Analysis of the current state of distance learning in the vocational education and training institutions

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Abstract. The article presents the clarified concepts' system in the context of the stated research theme, the current state of skilled workers' and junior specialists' distance learning in the Ukrainian vocational education and training institutions. The received data shows: education institutions' regional affiliation and profiles; education institutions' teaching staff experience in using distance learning technologies in teaching; their assessment of prospects of distance learning implementation in the Ukrainian VET system; teaching staff willingness to improve their distance learning technology mastering. The empirical data were obtained, analysed and systemized by conducting the e-survey using Google Forms web-service with restricted access to the form. The results of the SWOT analysis are presented; distance vocational learning implementation strengths, problems, opportunities and threats are summarized. The levels of teachers' readiness to implement distance vocational learning are revealed by diagnosis results. The proposals concerning the constructive solution of distance learning implementation in the skilled workers' and junior specialists' vocational education and training system are formulated and presented.

1 Introduction

The advantages of distance education in recent decades have been demonstrated by the developed countries' leading universities' practical experience. Distance vocational learning for skilled workers' training only starts to be used in the Ukrainian vocational education and training system (VET). VET teachers' and various enterprises, institutions and organizations HR managers' interest to distance learning significantly increased due to: first, the general trend to create a new mechanism of the direct use of information and knowledge in the production and service spheres, i.e. focusing on the processes of continuing education that characterizes the knowledge society [1]; second, the necessity to meet the personal needs in further new knowledge obtained not only by schools' graduates, but also by adults; third, the complex social and cultural and economic situation in the country due to the large number of displaced persons, their need to get new professions, qualifications or to improve them (Law of Ukraine, 2014) [2]; fourth, the construction of a distance learning system enables integration into the world sustainable education area, thus, greatly expands the potential sphere of domestic information and education environment for sustainable education process participants by using the information technologies (IT) modern methods and tools.

At the same time, the problem of future skilled workers' and junior specialists' distance learning technology implementation in Ukraine remains poorly researched, which makes it impossible to assess its state for administrative decision-making concerning its development and scientific and methodological support design.

The conceptual basis of distance learning, its designing and implementing is reflected in the publications of O. Alieksieiev [3], Ye. Smirnova-Trybulska [4], P. Stefanenko [5], P. Fedoruk [6], B. Shunevych [7], A. Kiv (2018) [8]. The problems of distance learning organization are raised in the dissertations of N. Zhevakina [9], O. Kravchenko [10], N. Miklashevych [11], Ye. Prokofiev [12], N. Burkina [13], Ye. Vladymyrska [14], T. Hryhorchuk [15], V. Zhulkevska [16], L. Ivanenko [17], T. Lavryk [18], V. Lukin [19], O. Khmel [20], S. Shtanhei [21] dedicated their researches to the development of techniques and usage of the distance learning technologies.

Theses analysis confirms that today in Ukraine distance education or its elements are introduced mainly in the universities' environment and are practically absent in the vocational education and training system. However, the request for it exists in the society.

The article's goal is to research and analyse the VET teachers' readiness to implement distance learning technologies in the skilled workers' and junior specialists' vocational education and training.

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2 Theoretical backgrounds

The legislative basis of the national distance learning systems are as follows: Law of Ukraine "On Education" (2017), National Strategy of Education Development in Ukraine for the period up to 2021 (President of Ukraine, 2013), Concept of Distance Education Development in Ukraine (Ministry of Education and Science of Ukraine, 2000), Regulations on Distance Learning (Ministry of Education and Science of Ukraine, 2013), etc. [22-25]. First, we will point out that we understand the concept "distance learning" in the context of interpreting the distance mode of education by the Law of Ukraine "On Education" (2017) as individualized process of education which happens mainly through indirect interaction of distant participants of education process in the specialized environment, which functions on the basis of modern psychological, pedagogical and information and communication technologies.

