

PROFESSIONAL COMPETENCE FORMATION OF FUTURE PEDAGOGICAL WORKERS IN THE CONDITIONS OF DUAL EDUCATION BY MEANS OF DIGITAL TECHNOLOGIES

^aTETIANA TURBAR, ^bSVITLANA ALIEKSIEIEVA, ^cOLHA VYSHNYK, ^dOLEKSANDR VASENKO, ^eLARYSA SUBOTA

^aZaporizhzhia National University, Zaporizhzhia, Ukraine

^bInstitute of Pedagogy, Kyiv, Ukraine

^cOleksandr Dovzhenko Hlukhiv National Pedagogical University, Hlukhiv, Ukraine

^dHryhorii Skovoroda University in Pereiaslav, Pereiaslav, Ukraine

^eNational Technical University "KhPI", Kharkiv, Ukraine

email: ^aTatyana.turbar@gmail.com, ^bsv-05@ukr.net,

^colhavysnyk@gmail.com, ^dvasenko.oleksandr@gmail.com,

^elorasub@ukr.net

Abstract: Initiated and actively implemented educational reforms affect all areas of education. One of the forms of education, gradually covering the institutions of higher education in Ukraine, is dual education. It combines theory and practice, providing a process of acquiring knowledge by the higher education seekers both in the traditional way and during practical work in a real enterprise. The main objective of introducing elements of dual education is to eliminate the main shortcomings of traditional forms and methods of training future professionals, to eliminate the gap between theory and practice, training and production, improving the quality of training taking into account the requirements of employers. The purpose of the academic paper lies in analysing the importance and features of developing professional competence of higher pedagogical education in the context of dual education using digital technologies. The research has provided data on the effectiveness of new digital technologies from the perspective of students. In addition, the opinions of students and teachers on the effectiveness of different types of digital tools during the learning process were studied. The results of the research are essential for further methodological development in the process of planning the implementation of this type of tools in higher educational institutions.

Keywords: dual education, digital technologies, level of professional competence, digital competence, efficiency of using digital tools.

1 Introduction

Taking into account the problems of higher educational institutions in Ukraine and the presence of a sufficient number of critics of educational programs (curricula), the issue of poor quality education is raised by scientists of all levels, teachers of educational institutions and in the society in general. When analysing hot discussions of teachers, higher education seekers and business representatives, it can be concluded that professionally educated workers, who are unable to meet the needs of the domestic labour market, cannot perform their duties in different companies without additional training, forasmuch as the competitiveness of Ukrainian education is low (Redecker, 2017).

In the process of training at HEIs, the fundamentals of professionalism are laid, as well as the need and readiness for a continuous process of self-education in changing conditions is formed. In this context, it is especially important that students who are actively involved in the process of acquiring knowledge and methods of mastering it from the very beginning should be aware that its significance remains unchanged even when moving to distance learning mode of training, forasmuch as the results of education and professional activity are a real enrichment of the individual for further professional development. Therefore, one should not neglect all the achievements of pedagogical science; one should continue to make every effort in the current conditions in order to improve one's own professionalism (ANNEX to the Proposal for a Council Recommendation on Key Competences for Lifelong Learning, 2020).

The lack of modern educational programs in certain areas of knowledge in Ukraine and the migration of students to other institutions of higher education in Europe will only exacerbate the problem of searching for specialists on the part of employers. First of all, it is subject to representatives of small and medium-sized companies that cannot train specialists on their own due to lack of time and funding. It should be noted that currently a

significant gap is observed between the professional requirements for teachers working under the conditions of dual education, and the skills acquired by them in the learning process. The dual form of obtaining vocational education is a way of learning where the theoretical material is mastered in an institution with a teacher, and practical training should take place at a potential workplace. Such approach is especially important from the point of view of "practical experience" in its basis, not only when consolidating theory in practice, but in the process of training the student in real working conditions (Punie & Redecker, 2017).

