

*Mukachevo State University

**Uzhhorod National University

ANNA TOVKANETS*, OKSANA TOVKANETS**

ORCID: 0000-0002-6191-9569; tovkanec2017@gmail.com

ORCID: 0000-0003-4438-0167; tovkanecoksana@ukr.net

*Virtualization of the Educational Process in the Training
of Future Primary School Teachers*

Wirtualizacja procesu edukacyjnego w kształceniu przyszłych nauczycieli szkół podstawowych

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ABSTRACT

The purpose of the article is to substantiate the peculiarities of the virtualization of the educational process in the training of future primary school teachers in Ukrainian higher education. The following methods of scientific research are used: questionnaires and analysis of statistical data – in order to clarify the understanding of the applicants of the virtual space and identify the advantages and contradictions of the use of distance education in professional pedagogical training; theoretical analysis – to determine the main theoretical approaches to distance education and its role in the educational process; generalization – to formulate conclusions on the virtualization of the educational process in the training of future primary school teachers. It is revealed that the use of distance technologies in the professional training of future teachers is active, and requires a variety of forms, methods and techniques of virtual support of professional and general cultural training. Emphasis is placed on traditional (principles of consciousness and activity of learning, regularity and consistency, accessibility of learning, expediency) and specific (principles of modular construction of the content of educational and cognitive activities, the transition from learning to self-education, collective nature of learning and taking into account the individual characteristics of students, the use of collective intelligence) principles of construction of distance education. The peculiarities of virtualization of the educational environment of the university in the professional training of future teachers are revealed: training on the basis of the project method; the use of social services and other social and information portals that help increase creative and intellectual potential on the basis of self-organization, the desire for knowledge, the ability to interact with modern computer technology; expanded opportunities to involve social partners and establish cooperation with the scientific world community during the implementation of a joint project or when creating an innovation and

communication product; creating a communication system from the student to teacher, to the international scientific community, to partners, which helps to increase the level of general intellectual development in the implementation of innovative projects, as well as maintains interest in innovative, research, creative and independent activities.

Keywords: distance education; applicant; institution of higher education; didactic principles

INTRODUCTION

The success of modernization of the Ukrainian education system is determined by many factors, including the willingness and ability to adequately respond to dynamic changes in society that arise under the influence of new technical and technological systems. The strategy of information space development and use of information technologies in the educational space of Ukraine is defined in the National Strategy of Education Development of Ukraine for the period up to 2021 (2013), the draft Concept of Education Development of Ukraine for the period from 2015 to 2025 (2014), “Concept of New Ukrainian School” (2018), “Roadmap for educational reform (2015–2025)” (2015), the Law of Ukraine “On Education” (2017) and others.

At the present stage of development, a new paradigm of “information education” is being formed, which promotes the integration of Ukrainian education into the global educational system. On the one hand, there is a tendency to irreversibility of movement to the information society, and, on the other hand, there are socio-economic and psychological-pedagogical barriers to informatization of education, which changes the educational space, educational technologies and content of education. Changes are also taking place in professional pedagogical training. As for the development of information technologies, the introduction of distance education and the creation of a virtual educational environment, the special importance was attached by V. Bykov, O. Banit, O. Donets, N. Kolesnyk, L. Lukyanova, A. Minenok, G. Sotska, O. Trinus, I. Turchina, or Yu. Cherednichenko.

The purpose of the article is to substantiate the features of the virtualization of the educational process in the training of future primary school teachers in Ukrainian higher education. In the course of our research, we used various methods of scientific research: questionnaires and analysis of statistical data – in order to clarify the understanding of applicants of virtual space and identify the advantages and contradictions of the use of distance education in professional pedagogical training; theoretical analysis – to determine the main theoretical approaches to distance education and its role in the educational process; generalization – to formulate conclusions on the virtualization of the educational process in the training of future primary school teachers.

DISTANCE EDUCATION AND VIRTUALIZATION OF THE EDUCATIONAL PROCESS

The analysis of scientific research shows that the distance learning method is convenient and much cheaper than the traditional one, due to the efficient use of educational facilities, easier adjustment of e-learning materials and ease of access to them. In the case of distance learning, the active role of the teacher is not reduced, as he must determine the level of knowledge of the applicant, and decide to adjust the curriculum in order to achieve the best mastery of the material. If necessary, the student can get advice from the teacher, communicating with him online, directly using the Internet as a means of communication (web-chat, IRC, ICQ, interactive TV, web-telephony, Telnet) (Bykov, 2015).