Thus, under the research we defined the following concepts:
- distance vocational learning is the individualized process of forming the professional competences, necessary to perform certain work or group of works, which can be carried out in the VET institutions by individual or course training in the production and service spheres; it happens through indirect interaction of distant participants of education process in the specialized education and professional environment using modern psychological, pedagogical, information and communication technologies;
- distance vocational learning technology is the ordered and systemized information and learning interaction of education subjects, which is carried out by using telecommunications, in the process of which the future specialists' professional competences forming is achieved;
- learning content management system (LMS or LCMS) in the VET institutions is the software and hardware complex which provides indirect interaction of distant participants of sustainable education process by means of automating its components and which is a part of VET institution information and education environment. The most common learning content management systems in the Ukrainian education sphere are LMS Moodle, eFront, OpenEDX, etc.

The distance education concepts are relatively young and dynamic in terms of IT, tools, methods, forms of work development and progress from the information and education point of view. It means that the teachers' readiness for distance learning implementation is multidimensional category, grounded in this context as:
- personal and professional formation, dynamic as concerns the progressive development of information and communication environment (e-systems, teaching aids and ICT) [26];
- the teacher permanently refines himself individually and in pedagogical interaction, thereby increases motivation to mastering the professional knowledge and skills, necessary to implement technological operations in the e-space; forms the ability to reflection, self-analysis on the basis of the activity results, personal and social significance awareness;
- appears in teaching by the complex of components (motivation and value, cognitive, operational and activity, evaluative and reflexive) though implementation of distance education functions (organizational, learning and cognitive, communicational, diagnostic);
- promotes effective combination of the traditional and innovative forms of learning for achieving the education goals by educators in the process of future skilled workers' professional training [27].

The components of VET teacher's readiness to distance vocational learning are: motivation and value – teacher's conscious motivation to distance vocational learning; cognitive – necessary amount and level of knowledge, skills and abilities, professional experience for making certain activity in the e-learning and professional environment; operational and active – the ability to correctly perform distance vocational learning; evaluative and reflexive – evaluating the distance vocational learning results on a reflexive basis.

3 Method

In order to implement the research goal, the adapted questionnaire for carrying out the SWOT analysis and authors' questionnaire for clarifying the VET teachers' readiness to distance vocational learning implementation were prepared. In order to ensure the statistical accuracy and relevance of the received data Google Forms web service with restricted access to the e-questionnaire (only by the link) were used. In turn, the link was spread exclusively through the regional training (scientific) and methodological centres (cabinets) of vocational education and training. It made it possible to provide the necessary number of respondents and address the questionnaire only to the target audience (to ensure the purity of the sampling).

4 Results and discussion

In total, about 3,500 VET institutions' teachers from all the regions of Ukraine took part in the e-study, the most active among which were as follows: Kyiv city (454 persons), Lviv region (395 persons), Sumy region (386 persons), Luhansk region (323 persons), Cherkasy region (298 persons) and Odesa region (266 persons).

The questionnaire was conducted by the Laboratory of Distance Vocational Learning of the Institute of Vocational Education and Training of National Academy of Educational Sciences (NAES) of Ukraine.

The questionnaire consisted of 4 groups of mostly closed questions (except for questions in Group 3):
1. A group of questions – a description of the respondent's VET institution (geography and specialization).
2. A group of questions – a description of the respondent, which included questions about age, work experience, qualification, subjects.
3. A group of questions was compiled according to the methodology of SWOT analysis. It aimed to determine the experience and expediency of using, as well as

prospects of distance learning technology in vocational education, the complexity or other problematic aspects of distance vocational learning.

4. A group of questions made it possible to determine teachers' readiness for distance vocational learning according to the developed criteria and indicators.

According to the VET institutions profiles, the teachers' participation was distributed as follows: building – 1408 persons, trade and catering – 1285 persons, transport – 1044 persons, agriculture – 1040 persons, etc. Half of the education institutions, teaching staff of which took part in the survey, had two or more profiles. According to the type of training the number of teachers were as following: vocational practical (38.4%), vocational theoretical (26.2%), social and humanitarian (16.7%), natural sciences and mathematics (12.2%), general education (3.4%) and physical (3.1%) subjects. Teachers with various qualification categories (higher – 24.7%), pedagogical titles (without title – 57.9%) and teaching experience (more than 20 years – 34.5%) took part in the study.