The digital revolution, the information revolution - these are the fundamental changes in the structure of our life and our consciousness, implicating the widespread use of computing technology, comprehensive penetration, and the massive use of personal portable communication devices. These changes have embraced various aspects of modern life, namely: the labour market, the home environment, political systems, technology, and led to a new reality called the Digital Age, where modern information technology has long been an integral part of everyone's living space (Maslich, 2021).

2 Literature Review

According to the viewpoint of Mukiy T.V., the pedagogical community notes that students of the XXI century possess modern devices for working with data, but do not have the necessary competencies to solve life's concerns and achieve success. Along with this, young people have free access to global information resources, a high level of Internet activity, however, a low level of skills of self-development and self-education, safe use of digital technologies of the global network (Mukiy, 2019).

Medvid L.A. describes a student of a new generation as a bearer of new energy and extraordinary psychological abilities, who is characterized by a multidimensional vision, a keen sense of interlocutor, cheerfulness. He frankly expresses a negative opinion about the imperfection of the education system, teachers, their training methods, which is the cause of conflicts. Extraordinary personalities cannot do routine things forasmuch as they seem uninteresting to them (Medvid, 2019).

Taking into account the increased level of informatization of modern students' life and in order to keep up with their expectations, the classes introduce an innovative digital element that can manifest itself in the way the learning process is provided. With the help of modern innovative technologies, teachers have the opportunity to stimulate the learning activity of students who use their own smartphones and tablets in order to use these devices for educational purposes and focus on topics while continuing to pursue their personal interests (Teach with digital technologies, 2022). Currently, there has already been a significant array of tools that can be used to form the digital infrastructure of the education system in an educational institution, as well as to develop and implement new forms and methods of active intelligent learning. International effective experience in the development of SMART education is introduced in the form of technologies such as smart laptops, libraries, e-learning and mobile learning, virtual classroom creation, collaborative learning, modelling, etc. Mobile learning is a new paradigm of SMART education; it is physically linked with e-learning and distance learning, on the basis of which a new learning environment is created where students can get access to academic subjects anytime and anywhere, which makes the learning process itself comprehensive and motivates continuous education and lifelong learning (Zaika, 2019).

Information technologies, as components of knowledge of the society, affect innovation in all spheres of human life, changing

social, cultural, economic, political realities. There are complexities, non-linearities and uncertainties in the development of social processes in the society. Globalization and modern technologies are transforming information into a product of manufacture, changing the world. The globalization of the educational process implies as follows: the expansion of the open information environment, the rapid spread of network relationships, high individual mobility. Under such conditions, public attention is shifted from economic capital to the human one, to the development of personal potential, which is based on culture, space and information (Pokidina, 2019).

Voronin, D., Saienko & Tolchieva, H. emphasize that there is no clear line between the concepts of “knowledge” and “awareness” in the minds of the society members. A person with a good memory and well-informed in many areas is often perceived as knowing a lot of unnecessary information. (“...Why should I study certain areas of knowledge if the Internet exists?”). But it should be noted that the reason for this situation was poor Internet connection, and erroneously formed information position of users of information resources. Supporting the opinion about the complexity of the academic process makes it possible to note the age-related needs for fundamental knowledge at the present stage of technology development (Voronin, Saienko & Tolchieva, 2020).

One of the ways to solve the concerns of quality support of the educational process is the partnership of educational institutions and enterprises. Let's analyze the existing and promising forms of partnership between educational institutions and the labour market.

Global tendencies in the social structure, labour market and technology in many areas of human life have posed serious challenges to the education system. Currently, the society is on the verge of the fourth industrial revolution, characterized by the fusion of technologies and the blurring of boundaries between the physical, digital and biological spheres, which is accompanied by the emergence of new areas of human activity, the need for new skills (Underwood, 2020).

The new era is also characterized by changes in the labour market. A distinctive feature of the technological revolution is that the sphere of influence in which humans can be more productive than machines remains smaller and smaller. Experts predict that by 2030 a large number of professions will disappear, and 186 new types of activities will emerge in their place (Sidorenko, 2018).