As part of our study, we conducted a survey to find out the role of distance education in the training of future primary school teachers. The respondents (52 students) – applicants for education in the specialty 013 “Primary Education” of the State Higher Educational Institution Uzhhorod National University and Mukachevo State University – were offered 5 questions.

The results of the survey showed that the majority of students (80.7%, 42 students) have a positive attitude to distance education, whereas 19.3% of respondents (10 students) have a negative attitude. Some questions concerned the peculiarities of the use of distance education in professional training. Students were asked the following questions: Can distance education ensure the quality of professional training?, Do you use the opportunities for distance education in your vocational training?, Do teachers use ICT in classes?, In what classes in higher education institutions have ICT been used?

Based on the analysis of the survey results, we can say that the modern student is an active user of information and computer technology, in particular in the process of professional training based on remote technologies (Figure 1).



Figure 1. Results of a survey on the use of distance learning opportunities by students in vocational training

Source: Authors' own study.

We determined the virtualization of the educational process by the question: Do teachers of higher education institutions use ICT classes?, the results of which are presented in Figure 2.

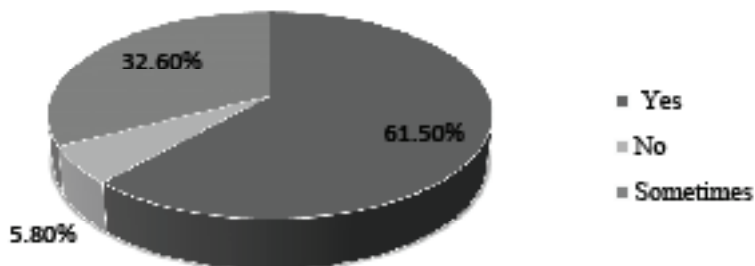


Figure 2. The results of a survey on the use of ICT classes by teachers of higher education institutions
Source: Authors' own study.

It was found that in the conditions of a modern institution of higher education for future primary school teachers, information and communication technologies are intensively used in teaching disciplines of professional orientation (71.2%), and to a lesser extent – in teaching disciplines of general cultural orientation (26.9%). At the same time, the respondents noted that there are cases when information and communication technologies are not used at all (1.9%) (Figure 3).

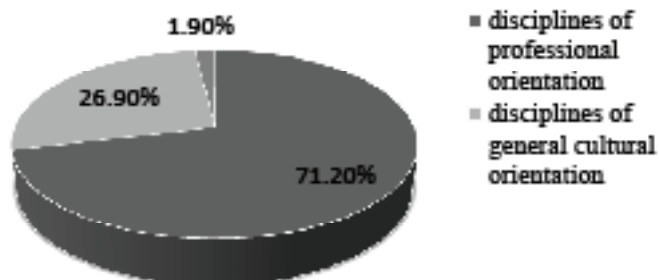


Figure 3. The results of a survey on the use of ICT in the teaching of disciplines in higher education institutions

Source: Authors' own study.

Please note that most students are not sure about the possibility of distance education to ensure the proper quality of professional training – 57.6% (30 respondents) (Figure 4), 18 students (34.6%) gave a positive answer, while 4 students (7.8%) had a dissenting opinion, which was reflected in the additional answers. The dissenting opinion of students is reflected in the considerations: “Of course it can, but only if the student is willing to make a lot of effort on their own”, or “Not fully able to provide, but there are additional opportunities” and others.

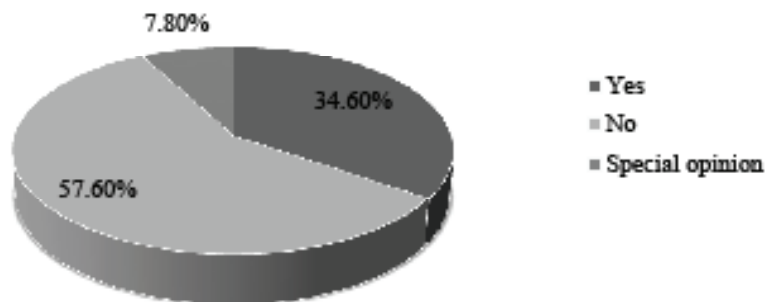


Figure 4. Survey results on the possibility of distance education to ensure the proper quality of professional training

Source: Authors' own study.