During the experimental work, the VET teachers' experience concerning the distance vocational learning usage in teaching was studied. Figure 1 presents the summarized answers received during the survey.

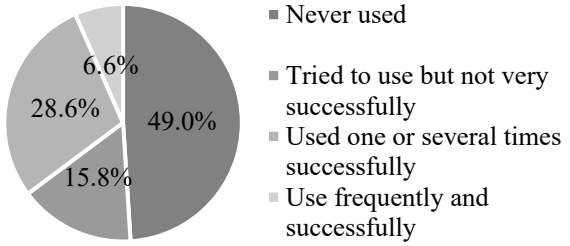

Fig. 1. Distribution of VET teachers according to the experience of distance vocational learning usage in their teaching.

So, almost half of teachers (49.0%) never used the elements of distance vocational learning in their teaching. Other half of questioned educators tried to use some elements of distance vocational learning (15.8% tried to use them but not very successfully; 28.6% – one or several times successfully used distance learning in their teaching). Almost every sixth respondent had negative experience of using the distance vocational learning (15.8% tried to use but not very successfully). Only a third part of educators (28.6% and 6.6%) had positive experience of such an activity and only 6.6% did it on the system basis and effectively. It can be argued that VET teachers use distance vocational learning or its elements occasionally.

According to the collected data, it was important to study the teachers' opinion concerning the prospects of distance learning introduction in the vocational education and training system. Figure 2 presents the summarized results.

Among the surveyed educators, the majority (28.3% answered "yes, it is perspective"; 28.4% – "rather yes") consider distance vocational learning introduction perspective and only 7.8% categorically find it inappropriate. So, two in three teachers consider distance vocational learning perspective, one in five (20.0%), on the contrary, find it rather unpromising, and one in six respondents could not decide. It is noteworthy that actually the number of those who have occasional successful experience of using the distance vocational learning – 28.6% (Figure 1) – matches those who consider distance vocational learning quite promising – 28.4% (Figure 2), as well as those with negative experience of use – 15.8% (Figure 1) and those who could not decide on their attitude towards distance vocational learning – 15.4% (Figure 2).

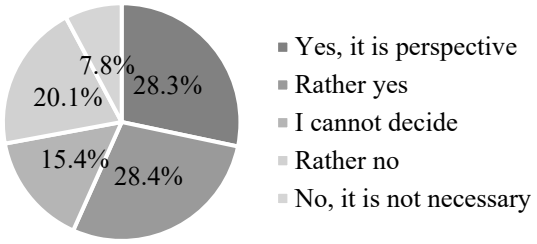

Fig. 2. Distribution of VET teachers according to the assessment of prospects of distance learning introduction in the vocational education and training system.

Similar ratios are retained in teachers' responses to the question concerning the prospects of distance learning usage on their own subjects: 24.7% – "yes, it is prospective", 26.3% – "rather yes than no", 12.3% – "I cannot decide", 21.9% – "rather no than yes", and 14.8% – "no, it is not necessary".

The relevance and promising character of distance vocational learning is confirmed by the desire of the majority of surveyed VET teachers to improve their mastering (75.0%). The number of those who consider using the distance vocational learning prospective (51.0%) is slightly lower. The number of those who could not decide (12.3%) is also lower. Almost the same is a number of those who opposite the distance vocational learning usage (21.9%), but the number of opponents of such learning (14.8%) is almost twice bigger.

According to the survey results, it is possible to conclude that the distance vocational learning problem is acute for all the vocational education and training system, VET teachers need not only scientific, but also thorough methodological support of distance vocational learning to use all the distance education opportunities fully and effectively and to achieve the highest level of readiness to qualitative organization of distance process, usage of distance vocational learning functions, distance courses design, etc.

Using the SWOT methodology in respect of the distance vocational learning technologies allowed to make appropriate summaries regarding the distance vocational learning strengths, problems, opportunities and threats.

