mastering the information and communication technologies «Google Classroom» and other practical work («Development of Internet Applications», «Development of Flash Applications», «Information and Communication Technologies in Education», «Electronic Educational Resources in Education»).

An important area of work of the Studio of Pedagogical Excellence is familiarization with foreign programs for training computer science teachers and practical experience of European countries and the USA in the use of information and communication technologies in educational activities. Thus, within the framework of this activity, consultations were provided on writing and implementing grants, projects to intensify international activities on issues of information technology education and pedagogical technologies. The organization of joint creative activities of the Studio of Pedagogical Excellence envisaged fundamentally new communication schemes between all participants in the form of interactive (network) interaction based on the theory and practice of adult learning, where the educational process is built on the principles of the priority of independent learning, joint activities, taking into account the experience of the one who is learning, individualization, systematicity, contextuality of learning, updating of learning results, electivity, development of educational needs and awareness of learning (Суховірський, 2016).

In order to achieve high efficiency in acquiring professional experience, mobile learning technologies were used, accompanied by the creation of a fundamentally new system for organizing a network methodological service that provides personal and professional development and information and methodological support for teachers. With the help of the network methodological service, new forms of distance events were implemented (holding pedagogical seminars, discussions, debates on innovative technologies introduced into the educational process, namely: organizing Internet conferences; participating in thematic quizzes, competitions of pedagogical skills; holding open pedagogical councils; organizing virtual exhibitions of achievements in the mobile learning system; in virtual communities, mastering webinar tools for text, audio and video communication; the mobile learning system). Thus, the activities of the Studio of Pedagogical Excellence contributed to the formation of an integrative personal characteristic in teachers – information technology competence, which ensured the effectiveness of work with information and communication technologies to solve professional problems related to the design of educational programs of elective courses for teaching in a specialized school using mobile learning technologies in the context of informatization and profiling of higher education.

The main condition for the formation of information technology competence of future computer science teachers is the focus of the content of the theory and practice of training future specialists on the formation of motivation for such a process. For this content of professional training of a computer science teacher, a holistic system of knowledge in the field of information technology and programming is included, which ensures the formation of the functional component of technological culture, in particular, familiarity with databases: the concept of a database, principles of its construction, searching for the necessary information in an existing database and saving it in your own, converting information; the relationship of various Microsoft Office applications, the ability to use the help system and the global Internet, etc. In the course of the study, we proceeded from the fact that, in addition to the knowledge, skills and abilities that are general issues of computer science, after completing this stage, students master a set of knowledge and skills necessary for them to take special courses related to future professional activities, and training is built taking into account the features and needs of different specializations (Прийма, 2005).

An important area was the optimization of student training disciplines based on interactive and problem-based learning technologies. Thus, when studying the disciplines «Theoretical Foundations of Computer Science»; «Computer Architecture», «Fundamentals of Computer Graphics» (1st year) and «Computer Networks, Internet, Web Design» (2nd year), the organizational forms of training were improved, including the use of information technologies: online lecture, slide lecture, video lectures. In addition, combined lectures were practiced, when a multimedia projector and interactive whiteboard were used; the teacher's lecture was accompanied by computer presentations. Additional didactic units included in the content of these courses were focused on mastering such concepts as «interactivity», «interactive learning», «interactive teaching tools». Therefore, the following topics were studied within the framework of these courses: Hardware and software for interactive teaching tools, Types of interactive equipment, Interactive Internet technologies, Development of interactive resources for the Internet, etc. Particular attention was paid to studying the types of interactive equipment and electronic educational resources, gaining knowledge about the potential of interactive teaching aids and their use for pedagogical support of students' activities, and acquiring primary experience in independently creating interactive teaching aids.