Currently, in Ukraine, various sectors of the economy require qualified personnel, modernization and updating of the principles of market preparation in educational institutions of various types of UNESCO (2021). Under such conditions, the requirements for the quality of training of specialists in educational institutions increase, which is a significant factor in ensuring the professional activity of pedagogical specialists. In Ukraine, the concern of systemic modernization of education is becoming increasingly significant, which creates conditions for the sustainable development of the society, increasing the competitiveness of the country's economy, professional growth and self-fulfillment (Zaika, 2019).

V. Sidorenko draws particular attention to the fact that learning technology is often interpreted as the application of a system of scientific principles for planning the learning process and using them in pedagogical practice in order to focus on detailed learning outcomes that allow assessing the training process. We consider this is a sharp remark; the assessment of activity is more focused on the training process than on the quality of learning by higher education seekers, on monitoring the practice (methods and techniques of training) in empirical analysis and widespread use of audiovisual media in education, and it should be carried out in close connection with future practical activities (Sidorenko, 2018).

Students of this type of study have an advantage forasmuch as, thanks to the close interaction of theory and practice, their careers begin already during their studies. At the same time, practical classes in educational institutions are not just a practice that takes place in parallel and independently of the educational process. During the practical classes, professional competence is developed, which is a complex integrated indicator characterizing the professional level of the specialist (Pukalo, 2019f).

Currently, there are the following forms of interaction between educational institutions and establishments that provide practical training, namely:

1. Practical training of students at enterprises (in Ukraine and abroad);
2. Internships and certification of teachers (in Ukraine and abroad);
3. Development of material and technical base in educational institutions (scientific and educational laboratories);
4. Support for writing a thesis on the course;
5. Joint holding of scientific conferences, seminars, competitions and olympiads in specialties;
6. Advanced training of employees of enterprises;
7. Organization of presentations of companies.

Prospective forms of interaction are as follows:

1. Coordinating educational programs with the requirements of potential employers;
2. Establishing a branch of the department or a branch of an educational institution on the basis of the enterprise;
3. Introduction of dual education;
4. Cooperation with associations of enterprises;
5. Holding career days, etc.

Dual education is one of the areas of the educational process that can meet the needs of employers in skilled workers. Dual education is a type of education that combines training of students in educational institutions at workplaces in enterprises, institutions and organizations in order to obtain a certain qualification (Pukalo, 2019f).

The *purpose* of the research lies in determining the level of necessity for the introduction of digital technologies in institutions of higher pedagogical education in order to improve the quality of the process of forming the professional competence of future teachers in the context of dual education.

3 Materials and Methods

The first part of the research represents data on the level of participation of employers in the dual form of education in Ukraine and their assessment of the use of digital technologies in the process of conducting lessons of theoretical and industrial training.

In order to obtain data for the second part of the research, a questionnaire survey was conducted among employers and teachers of institutions of higher pedagogical education. Along with this, 100 students of pedagogical HEIs in Ukraine (Taras Shevchenko National University of Kyiv, Drahomanov National Pedagogical University, and Central Institute of Postgraduate Pedagogical Education of the Academy of Pedagogical Sciences of Ukraine) were surveyed on the methods of studying the level of their professional competence (assessment of theoretical pedagogical knowledge, practical skills, and personal qualities).

The following methods have been used in the research, namely: analytical and synthetic methods when studying theoretical and methodological fundamentals for the definition and features of professional competence; comparative methods and analogies in the analysis and evaluation of indicators; methods of classification in order to determine the various characteristics of professional competence; the method of systematization and generalization when studying conclusions and results.

4 Results

In order to practically illustrate the extent of spreading the dual form of education in Ukraine, the following data are represented.

The level of involvement of employers in the dual form of education is the largest in the city of Kyiv (175), Zhytomyr (160), Lviv (134), Vinnytsia and Khmelnytsky (125), Rivne (111) regions (Figure 1).