The application of the SWOT methodology regarding the use of distance learning technologies has made it possible to generalize about the satisfaction, problems, opportunities and threats of distance vocational learning.

Thus, *the satisfaction* (strengths) of distance vocational learning can be defined as follows: organization of learning on an individual schedule; accessibility of distance courses' materials for students; rational usage of time by students and teachers; taking into account students' individual peculiarities and emphasizing their abilities' development; maximum consideration of each student's identity, creating conditions for their self-realization; providing vocational education to people with disabilities (equal access to quality education); saving time and money (economic efficiency); instant feedback between distance vocational learning subjects; direct teacher's control over the tasks performed by each student; convenience and objectivity of input and output control, which frees the teacher additional time; possibility of revising the material and composing new themes from available micro-modules; development of students' skills to work independently; stimulating teachers' self-education. In addition, teachers noted the significant development of interdisciplinary links, possibility to carry out binary lessons, round tables online, etc.; taking into account the modern trends in the life of society; providing wide opportunities for obtaining profession and speed of getting the information; increase of IT literacy, recording the material in a digital form, registering the results in an e-journal; exchange of experience of introducing the distance vocational learning in various VET institutions (organizing of webinar for acquainting with practical aspects of distance vocational learning functioning); teachers' design of e-learning materials using innovative technologies; expanding the possibilities of providing services in obtaining the vocational education for people from remote regions or other countries, etc.

Among *the weaknesses* (problems), respondents pointed the lack of VET institutions' provision with equipment and licensed software product for distance vocational learning organization; not all the teachers can master ICT; necessity of special training on distance courses design; the lack or difficulty of accessing the Internet for certain categories of students (socially disadvantaged, poor, from multi-child families, orphans, etc.); the lack of teachers' and students' readiness to distance learning technologies; absence of distance teaching technique; low level of teachers' and students' IT literacy; difficulties in passing the practice; the limited possibilities for information quick search (at the same time, the lack of knowledge how to search it correctly and effectively); difficulties in integrating theoretical and practical training (during the sustainable education process designing taking into account the need to form the practical skills); VET students' weak skills to individual work (needs high self-organization and motivation to effective distribute their own time).

Distance vocational learning implementation in Ukrainian VET institutions is complicated by the absence of technical possibilities and teachers' communication skills during webinars; insufficient level of teachers' information and communication competence development; insufficient teacher's qualification to organize distance learning. Therefore, there is a problem in designing and acquainting teachers with distance vocational learning implementation procedures, mastering the methodologies and technologies of distance courses design, conducting master classes on practical lessons, students' motivation, etc.

The respondents defined the following the *opportunities*, reserves and ways to solve the problems: instrumental, methodological and personal resources. To introduce and further use the mentioned technologies the teachers are proposed to study the experience of those education institutions, where distance vocational learning already works; combine traditional (paper) information sources with modern (electronic) ones; focus on the available tools; create and/or use the existed resources; use experience and recommendations of the Laboratory of Distance Vocational Learning of the Institute of Vocational Education and Training of NAES of Ukraine, results of researches or independently work out the necessary experience.

There are problems that the VET institutions cannot solve on their own: the availability of licensed software; the absence of techniques and technologies of designing learning materials, tests, future skilled workers' competences assessment system, creating professional video and audio materials, etc.

Among *the threats* of distance vocational learning the following were defined: rejection of distance vocational learning by separate categories of students; quick renewal of information and technologies (production technologies develop faster than teachers can design the distance course); appearance of technical problems and absence of access to Internet for some students at home; low level of teachers' and students motivation to virtual environment activity, their psychological unreadiness; insufficient number of e-resources on the subject taught distantly, etc. Separately the need for large investments and teachers' time expenditures on distance courses preparation and the absence of mechanisms of such work funding is pointed out.

