ORGANIZATIONAL AND PEDAGOGICAL CONDITIONS OF DEVELOPMENT OF DIGITAL CULTURE OF PEDAGOGICAL EMPLOYEES

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Abstract.

The *relevance* of the study is associated with the society's need for increasing the rate of vocational (professional) education digitalization and with the lack of methodological and didactic support of this process.

The *aim* is to justify the structure and content of organizational and pedagogical conditions of developing digital culture among the teaching staff at vocational schools.

Methods: comparison of scientific facts and generalization of pedagogical experience with extrapolation of the analyzed scientific principles and empirical ideas to the theory and methodology of vocational education; analysis of documentation and results of the teaching staff's activity at vocational schools; pedagogical observation and self-observation.

Results: the present-day status of vocational education and in particular the status of the teaching staff's digital culture have been analyzed; emphasis has been placed on the intensification of the digitalization trend due to the world pandemic; the key reasons for the low level of digitalization (domination of conservative approaches to the organization of training, complex mechanisms of implementing apprenticeship and work-based learning modes) have been identified; optimal ways of solving the problem (using hybrid learning models, ensuring appropriate infrastructure and equal access to the Internet and digital educational resources, organization of digital skills training for the teaching staff) have been described.

Conclusions: a novel set of organizational and pedagogical conditions as a subsystem of developing digital culture among the teaching staff at vocational schools has been justified. It consists of three blocks: the personal and professional block that includes the teaching staff's use of digital resources and their willingness to train themselves to improve the skills of using digital resources and services; the organizational and technical block which presupposes the creation of digital educational environment at vocational schools and organization of the educational process based on blended learning approaches; the content and procedural block that includes e-learning courses available in the Learning Management System (LMS) and the tailor-made course "Digital Technologies in Vocational Education".

Keywords: *vocational education, digitalization, digital educational environment, pedagogical conditions, teaching staff at vocational schools*.

Introduction. The problem of educational process digitalization, among others at vocational schools, has recently gained significance for the social life in Ukraine. The penetration of electronic means in all aspects of life has brought the provision of available educational services to a new level and extensively automated many stages of production and social processes. Teachers were among the first ones to become interested in the potential of using electronic resources at the modern digital stage of technological development. However, major obstacles involving, among others, the lack of methodological and didactic support have become a considerable impediment.

In the analysis of modern vocational education development trends, V. Radkevych (2020) identifies the following: digitalization, technologization and standardization. The above trends are a threefold structure whose elements, regardless of their formal independence, rely on each other and actively react to changes in them.

Above all, vocational education digitalization involves the use of new technological tools and information resources in the education process. It is accompanied by the processes of developing online platforms with learning and didactic materials for teachers and students; SMART complexes of study disciplines; hardware and software to ensure various aspects of training management and communication among education subjects; educational interaction in social networks; simulation of real-life production environment based on the software-supported learning principle; creation of students' digital profiles for recording acquired competences, etc. (Bazeliuk, 2018). Taking this into account, the investigation of organizational and pedagogical conditions of developing digital culture among the teaching staff gains particular significance.

Sources. Conceptual foundations of education informatization and digitalization are elaborated in the works of V. Bykov, A. Hurzhii and V. Kovalchuk. A wide range of issues related to the use of modern electronic means in vocational education are described in the works of O. Spirin, A. Kalenskyi and M. Pryhodii. Methodological aspects of remote vocational training are explored in a series of works by L. Petrenko and S. Kravets. The use of e-learning resources and the creation of SMART complexes for vocational education are described in the works of O. Humennyi, A. Kononenko and L. Lypska. The problems and prospects of vocational (professional) education digitalization were investigated by M. Yershov (2018).

Pedagogical conditions within methodological systems of teachers' professional development were studied by Yu. Babanskyi, A. Verbytskyi, B. Hershunskyi, I. Lerner, I. Pidlasyi, V. Slastonin, etc. General pedagogical aspects of pedagogical conditions were described by S. Batyshchev, R. Hurevich, A. Kolomiiets, A. Lytvyn, etc.

The **aim of the paper** is to justify the structure and content of organizational and pedagogical conditions of developing digital culture among the teaching staff at vocational schools as an important component of the phenomenon under study.

Methods. The following methods were used to conduct scientific analysis of the phenomenon under study: comparison of scientific facts and generalization of pedagogical experience with extrapolation of the analyzed scientific principles and empirical ideas to the theory and methodology of vocational education; analysis of documentation and results of the teaching staff's activity at vocational schools; pedagogical observation and self-observation, etc.