The use of information and communication technologies in lectures increased attention and contributed to the immersion of students in the developing information and educational environment. Various means stimulating students' reflective thinking were actively used in teaching: group discussions, structured conversation methods, business games and interactive seminars. In the process of

lecturing, the teacher used electronic and printed primary sources and methodological developments, while having the opportunity to carry out the necessary editing of the content of the academic subject (generalization of knowledge, increase in didactic units, integration of knowledge, condensation of information, etc.) taking into account individual differences in the abilities and intelligence of students. The use of information and communication technologies in the educational and information environment of a pedagogical institution of higher education made it possible to provide students with additional theoretical and methodological material on electronic media on the disciplines of basic training in the field of informatization of education, which made it possible to repeat the educational material on the issues under study and use it in a new context.

Mandatory conditions for organizing interactive learning were constructive positive relationships between all subjects of the educational process; democratic style and cooperation in the communication process; involvement in the process of presenting new material of vivid examples, facts, images; variety of forms and methods of presenting information; organization of non-standard forms of students' activities, their mobility; inclusion of external and internal motivation of activity, as well as mutual motivation.

Interactive forms of learning provided high motivation, strength of knowledge, developed creativity and imagination, formed communication skills, an active life position, team spirit. However, attention was paid to the value of individuality, freedom of expression, mutual respect and democracy. In the rating of advantages, which students determined for interactive methods, there were the project method, group workshop, discussion, role-playing games, oral journal.

One of the effective technologies designed to increase motivation for learning at the first stage was the project technology, which made it possible to create conditions of activity as close as possible to real ones, ensuring the formation of generalized competencies, universal, informational and cognitive (research) skills and the technology of situational analysis (case study), which made it possible to establish a connection with practice and rely in the educational process on the objective experience of students. The proposed technologies increased motivation, developed critical thinking, activated the theoretical knowledge of students, their practical experience, revealed and developed the ability to express their thoughts, ideas, suggestions, the ability to listen to different views and argue their own. Going through the main stages of creating projects: from organizational and preparatory (problematization, development of a project assignment (selection), project development (planning)) to technological (implementation of a creative idea), and then to the final (formalization of results, public presentation, discussion, self-reflection), students were able to work out

real production, methodological and pedagogical situations. Projects were used as part of group training. The implementation of tasks using the project method was a significant contribution to the development of professional competencies, which allowed the development of a technological worldview in the field of basic technological processes (Роганов, 2019).

For this purpose, additional methodological recommendations and topics for educational projects were provided, which were then used in teaching practice. E-learning methods were aimed at increasing the positive motivation of students. The teachers of the departments accompanied the teaching of lectures, practical classes and the organization of independent work of students with computer, electronic and online presentations using webinar rooms for synchronous online lectures and online seminars for all participants in the educational process. The modern technological base of pedagogical institutions of higher education made it possible to transform the combined knowledge of teachers into an electronic resource in a form accessible to students. The role of the teacher at this stage was to select and structure the material, provide students with the information necessary for mastering a particular module. At the same time, it is very important to remember the need to maintain links between theoretical blocks of information and the practice of their use. Without such a presentation of information, its link to a specific subject area, it is impossible to develop competencies in future teachers.

The emergence of new information technologies in education leads to a shift in the attention of students and teachers to the technical side of the educational process. However, there is a somewhat erroneous opinion that quality education is the presence of computer classes, the use of multimedia and information and communication technologies. However, all of these are only «tools», additional means that facilitate the learning process, but in no way replace it. When developing electronic training courses, teachers should take into account the provisions that the basis of training, in addition to innovative and interactive methods, should be live communication between all subjects of the educational process: the teacher and students; teachers; students and representatives of enterprises, employers.

The motivation for educational activity should be considered in synthesis with professional self-determination as one of the main tasks of professional training, a stimulating factor for further self-education of students. Therefore, extracurricular educational work, in particular motivational trainings («The Role of the Teacher in the Information Society»; «Your Future is in Your Hands»), debates («Information Society: What is it Like?», «Modern Technoethics and the Modern Future»), educational events («Initiation into Students», creative work competitions «Teacher of the New Formation», student holidays) contributed to

the strengthening of motivation to master the profession of a computer science teacher.