Thus, we found that the modern student has a positive attitude to distance education, actively uses distance education technologies in vocational training, at the same time, he is not sure about the possibility of providing proper vocational training in a virtual environment. According to the respondents, teachers of higher education institutions use ICT to a greater extent in classes in professional disciplines.

The analysis of the survey results shows the activity of the use of distance technologies in the professional training of future teachers; at the same time, it is necessary to diversify the forms, methods and techniques of remote provision of professional and general cultural training.

DIDACTIC PRINCIPLES OF DISTANCE EDUCATION

The analysis of the results of the questionnaire and scientific literature gives grounds to assert that in the professional training of future primary school teachers it is important to take into account certain methodological aspects. First of all, it should be noted that the didactic principles of distance learning were taken from the structure of methodological approaches to educating students in the learning environment. These didactic principles can be divided into traditional and specific.

Traditional principles include:

1. The principle of consciousness and activity of learning, which involves the relationship of pedagogical leadership with the conscious, active, creative activities of students. Consciousness is manifested in the understanding of the purpose and objectives of learning, in a full understanding of the case, a deep understanding of the material, penetration into the essence of the subject, the ability to consciously apply it in practice. The basis of learning consciousness is the mental activity of students. Consciousness in the assimilation of

material by students largely depends on the activities of the teacher, who must constantly monitor the attention of students in the learning process, stimulate it by setting problem situations (Minenok, Cherednichenko, Donets, Turchina, 2018).

First of all in the learning process, it is necessary to take into account the most common signs of conscious learning:

- students must be able to express their knowledge in the correct verbal formulation,
 - consciousness is expressed in the positive attitude of students to the content of educational material, in their interest,
 - a sign of conscious assimilation of educational material is the degree of independence – the higher it is, the more consciously knowledge is assimilated.
2. The principle of systematic and consistency. Man possesses scientific knowledge, when it clearly reflects the picture of the external world, is a system of interconnected concepts. Organized learning is a universal tool and the main way of forming scientific knowledge: the system of scientific knowledge is created in the sequence determined by the internal logic of educational material and cognitive abilities of students. Implementation of the principle of systematic and consistency involves continuity in the learning process, that is, the logical sequence and relationship between training courses studied at different stages of professional training.
 3. The principle of access to education is the conformity of the organization and implementation of the didactic process to the level of development and training of students, their individual abilities, age characteristics. A high level of development is achieved at the limit of possibilities, and thus the learning process must be complex, but feasible for the learner. Known classical rules relating to the practical implementation of the principle of accessibility, formulated by John Amos Comenius, are the following: “from easy to difficult, from known to unknown, from simple to complex”.
 4. The principle of advanced nature of training involves, first, identifying the conditions for restructuring the content of training in accordance with the deviation from the linear forms of presentation of educational material and the implementation of open forms and methods of teaching, based on the use of distributed information resources for educational purposes, which provide the possibility of continuous self-improvement of students, and secondly, the inclusion in the content of educational material of modern achievements of science and technology, relevant promising areas (Kolesnik, 2016).
 5. The principle of expediency provides for the provision of independent practice-oriented actions for information activities with a clear understanding of specific goals and objectives of educational activities, with independent choice of method of information educational activities, with variability of

actions in case of independent decision. Implementation of this principle necessitates the use of innovative methods and organizational forms of educational activities in the system of distance education (Nikolaeva, 2007, p. 65), including the introduction of the method of educational projects, various independent activities for collecting, processing, storing and transmitting information.