To solve the identified problems concerning the distance vocational learning technologies using in the VET institutions the Laboratory of Distance Vocational Learning of the Institute of Vocational Education and Training of the NAES of Ukraine organized the scientific and practical web-seminar "Using the LMS e-learning.org.ua in the Vocational Education and Training Institution's Education Process" (2016), 1st and 2nd all-Ukrainian web-conferences "Theory and Practice of Distance Learning in Vocational Education and Training" (2017, 2018). During these events a common discussion on actual problems took place, and therefore, the directions of solving the existing difficulties in the context of distance vocational learning realization were outlined. For example, the proceedings' detailed analysis allows to state many positive aspects in improving teaching on the basis of distance learning with full usage of combining the distance technologies with traditional opportunities. Along with the benefits of distance learning, practitioners define problems, namely: technical and methodological problems concerning e-platforms usage; much time spent on distance courses design, review, complementation, renewing the didactic, electronic, testing learning tools, etc.; difficulties with self-registration of participants in the

distance learning system; incomplete use of all the opportunities of web-oriented education process support system LMS Moodle; mismatch of organizational and technical provision to the of e-platforms' functioning; imperfection of methods of using IT in education process; the need to train teachers to use IT in traditional and distance learning; the need to increase the teachers' motivation in relation to ICT using (problem solving: courses, master classes, constant improvement of teacher's competence level, experience exchange); improving the control criteria in the distance learning process [28, 29].

Analysing the SWOT analysis results content, especially in terms of threads, and taking into account practical difficulties, which arise during distance vocational learning organization in the VET institutions, there is an urgent need to solve the problem of teachers' readiness continuous development to introduce distance learning technologies based on predefined components.

The experiment's confirmatory stage results concerning the teachers' readiness to implement distance vocational learning according to the components are evidenced by the following data: motivation and value component: high level – 40.5% of respondents, sufficient – 36.7%, average – 12.4%, low – 10.5%; cognitive component: 5.6%, 31.5, 37.4, 25.5% respectively; operational and activity component: high level showed – 8.6%, sufficient – 26.3%, average – 26.8%, low – 38.3%; evaluative and reflexive component: 22.0%, 52.2%, 22.5%, 3.2% respectively.

The general distribution of the VET teachers according to the levels of readiness to implement distance vocational learning is presented in Figure 3.

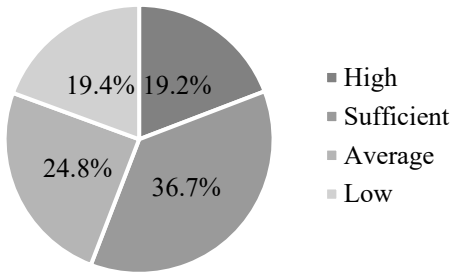

Fig. 3. Distribution of the VET teachers according to the levels of readiness to implement distance vocational learning.

The analysis of the received empirical data shows the prevalence of VET teachers with sufficient level of readiness for distance vocational learning. At the same time, the motivation and value, evaluative and reflexive components have the biggest demonstration in the general level of readiness, the level of cognitive and operational and activity components is smaller. This is evidenced by the fact that VET teachers in general are positively motivated and directed to distance vocational learning implementation. Under such circumstances the value of teacher's systemic innovative self-development, expansion of the cognitive sphere with new knowledge, information, methods and mechanisms, their productive transformation in the distance education environment increase. The optimal combination of traditional, innovative, distance, intuitive learning technologies by teachers ensures not only self-development of a modern teacher, but also helps to achieve the desired results in the skilled workers' and junior specialists' training in VET institutions.

5 Conclusions

So, based on the research results and analysis of teachers' readiness to implement distance learning technologies in the skilled workers' and junior specialists' vocational education we found that in the practice of skilled workers' and junior specialists' vocational education only some fragments of distance vocational learning are used. Partially distance vocational learning is introduced in different ways and using different methods, depending on material and technical capabilities of the VET institutions, level of teachers' mastering of IT tools and web-technologies. Most VET teachers recognize the promising character and expediency of system implementation of distance technologies in the process of concrete subjects teaching (general education, general vocational, vocational theoretical).

