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Computer Technologies as a Method of Forming Students' Information Skills in the Process of Learning

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Abstract: *The article investigates the problem of formation of future teachers' readiness to innovative activity, the role of computer technologies as a method of formation of students' information skills in the learning process. Based on the stated and analyzed interpretations of the authors about the concept of "innovations in education", the research position to consider innovation as an important element of education support in a state of dynamic development, adequate to the demands of today's society as a phenomenon of collective or formed individual professional creative activity of a teacher was formulated. On the example of the course, in which a systematic theoretical, methodological and practice-oriented training of students is carried out, the experience of formation of readiness of future teachers to innovative activity is described, the leading forms of pedagogical activity are presented. According to the results of the study it is concluded that the formation of the future teacher's readiness for innovative activity contributes to the identification of the conceptual position of the specialty, the identification of development resources and innovation (including potential) and their critical evaluation, creating conditions for finding innovative solutions in education. This competence is an important part of the professionalism of the today's teacher. Also in the article the role of computer technologies as a method of formation of students' information skills in the learning process is studied; e-learning tools as a basic step of realization of digital pedagogical technologies, the structure of the author's system of preparation of university teacher to the application of e-learning tools in professional activity is given.*

Keywords: *Modernization, pedagogical adaptation, aspects, implementation, professional training, methodology, computer technologies.*

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Introduction

Modernization of present-day domestic education is characterized by a number of trends, among which the focus on the search for new approaches to solving urgent educational problems, active implementation in the theory and practice of pedagogical innovations. The process of implementation of innovative educational transformations has influenced the increased requirements for the level of theoretical knowledge and practical training of the modern future teacher.

Scientists and researchers such as Openko et al. (2016) "believe that the level of formation of readiness of a teacher graduate to implement innovative activities today is one of the main indicators of the quality of professional education. In this regard, the formation of future teachers' readiness to develop, approbate and implement pedagogical innovations in the educational process today is a necessary component of their professional training in higher education".

In recent years, considerable attention has been paid to the use of digital technologies in education, through which students' motivation to learn is enhanced through the use of electronic textbooks, interactive information technologies that combine text, graphics, sound and video. A harmonious combination of traditional teaching tools with the use of digital technologies through presentations, computer games and interactive exercises can significantly increase students' motivation to learn and thus reduce the time for learning.

Protsenko & Yurochko (2015) "believes that the integration of complex software and hardware complexes into the educational process is associated with the integration of extensive data analysis, robotics, neural networks, artificial intelligence into the educational process . The tasks of reforming the education system require adequate changes in the means and methods of teaching and organization of the educational process based on the principles of state policy in the field of informatization and digitalization of education, which led to a new type of education - open, based on free unrestricted access to educational resources".

The purpose of this article is: Theoretical analysis of the concepts of implementation of educational innovation by future teachers, the problems of mentoring as a factor in the implementation of educational innovation and methodology and technology of e-learning as an element of innovative education, investigation of the role of computer technologies as a way of forming students' information skills in the learning process.

Computer technologies as a method of forming students' information skills in the process of learning

New generations of students increasingly rely on modern sources of information, digital educational technologies and virtual communication tools for personal development, because the presentation of educational information in digital form has a complex effect on the student: it increases interest in learning, expands the range of knowledge, improves the quality of learning and enhances the feedback between teacher and student.

Computer technologies are actively used in many areas of the economy and especially in vocational education: - the system of initial and continuous training of teachers; - computerization of the educational process; equipping the education system with technical means of informatization (computers, multimedia projectors, etc.); - interactive interaction between teacher and student.

Zhaldak (2010) "argued that today professional pedagogy and education are at an important stage of digitalization of the entire educational system, introduction of innovative methods, techniques and forms of work with students. The introduction of computer technologies in the theory and practice of pedagogy contributes to the effectiveness of student learning, but there is a problem of competent combination of teaching methods with information and communication and digital learning technologies. Information technologies should comply with the basic principles of professional pedagogy, such as pre-planning, replicability, goal-setting and integrity".