Results and discussion. Digital transformation of education has become an irreversible process that requires significant changes to all its components. This global process has intensified due to the COVID-19 epidemic, which has catalyzed it. The extraordinary session of the global UNESCO conference dedicated to education in the post-pandemic period (GEM 2020) emphasized that the crisis has brought to life vulnerabilities in the vocational education system. The main problems were found to be low levels of digitalization and outdated educational structure, which made it difficult to implement apprenticeship and work-based learning modes that are key functional elements of the vocational education system (Policy Brif, 2020). The use of hybrid learning models has been proposed as a solution to this problem. However, it has been found that they require not only appropriate infrastructure but also equal access to the Internet and e-learning resources. An important aspect is training the teachers in digital skills, which is directly related to the development of their digital culture. In this context, the Ministry of Education of Ukraine recommended vocational (professional), specialized pre-higher and higher education institutions to adopt a remote learning mode (Verkhovna Rada Ukrainy, 2020).

In 2020, the global COVID-19 epidemic has affected all social processes in the world. Introduced in March 2020, the quarantine measures have also become a great challenge for the system of vocational education in Ukraine. Transition to online learning has caused substantial difficulties in the achievement of the key objectives of vocational (professional) schools (Kukharenko and Bondarenko, 2020).

In October 2020, the Ministry of Education and Science of Ukraine and EU4Skills presented the results of the audit (Institute of Educational Analytics, 2020) at 1254 specialized pre-higher and vocational schools, in which ensuring equal access to the Internet for students was recognized as a key problem of digital transformation. It was noted that there are 0.4 rooms with Internet access per 1 person.

The findings of studies on remote vocational training (Radkevych and Artiushyna, 2018; Petrenko, anoth, 2020) from previous years demonstrated that almost half of the teaching staff (49 %) had never used any e-learning elements in their pedagogical activity. It was found that almost one in six surveyed teachers (15.8%) has a negative experience of using e-learning resources, while only one third of the teachers have a positive experience (28.6 % and 6.6 %, respectively). At the same time, only 6.6

% of respondents admitted using them systematically and effectively.

The analysis of the level of willingness to implement remote vocational training among the teaching staff at vocational schools (Kravets, 2016) demonstrates a sufficient level of willingness. However, the motivational and evaluative-reflexive components are the most pronounced, while the level of cognitive and operational-activity components is moderate. It indicates that there is a need for increasing the level of cognitive and operational-activity components of the willingness to implement remote vocational training among the teaching staff at vocational (professional) schools. The results of this study determine the need for the development of digital culture among the teaching staff at vocational schools based on their expertise and involving a set of professional creative skills, innovative and prognostic thinking, a high level of psycho-pedagogical culture, and a high level of proficiency in using modern digital technologies. It appears to trigger the development of both the vocational education system in general and the students' life opportunities (Bazeliuk, 2018). At the same time, such development of the vocational teaching staff can only take place in appropriate organizational and pedagogical conditions.

A. Lytvyn (2014, p.63) interprets pedagogical conditions as "a set of constructed opportunities (circumstances) of the content, forms and methods of the integrated educational and didactic process, which ensure the management of the operation and development of the procedural aspect of the education system, influence the training process, and ensure effective control and implementation of this process according to the objectives using the selected forms, methods, techniques, and provisions whose application ensure the achievement of the goal".

It is worth mentioning S. Kravets' (2018) view that any pedagogical conditions at a modern education institution are part of the information education environment. It means that the organizational support of vocational training must be provided at the background of proper technical support at education institutions, including the availability of computers, computer classrooms, stable Internet connection, etc., and the above-mentioned environment must be based on specialized hard- and software with learning management systems (LMS).

The description of the teachers' digital competence proposed by a creative team of scholars led by N. Morze (2019) includes requirements to the structure and levels of digital competence needed for the teaching staff to successfully carry out their activity in digital society. For the purposes of our study, this description is important as a systematized structure of professional and personal qualities required for a digital era teacher. Based on this description, we have formulated the *personal and professional conditions of developing digital culture among the teaching staff at vocational schools* as follows:

- teaching staff's mastering digital resources;

- willingness to engage in self-education and improve the skills of using digital resources and services.

However, the availability of computers and access to the Internet cannot fully ensure the requirements to education digitalization at vocational schools. Above all, digitalization is the creation of digital infrastructures capable of interacting with the user (establishing interactive (in the broad meaning) teacher-student, student-teacher, student-student connection) both at the local and at the global level. Thus, the need to ensure both the pedagogical conditions and, most importantly, their organizational and technical component comes to the fore.

The digital education environment at vocational schools must be based on the set of digital means (digital infrastructure components) capable of ensuring educational interaction among all its participants.

There are two basic scenarios for the creation of such infrastructure:

- based on cloud services (e.g. Microsoft or Google);

- based on specialized hard- and software with learning management systems (LMS), e.g. LMS Moodle.

The advantages and disadvantages of each of these scenarios deserve separate research, but it is obvious that, from the educational perspective, a teacher with a high level of digital culture will be more effective as the understanding of differences and specific functional features of these infrastructural components will allow teachers to take into account and overcome their disadvantages and to make a better use of their advantages.

Therefore, the creation of digital educational environment at vocational schools is a crucial component of the organizational and technical conditions of developing digital culture among the teaching staff at vocational schools.