At the same time, the problems in using distance vocational learning related to technical and material provision that causes difficulties in distance vocational learning organization were found, qualitative functional usage of e-platforms; distance courses design; low level of students' and teachers' IT literacy that complicated the introduction of distance learning technologies; integration of theoretical and practical training in the conditions of distance learning (designing sustainable education process taking into account the need to form practical skills); organization of students' independent work (need high self-organization and motivation to distribute one's own time effectively); mobility and flexibility (training student to distribute their capabilities properly), etc.

The analysis of the current conditions of distance learning in the VET system shows that it is essential to implement it to train skilled workers for certain sectors of economy. However, the level of development of individual components of teachers' readiness to work with distance learning indicates the need to organize their training both in the system of advanced training and in the organization of methodical work. At the same time, the content of each component (motivation and value component, cognitive component, operational and activity component, evaluative and reflexive component) of teachers' readiness to implement distance vocational learning can be used to develop a programme of training teachers for using information technologies in vocational training of skilled workers in the organization of methodical work in VET institutions. The applicable nature of the research lies in this very aspect.

The desire of VET teachers to solve the problems of distance vocational learning is confirmed by high indicators of motivation and value and evaluative and reflexive components formation for their readiness to implement distance vocational learning, under conditions of increasing the indicators of cognitive and operational and activity components of readiness, on the development

of which today scientific and methodological activity of the Laboratory of Distance Vocational Learning of the Institute of Vocational Education and Training of NAES of Ukraine through the organization of trainings, distance courses on a modular basis, scientific and practical web-seminars and web-conferences using the Institute's Learning Management System (http://e-learning.org.ua/), preparation and publication of research papers, scientific and methodological, information and analytical materials, etc. are coordinated.

The received research results and survey data analysis, the teachers' experience outlined the ways of scientific solution of existing problems, summarized prepared methodological recommendations for improving the process of distance learning implementation in vocational education and training [30].

Definitely, the implementation of theoretical and methodological developments regarding the development of distance education, training, technologies requires consolidation of efforts of the scientific community with all the stakeholders of the processes of distance education system development. Under these circumstances, the following suggestions for solution are outlined:

- at the national level – regarding the regulations support of the VET institutions students' distance vocational learning, i.e. the Regulations on Distance Learning (Ministry of Education and Science of Ukraine, 2013) should be renewed defining the goals and tasks, peculiarities of vocational education organization, normalizing the load and funding of distance mode of learning;
- at the regional level – regarding the creation of information education environment as a multidimensional data structure for the exchange of information in the region, the informatization of information flows for optimal administrative decision-making concerning ensuring the regional labour market needs with skilled workers, junior specialists and specialists with higher education;
- at the VET institution level – regarding the assistance in teachers' preparation to use the distance vocational learning through the in-service courses, in the methodological work system, during the intercourse period of professional development using various forms of self-education; creating the necessary material and technical, organizational, psychological and pedagogical, didactic conditions, appropriate training and methodological assurance of distance vocational learning; monitoring the effectiveness of distance vocational learning usage in subjects' teaching.

