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Modern technologies in the development of professional competence in teachers from professional (vocational) education schools

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Abstract. The article discloses the peculiarities of developing professional competence in professional training teachers. This process mostly involves using traditional pedagogical technologies. The article presents results of the ascertaining experiment and indicates the need for continuing professional development of teachers based on innovative principles. It also suggests using up-to-date pedagogical technologies of distance and project-based learning and production technologies to develop professional competence in actors in the educational process (teachers and students). This refers to the implementation of a competence-based approach in the professional education system. It is reflected in the development of professional competence based on some steps. They include expanding informational and educational space for actors in the educational process and individualizing learning using modern information resources (distance technologies); ensuring the interaction between actors in the educational process, as well as the joint realization of searching, cognitive and research activities (project-based technologies); organizing the educational process under the social partnership, taking into account the timely response of the professional education system to the emergence of innovations in production and the service sector (production technologies).

1. Introduction

The current reforms in professional (vocational) and professional pre-university education lead to some innovative changes. They are aimed at introducing modern pedagogical and production technologies in the educational process and creating effective models and mechanisms for training highly qualified specialists. Given such circumstances, the importance of continuing development of professional competence in professional training teachers (hereinafter “teachers”) increases. It involves introducing a new model of professional education, taking into account the objectives of the strategy for sustainable development of society, state, national economy. Also, it implies providing conditions for developing teachers’ capacity for a comprehensive and interdisciplinary analysis of situations in the labour market and based on the active interaction with actors in the educational process. Finally, it is essential to create an educational and development-oriented environment for managing project activities of future qualified specialists.



2. Theoretical backgrounds

The Law of Ukraine “On Education” states that teachers are to constantly improve their professional and general cultural levels and pedagogical skills [33]; the Concept of Teacher Education Development includes improving the system of teacher education to create facilities for training teachers of a new generation, creating conditions for involving the best specialists in other fields and providing conditions for establishing and developing modern alternative models of teachers’ continuing professional and personal development, which will also become a key prerequisite for implementing the state policy in the reforms of all educational levels [17]; the Law of Ukraine “On Professional (Vocational) Education” [32] and the concept of state policy implementation in the field of professional (vocational) education, titled “Modern Professional (Vocational) Education” for the period up to 2027, indicate that the priority objectives are to improve the system of training teachers in the field of professional (vocational) education through involving highly qualified specialists from production and the service sector in the educational process and introducing motivational mechanisms for stimulating teachers’ professional activities and development [6].

Some Ukrainian scholars (Ihor O. Arkhypov [13], Liudmyla O. Bazyl [3], Valeriy Yu. Bykov [5], Oleksandr V. Didenko [15], Maryna M. Klymenko [4], Vasyl H. Kremen [15], Olena O. Lavrentieva [14], Oksana M. Markova [20], Yevhenii O. Modlo [19], Valentyna O. Radkevych [3], Larysa M. Sergeieva [28], Vasyl V. Yahupov [35] et al.) believe that the enhancement of the quality of future skilled workers’ training depends on a high level of professional competence of teachers. The latter implement certain pedagogical and organizational-and-managerial measures aimed at providing citizens with the knowledge, skills and abilities in the chosen professional area, developing competences and professionalism, cultivating general and professional culture in the system of professional (vocational) education [8].

Today, educational activities of teachers exceed the implementation of syllabi and acquire features of educational multifunctionality. It covers the participation in the realization of strategic objectives in education; the ability to update the content of professional education; the establishment of intersectoral communication; the management of educational projects; the development of integrated models for professional training based on a combination of traditional methods and modern pedagogical technologies in the educational process, copyright protection of educational and methodological products prepared by teachers.

Scholars and practitioners more actively use innovative pedagogical technologies based on a competency-based approach now. In this regard, one should pay particular attention to the systematic development of professional competence in teachers to increase their readiness to employ innovative pedagogical technologies in their pedagogical activity.