Thus, at the motivational-target stage of the formation of information technology competence of future computer science teachers, the acquisition by future specialists of new knowledge about the universality of the profession of a computer science teacher, the development of motivation for the teaching profession, the ability to apply information and communication technologies and interactive teaching tools in professional activities. An important achievement at the motivational-target stage was the creation of favorable conditions for students to realize the need to implement information and communication technologies in a comprehensive school, the importance of their use in professional activities at the current stage of development of the information society, the formation of a technological worldview and personal moral qualities of students, oriented towards infoethics.

Conclusion. Thus, the creation of an educational and information environment of modern higher education in the process of professional training of future computer science teachers should ensure the involvement of students in search and research activities through individualization of training; tuning to pedagogical cooperation using dialog and polylogue communication models aimed at improvisation and multivariance of search results; focus not only on learning outcomes, but also on the very process of achieving this result; implementation of the principle of student-centrism, creation of optimal conditions for ensuring the success of everyone in learning; flexibility of the educational and information environment; a variety of methods for assessing students' educational achievements.

Thus, we note that the designed educational and information environment should contribute to the formation of basic concepts in the field of technologization and informatization of education, the development of the information environment of a pedagogical institution of higher education; the formation of the ability to design and implement the educational process and professional contacts in pedagogical activity; expansion of the scope of application of modern information and communication technologies based on interactive, network, mobile and multimedia technologies of the professional activity of a future computer science teacher; adaptation of a computer science teacher to the implementation of professional activities in the information environment of a dynamically developing higher pedagogical educational institution; the formation of methods for implementing professional actions in solving general didactic and methodological problems using information and communication technologies and interactive teaching aids.

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ПЕДАГОГІЧНЕ КЕРІВНИЦТВО ПРОЦЕСОМ ФОРМУВАННЯ ІНФОРМАЦІЙНО-ТЕХНОЛОГІЧНОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ УЧИТЕЛІВ ІНФОРМАТИКИ: ПРАКТИЧНИЙ АСПЕКТ

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В статті розкривається актуальна проблема організації педагогічного керівництва процесом формування інформаційно-технологічної компетентності майбутніх учителів інформатики у практичному аспекті. Наголошується, що технологічна підготовка в умовах сучасного інформаційно-освітнього простору педагогічного закладу вищої освіти, що реалізується шляхом виконання значної частини навчальних дій з використанням засобів інформаційно-комунікаційних технологій, передбачає обов'язкову наявність початкової інформаційної та технологічної грамотності студентів, що виявляється не тільки в оволодінні ними вміннями та навичками використання в своїй діяльності сукупності технічних засобів та пристроїв, а й у здібності усвідомити, коли потрібна ця інформація, знайти її, оцінити та ефективно використовувати. Тому необхідно удосконалювати шляхи формування та розвитку інформаційно-технологічної компетентності фахівців як необхідного компонента їх загальної професійної компетентності, яка є ціннісним орієнтиром сучасної вищої педагогічної освіти.

Розкрито практичну складову процесу формування інформаційно-технологічної компетентності майбутніх учителів інформатики в контексті діяльності студії педагогічної майстерності для підвищення методичної та технологічної грамотності викладачів закладів вищої освіти, яка передбачала роботу за двома напрямами: «Сучасні освітні технології» та «Основи комп'ютерних телекомунікацій».

Робиться висновок, що використання інформаційно-комунікаційних технологій в освітньо-інформаційному середовищі педагогічного закладу вищої освіти та оптимальне керівництво цим процесом дозволило надавати студентам додатковий теоретичний та методичний матеріал на електронних носіях з дисциплін базової підготовки в галузі інформатизації освіти, що дало можливість повторювати навчальний матеріал з досліджуваної проблематики та використовувати його в новому контексті.

***Ключові слова**: інформаційно-технологічна грамотність, інформаційно-технологічна культура, інформаційно-технологічна компетентність, формування та розвиток інформаційно-технологічної компетентності, учитель інформатики.*

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