Although computer technologies are quite a young direction in professional pedagogy, they are developing very dynamically. They are actively introduced into the teaching process at all levels of education - in schools, colleges and universities. For example, some Kazakhstan universities have introduced training programs and courses that actively introduce computer technologies into the educational process. In addition, computerization of education and Internet technologies have led to the rapid development of a new form of education - distance education, which today represents the highest level of computerization of education.

Concepts for implementing educational innovations by future teachers

On the basis of the study of pedagogical sources devoted to the problems of pedagogical innovation, a number of trends and patterns were formulated. Implementation of pedagogical innovations is characterized by a number of certain problems in the activities of a teacher associated with the

inconsistency of innovative and state programs of education and training, the need to harmonize different pedagogical concepts, new methodological developments.

Today the problems of adaptation of pedagogical innovations to the specific working conditions of the teacher, the development of the necessary educational and methodological support and the mechanism for implementation of pedagogical innovation in a particular educational institution are relevant.

The problems of expanding the range and scope of innovation activities of future teachers are related to the lack of awareness of teachers and future specialists on the organization and implementation of innovative activities.

Mykhailyshyn (2016) "argued that the process of future teacher training, according to the principles of lifelong learning, today faces a number of contradictions: between the reproductive nature of teacher training and the need for productive pedagogical activity, between the difficulties of mastering ways of innovative activity by teachers and the need for professional-pedagogical interaction to solve problems related to the implementation of innovative educational technologies".

On the basis of the indicated regularities and trends in the education system it is possible to substantiate the necessity of purposeful formation of future teachers' readiness for innovative activity.

To solve this work it is necessary to develop a special methodology. Thus, within the framework of the study, the methodology of formation of future classroom teachers' readiness for innovative activity was developed. Pedagogical experiment, including the ascertaining, forming and control stages, as well as the method of statistical processing of quantitative and analysis of qualitative results of the study were chosen and used as the leading method of research.

"In the process of developing and approbation of the methodology of formation of future teachers' readiness for innovative activity we took into account today's educational trends and requirements, namely construction of innovative educational environment, formation of innovative thinking and professional and informational culture of teachers. To develop the methodology, we studied the main theoretical provisions of the phenomenon of teacher readiness for innovative activity" (Demchenko, 2021).

Therefore, innovations are changes aimed at improving the various elements of the educational space (educational process - in terms of the development of content or technological components, management

mechanisms, changes directly related to the methods of educational activities, etc; these innovations can be systemic, modular or private), is the process of introducing innovations, and innovation activity in this context is seen as a set of project-active procedures from the creation of an idea to its replication in the educational practice of other educational institutions.

A priori innovations, which we understand as vectors of development of educational process, are a reflection of scientific and methodological search of personal or collective professional and pedagogical action in different directions (goal setting, forms and methods of training and education, training technologies, innovations in the content of education, etc.).

Let us note some of the most common research positions of Belyaev on the interpretation of the term "innovation in education" “Innovation in pedagogy represents the content of possible changes in pedagogical reality, which leads (in pedagogical community management of innovations and their implementation") hitherto unknown, which previously did not occur in this form in the history of education as a state, resulting in the development of education theory and practice”(Belyaev, 2015). Pedagogical innovations are new ways, methods of interaction of teachers and students, ensuring the effective achievement of the result of pedagogical activity." "Innovation is the introduction into something new. New forms, methods and skills in different areas, namely, industries. professional training or in the field of education and science. Therefore, all social and economic introductions can be considered innovations until they have gained mass, that is, the order of spread.

Danylenko's (2015) statement that innovations regarding education “are inevitably at odds with the existing traditional system of education, but there is a dialectical relationship between them" deserves special attention. Is it so? In our opinion, this statement is quite categorical and even controversial”.

Our observations show that the teacher's readiness for innovative activity, realized in the professional field, in a particular subject area allows to achieve educational results more effectively, because it contributes to the correct consideration of the needs of each student.

The scientific literature substantiates the logical chain of the main procedural elements of innovation processes. In particular, V.M. Klarin formed the following sequence of elements that form a single innovation cycle.