Specific principles include:

1. The principle of modular construction of the content of educational and cognitive activities, which involves the implementation of block-modular structure of construction of training programs. The block-modular approach to the development of programs of educational courses is based on the following features: each direction of training is presented in the form of the separate block; each block is presented in the form of modules that reflect specific topics to be studied; the built training program on a set of modules takes into account the requirements for the preparation of the student at a particular stage of his education with elements of advanced training, taking into account the profile preferences of students and teaching hours allocated for mastering; the content of the blocks can be adjusted depending on specific conditions; different combinations of modules can be used to teach students at different stages; openness of training programs for introduction of new directions of training (blocks) and adjustment of the content of training (modules) is provided. Since modular learning as one of the main goals involves the formation of student self-education skills, the whole process is based on conscious goal-setting with a hierarchy of close goals (knowledge, skills, abilities), average goals (general skills and abilities) and long-term goals (personality development). Awareness of educational activities translates the teacher from the mode of informing to the mode of counselling and management. Its leading role remains, but within the framework of subject-subjective relations in the system teacher–student. The method of modular training provides an opportunity for students to choose the path of movement within the module.
2. The principle of transition from learning to self-education. With the rapid development of science and technology, knowledge acquired in educational institutions quickly becomes obsolete. Higher education institutions are tasked with awakening the need for self-education in all students and equipping them with appropriate skills. To realize this requirement of life, the teacher must systematically encourage students to work independently to acquire knowledge in a particular field of science, technology, or art. Human self-education is individual and involves a creative approach to defining private and long-term goals, choosing methods and means of self-control, understanding the social order, qualification requirements for training, life attitudes, stock of available knowledge and skills. The quality and

- efficiency of self-educational work largely depends on the style and methods of independent work. It is important to treat self-education as a certain system of personal learning.
3. The principle of the collective nature of learning and taking into account the individual characteristics of students. This principle expresses the need to educate the group as a learning team, to create conditions for active organized work of all students and, at the same time, to approach each individually in order to successfully learn and promote the development of positive talents. And here the creation of a trans-educational environment is quite relevant – a combination of traditional and distance learning. The rationale for this principle lies in the obvious fact that learning takes place in groups. In later life, young professionals have to work in a team.
 4. The principle of using collective intelligence. The concept of collective intelligence did not appear in the context of distance education. It was actively used by sociologists in the last century and was defined as the ability of a group of people to find more productive solutions than a particular participant. But in the context of the virtualization of society, this concept has acquired a new meaning, now it also determines the ability of a group of authors to create better information content than each individual. In distance education systems, this concept has become quite widespread due to the use of wiki technology. One of the tasks of teaching is for students to learn to work together and effectively in a team. This means the need to clearly understand the tasks, goals of the team, the ability to cherish the honour of the team and fight for it. Educating the habits of working in a team and subordinating one's intentions and actions to its interests is an important task of higher education institutions (Lukyanova, Tovkanets, Sotska, Trinus, 2019, p. 19).

FEATURES OF STUDENTS' BEHAVIOR IN A VIRTUAL ENVIRONMENT

It is important to determine the role of distance education and virtualization of the educational environment in order to understand the behaviour of students and the ability to correct it by the teacher. There are three types of students due to the nature of educational activities and the corresponding patterns of behaviour in distance education.

1. Interests go beyond the knowledge outlined in the curriculum and programs of disciplines. They are active in all spheres of life of higher education institutions and are focused on broad specialization, on diverse professional training (Plotnikova, 2006, p. 310).

2. Clear focus on narrow specialization. Here, the cognitive activity of students goes beyond the curriculum too, with an in-depth study. The whole system of activity is limited by the framework of professional interests.
3. Cognitive activity is aimed at acquiring knowledge and skills within the curriculum. These students demonstrate a minimum level of activity and creativity. Thus, the features of the virtualization of the educational environment in the context of distance education are manifested in three areas: didactic principles, psychological factors of students and methods of organizing learning in the system of distance education.