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References

1. G. Behmann, *Sovremennoe obshhestvo: obshhestvo riska, informacionnoe obshhestvo, obshhestvo znanij* (Modern society: society of risk, information society, knowledge society). (Logos, Moscow, 2010)
2. Law of Ukraine, Pro zabezpechennia prav i svobod vnutrishno peremishchenykh osib (On the protection of rights and freedoms of internally displaced people), No 1706-VII (20 Oct 2014), http://zakon4.rada.gov.ua/laws/show/1706-18. Accessed 15 Nov 2018
3. O.M. Alieksieiev, Dissertation, Institute of Information Technologies and Learning Tools of the National Academy of Educational Sciences of Ukraine, 2012
4. Ye.M. Smyrnova-Trybulska, Dissertation, National Pedagogical Dragomanov University, 2007
5. P.V. Stefanenko, Dissertation, Institute of Pedagogics and Psychology of Professional Training of the Academy of Pedagogical Sciences of Ukraine, 2002
6. P.I. Fedoruk, Dissertation, Institute of mathematical machines and systems problems of the National Academy of Sciences of Ukraine, 2009
7. B.I. Shunevych, Dissertation, Institute of Higher Education of the Academy of Pedagogical Sciences of Ukraine, 2008
8. A.E. Kiv, V.N. Soloviev, S.O. Semerikov, CTE 2018 – How cloud technologies continue to transform education. CEUR Workshop Proceedings **2433**, 1–19 (2019), http://ceur-ws.org/Vol-2433/paper00.pdf. Accessed 21 Mar 2020
9. N.V. Zhevakina, Dissertation, Luhansk Taras Shevchenko National University, 2009
10. O.I. Kravchenko, Dissertation, Luhansk Taras Shevchenko National University, 2012
11. N.V. Miklashevych, Dissertation, Luhansk Taras Shevchenko National University, 2012
12. Ye.H. Prokof'iev, Dissertation, National Pedagogical Dragomanov University, 2011
13. N.V. Burkina, Dissertation, Bohdan Khmelnytsky National University of Cherkasy, 2009
14. Ye.Yu Vladymyrska, Dissertation, Institute of Higher Education of the Academy of Pedagogical Science of Ukraine, 2006
15. T.V. Hryhorchuk, Dissertation, Institute of Higher Education of the National Academy of Educational Science of Ukraine, 2010
16. V.O. Zhulkevska, Dissertation, Ivan Franko National University of Lviv, 2005
17. L.O. Ivanenko, Dissertation, V.N. Karazin Kharkiv National University, 2013
18. T.V. Lavryk, Dissertation, Classic Private University, 2013
19. V.Ye. Lukin, Dissertation, Ukrainian Engineering Pedagogics Academy, 2009
20. O.V. Khmel, Dissertation, Institute of Pedagogics of the Academy of Pedagogical Sciences in Ukraine, 2006
21. S.V. Shtanhei, Dissertation, Kharkiv National University of Radio Electronics, 2009

22. Law of Ukraine, Pro osvitu (On education). No 2145-VIII, http://zakon.rada.gov.ua/laws/show/2145-19. Accessed 15 Nov 2018
23. President of Ukraine, Pro Natsionalnu stratehiiu rozvytku osvity v Ukraini na period do 2021 roku (On the National strategy of education development in Ukraine for the period up to 2021), decree No 344/2016, https://zakon.rada.gov.ua/laws/show/344/2013. Accessed 15 Nov 2018
24. Ministry of Education and Science of Ukraine, Kontseptsiia rozvytku dystantsiinoi osvity v Ukraini (Concept of distance education development in Ukraine), http://www.osvita.org.ua/distance/pravo/00.html. Accessed 15 Nov 2018
25. Ministry of Education and Science of Ukraine, Pro zatverdzhennia Polozhennia pro dystantsiine navchannia (On approving the regulations on distance learning) No 466 (15 Apr 2013), https://zakon.rada.gov.ua/laws/show/z0703-13. Accessed 15 Nov 2018
26. V. Ermolayev, F. Mallet, V. Yakovyna, V. Kharchenko, V. Kobets, A. Korniłowicz, H. Kravtsov, M. Nikitchenko, S. Semerikov, A. Spivakovsky in *Proceedings of the 15th International Conference ICTERI 2019, ICT in Education, Research and Industrial Applications. Integration, Harmonization and Knowledge Transfer* vol. II, Kherson, 2019
27. S. Kravets, The essence and components of teachers' readiness for the introduction of skilled workers' distance learning, Profesiina pedahohika, **12** (2016)
28. L.M. Petrenko, S.H. Kravets, *in 2nd all-Ukrainian web-conference proceedings, Theory and practice of distance learning in vocational education and training*, Kyiv, 2018
29. V.V. Hlushchenko, Designing support system of distance learning in vocational educational institutions. Informatsiini tekhnolohii i zasoby navchannia, **49**(5) (2015)
30. O.V. Bazeliuk, O.M. Spirin, L.M. Petrenko, A.A. Kalenskyi, L.A. Maiboroda, *Distance learning technology* (Polissia, Zhytomyr, 2018)