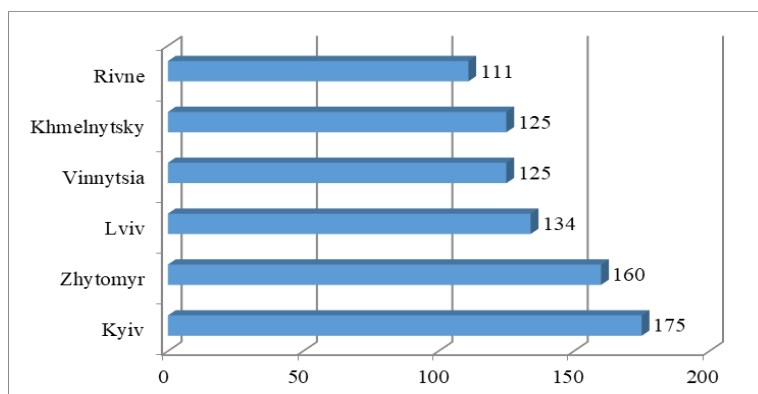


Figure 1. The level of involvement of employers in the dual form of education

As it can be seen from Figure 1, in the 2020-2021 academic year, 217 vocational education institutions used the dual form of education.

In the 2020-2021 academic year, admission to study in the dual form amounted to 6 660 people in 192 institutions.

Of the total number of vocational educational institutions, the largest percentage of institutions that introduced a dual form of education in the 2019-2020 academic year is revealed in Khmelnytsky region (78,6%), the city of Kyiv (75%), Lviv (63,6%), Kirovohrad and Chernihiv (according to 50%) regions (Figure 2).

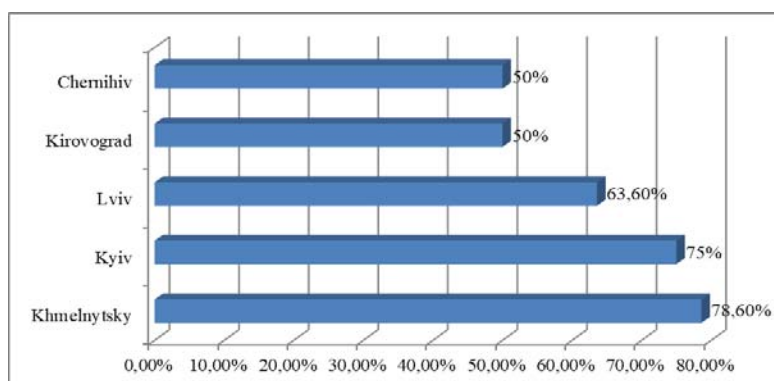


Figure 2. Part of vocational educational institutions that introduced a dual form of education from the total number in the region

As it can be seen from Figure 2, in the 2020-2021 academic year, 12 395 people have received vocational education in dual form. The largest number of students studying in the dual form of education is revealed in the institutions of Khmelnytsky (877 people), Lviv (807), Vinnytsia region (529), and the city of Kyiv (464).

In March 2020, with the introduction of quarantine restrictions in order to prevent the spread of COVID-19, institutions, training

students in a dual form, were recommended to transfer such students to distance learning. The resources that the enterprise could provide for training were as follows: online platforms, training films, enterprise manuals, etc.

In the framework of the present research, a survey was carried out after 6 months of using digital technologies in the process of conducting lessons of theoretical and industrial training in the dual form of education (Figure 3).