Firstly, it is a predictively identified need for change; secondly, the collection and analysis of a set of data characterizing the educational

situation, allowing to highlight the direction of the desired changes; thirdly, the process of actual development, implementation and correction and, finally, "institutionalization or long-term use of innovation, in which it becomes an element of everyday practice".

An important aspect in the process of innovation development in the educational space was noted by Yevdokimova & Aleksieienko (2017) , fixing that "although innovations refer to different levels of the education system and are very different in their objectives, content, volume, degree of novelty, nature and radicality of changes and innovations introduced in the pedagogical process, the main factors, conditions of their implementation are: - methodological elaboration of innovative ideas and models, ensuring their implementation in practice in the educational process in the educational organization (educational structure), i.e. in the system of interaction "teacher - student"; - readiness of teachers (teachers, lecturers and educators) for innovative activity".

Openko (2013) and Oleshko (2018) "believed that it is important to include educational material in the process of professional training and retraining of teachers. To solve the stated set of tasks, separate topics are included in various courses of pedagogical and methodological orientation, and at the stage of training we implement a separate course "Innovative activities in the subject field".

Let us briefly characterize this course. Vocationally-oriented training, implemented within the framework of the stated course, allows you to focus not only on the methodological aspects of this direction of pedagogical science, but also on the selection of educational content elements, reflecting the current demand and realities of the present educational space and focused on educational standards.

Thus, the course includes several sections, within which theoretical and practical levels are studied:

- current socio-cultural situation and its reflection in the format of social order to education, in particular to education in the humanities;
- correlation between normative requirements to the subject field (content of educational standards, including requirements to results) and expectations of educational process participants; within this topic the emphasis is made on the analysis of requirements and expectations, characterized by specifics of particular schools, which allows fixing the uniqueness of local innovations;
- the educational phenomenon in the innovation activity on the example of humanities disciplines;

- resources of educational design and project method for solving urgent problems of educational space;

- mechanisms for creating meta-space (within the framework of implementing interdisciplinary and meta-disciplinary approaches based on the use of different technologies of educational activity).

This practice-oriented course includes several major learning activities.

First, work with scientific pedagogical sources;

Secondly, work with practical material (familiarization with documents and materials of innovative practice in the profile of training, watching videos, etc.); these two types of learning activities are aimed at forming a critical evaluation position in assessing changes and innovations in education.

Thirdly, performance of practical tasks of developmental character; fourthly, performance of a complex project aimed at theoretical and methodological comprehension and model practical development of a separate element in the subject area.

Mentoring as a factor in the implementation of educational innovations

The basis of the mentor's activity is to replenish the accompanying educational deficit. In this regard, the activity of a mentor is close to pedagogical support, theoretical and methodological and scientific and practical foundations are developed in the works of domestic authors. According to most authors, the essence of pedagogical support is to assist a person in overcoming those or other external barriers that he or she is unable to overcome independently.

The external barrier can be a lack of resources for realization of own initiatives, absence of organizational or other mechanisms (for example, regulatory and organizational and technical difficulties at the stage of formation of school or student self-government; realization of school or student projects, startups, etc.) etc.). However, in all cases the external barrier is secondary to the internal unpreparedness of the accompanied person to overcome this barrier independently.

Such unpreparedness is called an "educational deficit. When the internal educational deficit is filled, the person accompanied will independently overcome external obstacles. Thus, the essence of a mentor's activity in education includes not only pedagogical support, but also elimination of internal educational deficits of students, i.e. creation of conditions for formation of readiness to independently solve one or another

type of social, educational or professional problems. A common feature of all types of educational deficits is the lack of independent accompaniment.

According to the final results of the mentor's activity there is an acquisition of the accompanied person's ability to act independently, solve problems, overcome barriers, independently manage the processes of personal development, education, adaptation, career growth, etc.

Pekhota et al. (2016) "believed that "Psycho-pedagogical basis of mentoring can be represented as four pairs of interacting processes, where in each pair the first process is the main, the second – auxiliary".