The article aims to justify modern technologies for developing professional competence in teachers from professional (vocational) education schools to enhance their readiness to provide professional training to future specialists based on innovative principles.

3. Method

A theoretical analysis of scientific works on the issues of educational philosophy, continuing professional education, adult education; a study of international experience in dealing with this particular problem; a study of regulatory documents in the field of education, an analysis of curricula with the aim of revealing the coverage of the problem under study and determining areas of research); comparison with the aim of studying different scientific views on the problem under study); analysis and synthesis with the aim of determining innovative pedagogical and production technologies for developing professional competence in teachers); systematization and generalization needed to formulate conclusions; pedagogical experiment (the ascertaining stage) required to determine the level of teachers’ and students’ readiness for professional development; statistical methods (frequency analysis, computer tools for statistical processing of experimental data.

4. Results and discussion

Modern education systems gradually start using resources of a competence-based approach to the fullest. In professional education, this approach is the conceptual basis for implementing an innovative system of principles for determining goals, building the content of professional education, organizing the practice-oriented educational process and assessing learning outcomes. The tools for achieving goals of a competence-based approach include innovative technologies (both pedagogical and production). Their effects in professional education depend on the variability of their use at the level of creativity and skills of teachers, their modification based on the characteristics of pedagogical interaction, as well as the changes in educational, technological and social trends.

The teachers’ experience of using innovative pedagogical and production technologies in professional training of future specialists is a decisive indicator of their professional skills. At the same time, innovative pedagogical and production technologies serve as a means of teachers’ systematic professional development.

4.1. The results of the ascertaining pedagogical experiment

The results obtained from experimental work conducted at the Institute of VET of the NAES of Ukraine within the framework of the topic “*Methodological Principles of Developing Professional Competence in Masters of Vocational Training from Professional (Vocational) Education*” show that teachers demonstrate the need for improving their professional competence systematically.

The questionnaire for identifying the levels of professional competence in masters of vocational training from professional (vocational) education schools (https://docs.google.com/forms/d/128Vn66v8KxnhGs9yEiF4TT4bT7r2gxb_fQvj6DQaNW4/edit#responses) has made it possible to survey 1888 respondents. It takes into account their job functions following the professional standard.

It is found that 60.4 % of them feel the need to develop professional competence. Interestingly, 25.4% of them rather realize that it is necessary to develop their professional competence. The rest of the respondents (14.2%) rarely feel such a need, do not feel it at all or are not sure what to answer (figure 1).

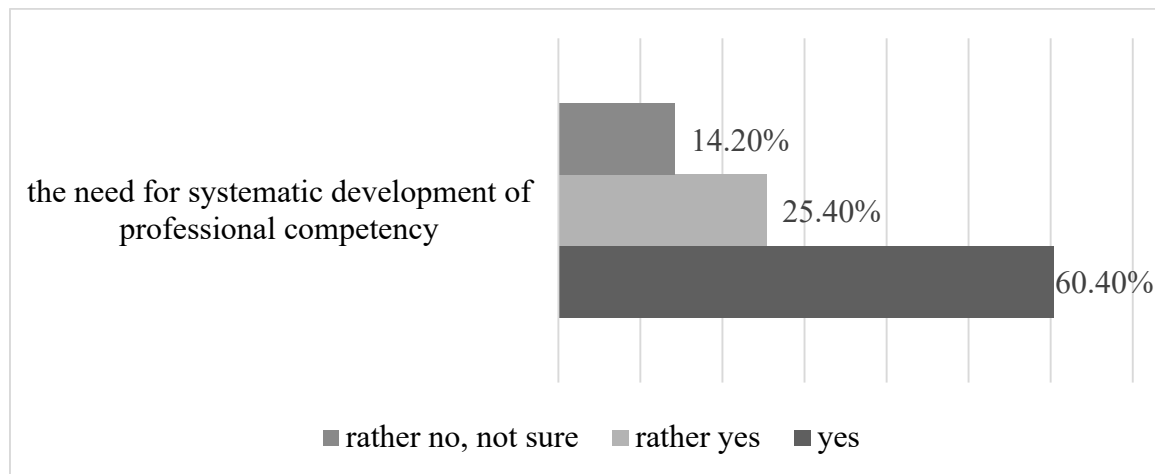


Figure 1. The results of teachers’ self-assessment of their need for the systematic development of professional competence.