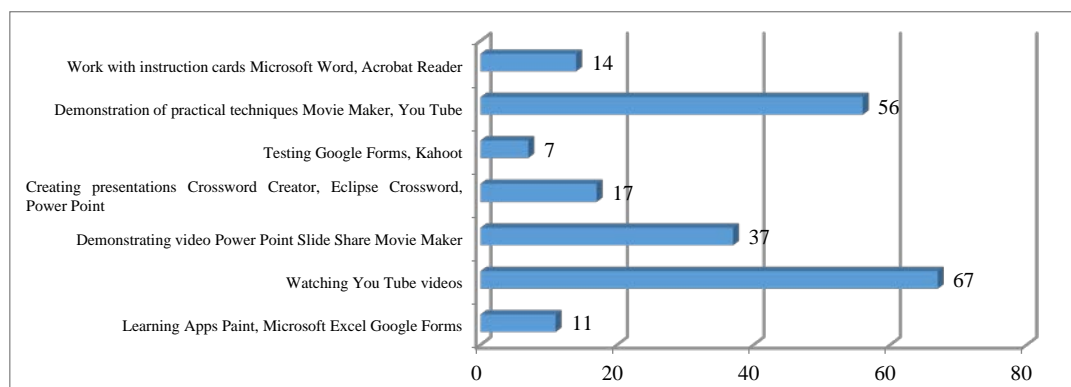


Figure 3. The effectiveness of the use of different types of digital technologies in the process of conducting lessons of theoretical and industrial training

In the process of conducting the research, the viewpoint of higher education seekers and teachers was studied regarding the

most tangible positive impact of digital tools in teaching subjects on various aspects of the effectiveness of the educational process.

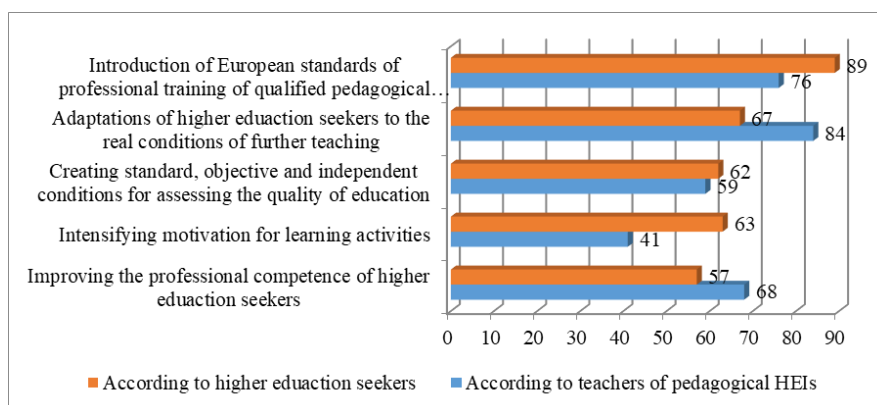


Figure 4. The most significant positive impact of digital tools on various aspects of the effectiveness of the educational process, %

The result of the survey has shown that, both in the opinion of students and from the point of view of teachers, the most intensive use of digital technologies in the educational process of the IP (PT) E contributes to the introduction of European standards for the professional training of qualified workers and the adaptation of future graduates to real production conditions. Students also experience increased motivation for educational activities through the use of educational technologies, and from

the point of view of the teaching staff of educational institutions, these types of tools increase the overall professional competence of students.

In order to study the effectiveness of applying digital tools in terms of the development of various types of competence of higher education seekers, the level of personal, professional and communicative qualities of higher education seekers was assessed (Figure 5).

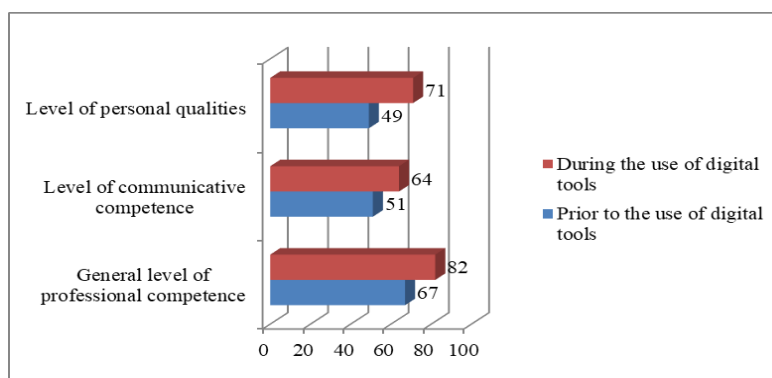


Figure 5. The level of personal, professional and communicative qualities of higher education seekers prior to and during using digital tools in the educational process in dual education

As it can be seen from the results of the research, when using digital tools in the educational process, a higher level of assessment is observed for all types of competence.