The mentor's main activity is the main type of professional activity that the mentor (as a person with relevant experience) is involved in and in which he is called to assist the mentee.

In a simpler and clearer form, this provision is reflected in the work of the mentor in production: his main labor function is participation in a certain production process as a worker or specialist; an additional labor function is mentoring, i.e. supporting novice workers or specialists included in the same production process.

The accompanied activity (educational, professional, volunteer, entrepreneurial, etc.) is the activity of the mentor. The presence of a mentor with a certain educational deficit is a key factor in determining the need for a mentor, and at the same time a key condition for making mentoring possible. At the same time, the nature of the mentoring activity and the mentor's competence must correspond to the nature of the educational deficit.

"The basic process of development (socialization, self-determination, identification, etc.) is mentoring. The type of mentoring activity and the mentor's competence must correspond to the type of basic development process. Development of the accompanied person in the process of activity - activity of the accompanied person (educational, game, labor, project-research), etc., its discussion and comprehension of the received experience" (Skrypnyk, 2019).

Accordingly, the significant methods of the mentor's work are the organization of the accompanied person's activity and joint discussion. The specificity of mentoring activity is also evident in its duration. Achieving the goal of mentoring related to overcoming educational deficits is impossible during one or a few one-time events (consultation, conversation, master class) and requires more or less long interaction between the mentor and the mentee (mentees) in the process of the latter's activity. Proper completion of the mentoring period assumes that the mentee has overcome their internal

educational deficit, as evidenced by a consistent series of changes in behavior.

Such a format of mastering the course can be conditionally designated as a problem-creative laboratory, in the framework of work in which the student fully develops theoretical and methodological tools and adopts new models of professional activity.

Methods and technologies of e-learning as elements of innovative education

Today in pedagogical science considerable attention is paid to the improvement of teaching methods and technologies in connection with the need to train highly qualified personnel in all areas of activity in a dynamically changing economic and social conditions and the outlined prospects for the integration of digital technology, designated a priority state task. Reforming and modernization of education in higher education is inextricably linked with the use of digital learning technologies and the trend of informatization, which creates conditions for new research areas of means of organizing the educational process.

The implementation of the trend of informatization of education allows you to create a strong single center of world education, which is the foundation of open education.

"The trend of informatization of education and the construction of information and educational environment has led to the emergence of pedagogical research of information and communication and digital technologies and the actualization of e-learning, which in foreign sources is denoted by the term E-learning. E-learning has become a means of implementing open education as part of the construction of information and educational environment" (Starosta & Hoshko, 2018).

E-learning is understood as the organization of educational activities using the information contained in databases and used in the implementation of educational programs, and ensuring its processing through information technology, technical means and information and telecommunication networks to ensure the transfer of information specified in the information on the lines of communication, interaction between students and teachers.

Also, when defining e-learning, attention is paid to its multimedia content, which allows you to define e-learning as an educational process, implemented with the help of the Internet and multimedia technologies. E-learning is an important component of the educational process. This is

confirmed by the fact that the legal framework regulating e-learning in the educational process is developing.

"E-learning is presented not only as a means of implementing open education, but also as a new form of learning. E-learning tools as a tool for implementing e-learning within the information and education environment catalyze a change in the world and the principles of learning, introducing digital technologies in pedagogy, giving them a new educational content" (Ogienko, 2013).

That is why e-learning is an innovative form of educational technology development of future teachers.

Scientists interpret the definition of e-learning tool from different points of view:

• E-learning tools are software tools that reflect a particular specialty, to a certain extent implemented the technology of its study using information and communication technologies, provide the conditions for various types of learning activities.

• E-learning tools - software of educational purpose, which reflects a particular specialty, to a certain extent implemented the technology of its study, created the conditions for the various types of learning activities.

• E-learning tools can be electronic publications that contain systematic material from the relevant scientific and practical field of knowledge, providing a creative and active assimilation of knowledge, skills and abilities in this area.