Regardless of the selected scenario for the organization of the digital educational environment,

the teachers will inevitably face the problem of achieving the objective related to the mastering of respective professional skills by future qualified specialists. This problem is extremely pressing for vocational training as learning fully remotely is either impossible or very difficult for most professions. This problem can be resolved if distance and traditional learning is joined, and remote and face-to-face interaction is combined. This combination has been called blended learning (Bazeliuk et al., 2017), (Kukharenko, 2016). For vocational education, blended learning is a harmonious combination of remote learning (to acquire theoretical knowledge) and students' applied practical activities. Recommendations on the organization of blended learning are set forth in the Recommendations of the Ministry of Education and Science (Recommendations on the Implementation of Blended Learning at Specialized Pre-Higher and Higher Education Institutions, 2020).

Thus, a second component of the organizational and technical conditions for the development of digital culture among the teaching staff at vocational schools is the *organization of the educational process based on blended learning approaches*.

At the same time, the implementation of the proposed blocks of organizational and pedagogical components is impossible without a targeted process of acquiring pedagogical experience in the digital environment and systematic development of the level of one's digital culture. Taking this into account, we have defined the *content and procedural block of conditions* that is an integral component of the development of digital culture among the teaching staff at vocational schools. It is this block that contains the main procedural elements and their content. This block of pedagogical conditions includes e-learning courses available in the Learning Management System, namely "Critical Thinking Development", "Digital Communication Culture"; "LMS Moodle for Vocational Education", and the tailor-made course "Digital Technologies in Vocational Education". The courses con-

tain up-to-date information on a wide range of digital technologies used in the practical activity of the teaching staff at vocational schools and provide an opportunity to increase the level of one's digital culture in a systemic and targeted manner. It also helps avoid chaotic acquisition of digital skills detached from the pedagogical process.

Conclusions. The global process of digital transformation has given rise to serious educational challenges, in particular in vocational training. Digital transformation in education is an objective global process significantly accelerated by the world pandemic of COVID-19. Only a teacher with a high level of digital culture is now able to ensure an effective educational process in the new-age digital educational environment. The development of digital culture among the teaching staff at vocational schools will be rapid if respective organizational and pedagogical conditions are in place.

The proposed organizational and pedagogical conditions as a subsystem of the development of digital culture among the teaching staff at vocational schools consists of three blocks that rely on and complement each other.

The personal and professional block includes the teaching staff's use of digital resources and their willingness to train themselves to improve the skills of using digital resources and services.

The organizational and technical block presupposes the creation of digital educational environment at vocational schools and organization of the educational process based on blended learning approaches.

The content and procedural block includes e-learning courses available in the Learning Management System (LMS) and the tailor-made course "Digital Technologies in Vocational Education".

In the future, components of the digital environment at vocational schools must be studied and the regulatory background of the teaching staff's activity at vocational schools must be explored taking into account extensive implementation of digital technologies.

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Організаційно-педагогічні умови розвитку цифрової культури педагогічних працівників

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Реферат.

Актуальність дослідження зумовлена потребою суспільства в прискоренні темпів цифровізації професійної (професійно-технічної) освіти та відсутністю методологічного й методичного забезпечення даного процесу.

Мета – обґрунтувати структуру та зміст організаційно-педагогічних умов формування цифрової культури педагогічних працівників закладів професійної освіти.

Методи: співставлення наукових фактів та узагальнення педагогічного досвіду з екстраполюванням в теорію та методику професійної освіти проаналізованих наукових положень та емпіричних уявлень; вивчення документації й результатів діяльності педагогічних працівників закладів професійної освіти; педагогічного спостереження та самоспостереження.

Результати: проаналізовано сучасний стан професійної освіти і зокрема стан цифрової культури педагогічних працівників; акцентовано увагу на посиленні тенденції цифровізації, зумовленій світовою пандемією; виявлено основні причини низького рівня цифровізації (домінування консервативних підходів до організації навчання, складні механізми впровадження наставництва та режимів навчання на засадах продуктивних діяльності); охарактеризовано оптимальні шляхи вирішення проблеми (використання гібридних моделей навчання,

забезпечення відповідної інфраструктури, рівного доступу до Інтернету та цифрових освітніх ресурсів, організація навчання цифровим навичкам педагогів).

Висновки: обґрунтовано власний комплекс організаційно-педагогічних умов, як підсистеми розвитку цифрової культури педагогічних працівників закладів професійної освіти, що складається з трьох блоків (особистісно-професійний блок, що складається з володіння педагогічними працівниками цифровими засобами та готовності до самоосвітньої діяльності з вдосконалення володіння цифровими засобами та сервісами; організаційно-технічний блок, що передбачає створення цифрового освітнього середовища ЗПО та організацію освітнього процесу на основі підходів змішаного навчання (blended-learning); змістово-процесуальний блок, що містить електронні навчальні курси розміщенні у Системі управління навчанням (СУН), та авторський курс «Цифрові технології в професійній освіті».