The results obtained from assessing teachers’ readiness to realize the professional development function, correlated with the development of professional competence in terms of the content, show that 48% of respondents are at a high level of readiness for professional development; 47%, 5%, 0% – at sufficient, average and low levels, respectively (figure 2).

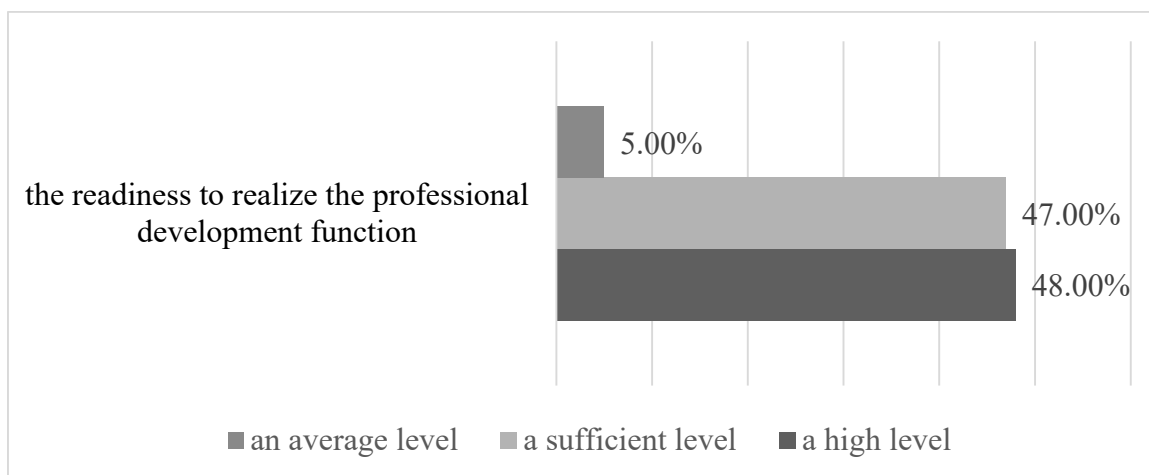


Figure 2. The results of teachers’ self-assessment of their readiness to realize the professional development function.

It must be noted that teachers’ willingness for professional development is extrapolated in the educational process due to the emergence of students’ needs for self-development within a particular profession.

The results of the survey of future hospitality specialists within the framework of the topic “*Developing Professional Competence in Future Restaurant Specialists during Professional-Practical Training*” show that 3.1% of respondents (out of a total of 588 future skilled workers) cannot plan their future profession and systematic professional development and self-development. At the same time, 27.6% of them are at an average level of such ability. Accordingly, 44.9% and 24.5% of them are at sufficient and high levels, respectively (figure 3).