Oliynyk (2013) "noted that electronic learning materials should be characterized by high performance and artistic design, completeness of information, quality of methodological tools, quality of technical execution, clarity, logic, and consistency of presentation".

It is impossible to find e-learning materials reduced to the paper version without losing didactic qualities. According to this logic, e-learning tools should have the following properties:

1.E-learning tools should be presented through a combination of graphic, textual, digital, linguistic, musical, video, photo, and other information.

2. In the structure of e-learning tools can be distinguished sources of information, tools for creating and processing information, administrative structures.

3. E-learning tools that contain systematized material in the relevant scientific and practical field of knowledge, provide a creative and active learning of students knowledge, skills and abilities in this area. The use of electronic learning tools is based on the following basic didactic principles.

The principle of visualization of learning. Application in the learning process of means, allowing to receive information visually by different means: advanced multimedia means, graphic means, conditionally graphic means.

Principle of distributed learning material. The educational process based on the means of e-learning, uses the base as a computer in computer networks. Computer networks are a component of the technical infrastructure, the computer is a tool for placement and demonstration of educational information. Therefore, E-learning tools can be available to students in both global and local networks.

The principle of interactivity of educational material. Students' activity and their interaction with the teacher are provided by the means of information presentation. Such means are combined into a single structure; the student receives a complete interactive course, and the teacher-moderator will conduct a systematic unification of disparate materials.

Principle of multimedia representation. Students with different dominant abilities to perceive learning information can independently adapt the course and activate an acceptable multimedia means of presentation of information of the training course. Maximum consideration of individual characteristics is ensured.

"Principle of adaptability to the personal needs of the learner. The principle implies a change in the amount of information offered for study in a certain period of an hour, depending on the individual characteristics of the student; in this regard, the main problem of optimization of training in terms of preservation and development of adaptive reserves is the assessment and correction of the human condition in the process of obtaining new knowledge of multimedia technology; to provide feedback to the user during interactive interaction, monitor the results of training and progress in training; automate processes of information and methodological support of the educational process and organizational management of the educational institution" (Litvinov, 2019).

The effectiveness of training future teachers to use e-learning tools in professional activities is expressed by indicators of the quality of education: progress, test results, satisfaction with the learning process, providing options for individual educational trajectories. Transparency of procedures for assessing learning outcomes allows the educational organization to meet the challenges of creating conditions for the implementation of educational programs with the use of electronic resources.

Conclusions

The importance of the article lies in the fact that the formation of skills in the field of innovation activities of future teachers in the process of professional education and teachers in the process of professional development and retraining is not an end in itself, but an important part of the professional profile of the teacher, allowing the professional to do it participate to be in the stage of development.

The formation of the future teacher's readiness to innovative activity is facilitated by the identification of the conceptual position in the specialty, the identification of development and innovation resources in it and their critical evaluation, including the potential creation of conditions for the search for innovative solutions. Therefore, we can consider the competence developed in the course presented as an element of pedagogical competence and methodological culture of the teacher, contributing not only to the generation of new ideas, but also to the formation of high-quality professional activity.

Under the conditions of socio-economic transformation of post-industrial society, the development and integration of digital technologies in education determines the relevance of a new kind - open education and determines the means of their implementation in the information and education environment in Ukraine.

The article proves that the basic activity of the mentor is the main type of professional activity of future teachers, in which the mentor is included as a professional with experience and in which he is called to download the accompanied.

This can be educational, professional, leisure, creative, communicative activities. Nowadays the problems of adaptation of pedagogical innovations to the specific tasks for the future teacher, development of the necessary educational and methodological programs and mechanisms of implementation of pedagogical innovation such as e-learning etc. are relevant.

Thus, computer technologies allow to obtain knowledge and skills necessary for living and working in today's society. They allow learning to adapt to information flows, increase computer literacy of the population in the 21st century.

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The Authors 3,4 characterized the problems of mentoring as a factor in the implementation of educational innovations.

The Author 5 analyzed the methods and technologies of e-learning as an element of innovative education.

The Author 6 investigated the role of computer technology as a method of building students' information skills in the learning process.

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