5 Discussion

As can be seen from the above, the analysis has shown that, according to scientists' viewpoint, modern digital technologies can increase the expediency of the educational process, its individualization in concordance with the needs and abilities of each higher education seeker, as well as the interest and motivation for learning on the part of the current generation, and, in general, promote the creation of a new digitization of education (HeadHunter Ukraine, 2021).

The pedagogical competence of a teacher in the context of digital education should be focused on the development of values determining the motives of professional activity and regulating their personal actions; professional knowledge and skills in working with digital technologies; effective skills of behaviour in specific situations and in the process of selecting appropriate digital pedagogical tools, as well as psychophysiological properties that ensure the implementation of such skills (Soroka, 2021), (Kovalchuk. & Soroka, 2018).

Based on the foregoing, the need for the active introduction of digital technologies in education is convincing, which will lead to a rapid restructuring of the system depending on external factors, while working to improve the quality of education in any format in order to fulfil the principal goals of the educational process (Soroka, 2021).

Dual education provides the student with numerous opportunities for professional development, forasmuch as this concept of the educational process involves as follows: combination of acquired theoretical knowledge with practical experience in one or more companies, institutions or organizations; increasing the chances of permanent employment immediately after graduation; availability of professional experience necessary for further professional development prior to graduation, realistic idea of one's own career path; gaining practical experience during training and the opportunity to receive a monetary reward in the process of training (The age of digital interdependence, 2019).

The survey conducted in the course of this research shows that the effectiveness of the use of digital tools in the educational process is high for the optimization of all types of professional skills.

At the same time, it should be noted that dual education in Ukraine requires revision and refinement of its organizational, legal and economic principles, verification of the concept of effectiveness, etc. Along with this, it is necessary to work with applicants in order to understand the needs and prospects of this type of training. The modern student usually does not take practical participation in the form of industrial and professional practice seriously, and he can transfer this worldview to dual learning (Stetsiuk, 2020).

GfK, Ukraine's National Survey on Ukraine, "Z: Values and Benchmark" has revealed that the vast majority (43%) of young Ukrainians believe that Ukrainian education and training cannot meet the needs of current labour market. According to the survey "Student - Employer of the Year", 36% of companies surveyed cited the first interview as a barrier to hiring. Students aren't aware what goals they pursue, for whom they will work, or whether they have chosen the right profession (GfK Ukraine (Project), 2017).

Therefore, when designing an innovative educational and information environment, one should take into account both the requirements of consumers of educational services and understanding the essence of advanced training in postgraduate education as a process that occurs throughout the active creative life of a teacher for his comprehensive development. It is this development that manifests the process of forming a new quality of professional and pedagogical action, the development of one's own original pedagogical style, the acquisition of competence, experience in performing innovative roles and functions in the organic unity of psychology and pedagogy, methodology, technology, research, information, using the latest technologies for a dual form of education.

6 Conclusion

Thus, the main objective of the development of pedagogical education in the conditions of dual form of education in Ukraine is its modernization in order to embody the content of the educational process of new quality, which lies in training individuals adapted to the society, labour market and digital economy. These tasks can be completed by implementing digital technologies in the educational process. The use of digital technologies in education has become especially relevant during the COVID-19 pandemic, when educational institutions in many countries around the world were forced to switch to distance learning. This difficult situation has accelerated the process of implementing digital technologies in the educational process, providing an opportunity to test one's new skills and assess one's own strengths. However, the general transition to digital learning has proved to be a difficult task not only for the education system of Ukraine, but also for many developed countries. The difficulties lie in the lack of the necessary digital equipment in educational institutions, the insufficient development of electronic courses, the lack of students' motivation for distance learning and the insufficient digital competence of teachers.

The above factors, affecting the level of distance learning, are promising and require conducting subsequent investigations.

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Primary Paper Section: A

Secondary Paper Section: AM