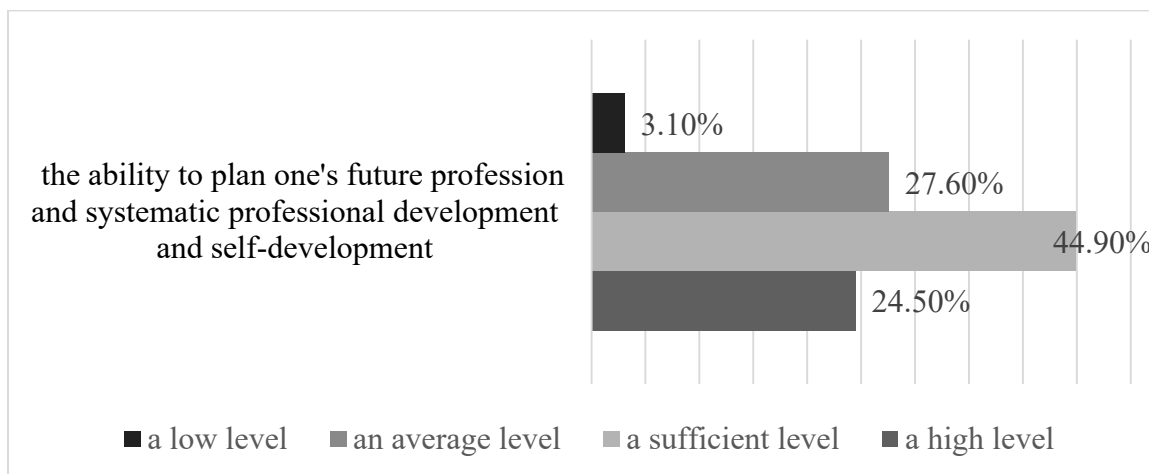


Figure 3. The results of future hospitality specialists’ self-assessment of their ability to plan their future profession and systematic professional development and self-development.

The results of the survey show that the professional development of teachers is correlated with the needs of students in enhancing professional competence. The processes of consolidating teachers’ professional knowledge and skills in a particular field of production, services and developing students’ needs take place within a single practice-oriented educational environment of professional education.

The survey of teachers on clarifying the most optimal factors in the development of their professional competence indicates the priority of their participation in scientific-practical conferences,

methodological seminars, professional competitions, educational exhibitions (27.6%). Also, it points out to the availability of a system of incentives (26.3%) and a system of motivation (23.6%) towards professional and self-study activities. Next, it reveals the realization of the practice-oriented educational process, communication with employers, social partners and the organization of industrial training (23.1%). Finally, it analyzes the functioning of systems of methodical work, advanced training, certification, internships at the enterprises and the study of positive Ukrainian and foreign teaching and industrial placements (20.8%).

As for the possibilities and frequency of using forms of professional development, employees believe that the most commonly used forms are advanced training (studying in educational institutions (87%), internships (57%); retraining (studying in educational institutions (79%), in production (65%) [8].

The development of professional competence is a continuing process. Given the introvert pedagogical system, it is characterized by studying positive practices of teachers; self-study; the participation in the activities of methodical commissions, mentoring schools, novice teachers/masters of vocational training; the exchange of experience, mutual visits, mutual assistance, the organization of methodical seminars.

The open pedagogical system involves integrating the educational process with organizational-and-technological processes of production under the established social partnership between educational institutions and enterprises. It includes studying and applying production technologies, using the resources of public-private partnership and organizing dual training. Besides, it covers enhancing professional and educational qualifications; ensuring internships in production, as well as certification, participation in the national and international competitions of professional skills.

Nowadays, it is admissible that lifelong learning refers to all types of teaching and includes every kind of learning activity undertaken throughout a person's life-time [10].

Therefore, when choosing up-to-date technologies for developing professional competence in professional training teachers, one should focus on those technologies which can ensure the development of professional competence in the practice-oriented environment of professional education schools. In this context, pedagogical technologies of distance and project-based learning, as well as modern production technologies, are the most optimal ones.

4.2. *Distance learning technology*

The analysis of relevant scientific studies on the implementation of distance learning in higher, professional and adult education institutions proves that the problem of teachers' professional self-development under the introduction of distance learning has originated as a result of the insufficient elaboration of the theory and practice of education informatization in Ukraine. Insufficient use of pedagogical opportunities provided by distance learning and insufficiently high readiness of teachers to introduce distance learning [31] and develop their own digital literacy [9] add to it, too. All this has caused the need for a thorough scientific and methodological support of professional distance learning to use all the opportunities of distance learning fully and effectively [25].