Thus, the specific features of distance learning of the student in the educational environment of the university are the following:

1. The use of the project method in the training of future teachers, conducting project activities in the group.
2. Applicants for pedagogical education like no other feel an urgent need for self-development. The use of social services and other social and information portals help to increase creative and intellectual potential through self-organization, the desire for knowledge, the ability to interact with modern computer technology and mastering the latest information and communication technologies (Lukyanova, Tovkanets, Sotska, Trinus, 2019, p. 21).
3. Training of the future teacher in the system of distance education takes place with the involvement of social partners, during the implementation of a joint project or when creating an innovative communication product.
4. In the course of the project or order, it is necessary to maintain information and communication links between the student and the teacher, and between the student and the scientific world community.
5. The student in the system of distance learning constantly interacts with the international professional and student community, which forces the future primary school teacher to take into account the peculiarities of international communication, professional vocabulary and ethics, information and communication technologies.
6. The training of future teachers in the system of distance education requires the creation of an “information network”, communication from the student to the teacher, to the international scientific community, to partners, which helps to increase the level of general intellectual development in the implementation of innovative projects with various enterprises, organizations, research centres, as well as maintains interest in innovative, research, creative, independent activities in the creation and implementation of projects.

CONCLUSIONS

The concept of distance education in the virtual educational environment of higher education institutions is interpreted as distance learning for students. At the same time, it should be understood that the creation of a distance education system cannot completely replace the educational process, even if the package of materials is fully provided. If such a package could be created, it would be infinitely expensive, as it must reflect the whole complex process of direct interaction between the teacher and student. The distance educational process is completely different from the direct interaction of the teacher and the learner due to the lack of quick reaction of the teacher and fellow students from the group. Providing support to students in the distance learning system is a multifaceted problem, which creates the need for an advisory and supportive role of distance education institutions.

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ABSTRAKT

Celem artykułu jest uzasadnienie cech wirtualizacji procesu edukacyjnego w kształceniu przyszłych nauczycieli szkół podstawowych w ukraińskim szkolnictwie wyższym. Wykorzystano następujące metody badań naukowych: kwestionariusze i analiza danych statystycznych – w celu wyjaśnienia rozumienia przez wnioskodawców przestrzeni wirtualnej oraz zidentyfikowania zalet i sprzeczności wykorzystania kształcenia na odległość w profesjonalnym kształceniu pedagogicznym; analiza teoretyczna – do określenia głównych podejść teoretycznych do kształcenia na odległość i roli takiego kształcenia w procesie edukacyjnym; uogólnienie – do sformułowania

wniosków dotyczących wirtualizacji procesu edukacyjnego w kształceniu przyszłych nauczycieli szkół podstawowych. Okazało się, że wykorzystanie technologii w zdalnym kształceniu zawodowym przyszłych nauczycieli wymaga różnorodnych form, metod i technik wirtualnego wsparcia kształcenia zawodowego i ogólnokulturowego. Nacisk kładziony jest na tradycyjne (zasady świadomości i aktywności uczenia się, systematyczność i konsekwencja, dostępność uczenia się, celowość) i specyficzne (zasady modułowej konstrukcji treści działań edukacyjnych i poznawczych, przejście od uczenia się do samokształcenia, kolektywny charakter uczenia się i uwzględniania indywidualnych cech uczniów) zasady budowania kształcenia na odległość. Określono typy uczniów ze względu na charakter działalności edukacyjnej i odpowiadające im modele zachowań w warunkach kształcenia na odległość. Ujawniane są cechy wirtualizacji środowiska edukacyjnego uniwersytetu podczas szkolenia zawodowego przyszłych nauczycieli: szkolenie w oparciu o metodę projektów; korzystanie z serwisów społecznościowych i innych portali społecznościowych i informacyjnych, które pomagają zwiększać potencjał twórczy i intelektualny w oparciu o samoorganizację, pragnienie wiedzy, umiejętność interakcji z nowoczesną technologią komputerową; rozszerzone możliwości zaangażowania partnerów społecznych i nawiązania współpracy ze środowiskiem naukowym podczas realizacji wspólnego projektu lub przy tworzeniu innowacyjnego produktu komunikacyjnego; stworzenie systemu komunikacji od ucznia do nauczyciela, do międzynarodowego środowiska naukowego, do partnerów, pomagającego podnieść poziom ogólnego rozwoju intelektualnego w realizacji innowacyjnych projektów, a także podtrzymującego zainteresowanie innowacyjnymi, badawczymi, kreatywnymi, niezależnymi działaniami w zakresie tworzenia i realizacji projektów.

Słowa kluczowe: kształcenie na odległość; kandydat; uczelnia; zasady dydaktyczne