The basing of the educational process on distance learning technologies [29], in particular psycho-pedagogical ones (a system of tools, techniques, steps, whose consistent implementation ensures the accomplishment of tasks), and distance learning on a competence-based approach allows one to ensure learning efficiency. Furthermore, it can increase the practical value of its results in terms of solving specific practical problems with the use of ICT [21].

The Concept of Distance Education Development in Ukraine defines the structure of distance education: organizational and managerial, regulatory and legal, instructional and methodical, informational and communicational, economic and financial components. Teachers should take an active part in the implementation of these components. Indeed, they should update the content of training and methods of teaching and learning, expand the access of students to all its levels, realize the possibility of obtaining professional education by a great number of young people, including those who cannot study in professional education schools under traditional forms, and implement the system of continuing education; ensuring the individualization of learning [16]. Valeriy Yu. Bykov theorizes that

the main problems of creating and implementing distance learning systems are technological, managerial, psycho-pedagogical, financial-economic and regulatory ones [5].

In this regard, it is necessary to model the technology for developing teachers' readiness to implement distance learning and implement its functions, as well as elaborate distance learning courses for professional training of future specialists. The components of teachers' readiness for professional distance learning are motivation and values (a conscious intention of teachers to conduct professional distance learning), cognition (the required amount and level of knowledge, skills and abilities, professional experience in performing specific activities in an electronic environment), operations and activities (ability to conduct professional distance learning technologically well), assessment and reflection (ability to assess the results of professional distance learning on a reflective basis), whose development is possible by implementing organizational, learning-and-cognitive, communicational and diagnostic functions of distance learning [25].

The researchers of the Institute of VET of the NAES of Ukraine have elaborated scientific and methodological support for the comprehensive development of teachers' readiness to implement technologies of distance learning. It includes technologies of professional distance learning [2], methodical recommendations for training teachers from vocational education schools to implement distance learning for skilled workers. Also, they have organized and held educational and methodical measures: the organization of distance learning in professional education schools (https://www.youtube.com/watch?v=3IvSOWaYhkM&feature=emb_title); organizational and pedagogical conditions and a model of professional distance learning (https://www.youtube.com/watch?v=wP4eW1e7joc&feature=emb_logo).

Besides, the Institute has created a distance learning system (e-learning.org.ua), whose users were 1440 teachers (as of 2019). They studied the proposed content of distance learning courses and enhanced their readiness to implement the functions of professional distance learning.

The use of distance learning technologies in the development of professional competence in teachers and the practice of future specialists' training can take place on different platforms and in various organizational forms, including online learning, online courses, online training, online counselling [34], webinars, the use of interactive electronic textbooks [23], electronic virtual laboratories [22], social networks, educational sites [11], blogs [26].

Active development of distance learning technologies and systems is based on theoretical and practical tasks, their designing together with conscious and consistent implementation of methods and tools of project-based management in the practice of professional training.

4.3. Project-based learning technology

The consideration of the sectoral context in professional training of future specialists highlights the importance of using project technologies in the development of professional competence in actors in the educational process. Their popularity is ensured by the possibility of integrating knowledge and applying it to solve specific educational and production problems. Thus, it is a pedagogical technology focused not only on the integration of knowledge but also on its acquisition through self-study activities of educational courses. On the other hand, project technologies involve using a set of different methods and tools of teaching and learning by teachers.

Project technologies aim to create appropriate conditions under which project participants (both teachers and students) can independently gain knowledge from various sources of information. It is also important that they learn the ability to use the acquired knowledge to solve specific cognitive and practical problems, acquire communication skills, develop research skills (identifying specific problems, obtaining feedback, observing, conducting experiments, analyzing them, constructing general and partial hypotheses, summarizing results) and thinking. The essence of project technologies lies in stimulating a cognitive interest in solving certain problems ([1], [7], [24], [30]). This process involves acquiring certain knowledge, implementing it through project activities and applying it in practice by activating reflective (critical) thinking (searching for facts, analyzing, reflecting on their reliability,

constructing the logic of these facts to learn something new, cultivating confidence based on reasoned conclusions) [27].

Project technologies allow organizing joint activities of teachers and students not only based on personal experience but also through developing such personality traits as independence, curiosity, social skills in group interaction, gaining research experience, cultivating creative thinking and intellectual, informational and communication skills. They play a special role in the organization of educational cooperation between students in small groups since all participants need to settle things among themselves, develop a common strategy for solving the problem, distribute responsibilities, provide mutual assistance in its implementation and take responsibility for the results to achieve a common goal. From the standpoint of the student, project activities allow doing something interesting in a group or by oneself, making the most of one's opportunities. It is an activity that allows one to express oneself, test one's strength, apply one's knowledge, be of benefit and present the results to the public. It is aimed at solving a significant problem, formulated by the students themselves in the form of goals and objectives, whereas the result of this activity, that is a way to solve the problem, is characterized by important practical values [36]. Project activities change the role of the teacher, who performs the functions of organizer, mentor, consultant, assistant. He or she helps students to find the necessary sources of information, becomes the very source of information, coordinates the process of working on the project, supports, encourages and provides constant feedback for successful performance.

The main principle of implementing project technologies in the development of professional competence in actors in the educational process is the integration of theoretical and practical components of professional training. It is based on the active and creative use of modern forms, methods and tools of teaching and learning aimed at mastering both knowledge and professional skills for the next transition from training to production activities.

4.4. Production technologies

The technologization of society reinforces the importance of practice-oriented areas of a competence-based approach focused on initial results (competences), which are acquired during dual training, in production centres or the workplace. The authors of the article believe that the process of developing professional competence in actors in the educational process should combine innovative pedagogical and production technologies and bring some practical results. It is reflected in the acquired skills allowing one to perform and update knowledge following new production technologies, have basic computer knowledge, raise problems, think creatively, make original decisions in unusual situations and be active in professional activities and social environment. Today's labour market, however, requires that graduates should have not only practical abilities and skills but also significant personal qualities, which enable them to dynamically change their profession during work activities while developing new production technologies. These are additional skills (key competences, soft skills), including a high level of self-organization, communication skills, creativity, teamwork skills, re-engineering skills, persuasiveness, leadership (being able to take responsibility for proposed and adopted decisions), time-management skills, emotion management skills, capacity for self-development, ability to resolve conflict situations and keep fit [8].

The organization of training with the use of production technologies involves motivational readiness of actors in the educational process to acquire knowledge, skills and abilities and study modern production innovations. Professional training of future specialists based on the use of production technologies optimally ensures the implementation of such principles as links between training and practice, innovations, partnership and cooperation. To this end, Ukraine has launched the creation of training and practice centres for the most popular professions (approximately 150 centres for professional (vocational) education as of 2020). Such centres are equipped with modern resources for workshops. It makes it possible to implement the latest production technologies, update educational and methodological support and increase the level of professional competence in teachers they need to use modern production technologies. Their development is facilitated by the establishment of cooperation

with social partners. It involves organizing joint training and production activities with educational institutions, research institutions, enterprises, production structures, public organizations and other institutions to signal about the changes and innovations in the field of education and science. Besides, it indicates the needs and conditions of a professional environment arising due to the influence of socio-economic factors.

The main areas of cooperation between professional education schools and enterprises and organizations are mentioned in the Concept of Public-Private Partnership. It implies systemic, constructive and mutually beneficial cooperation to ensure high-quality training, attract additional resources for professional education and focus it on modern technical and technological conditions. Also, it includes preparing proposals for updating the professional education system, creating professional and educational standards, providing advisory assistance in dealing with issues of common interest, participating in joint events, developing mechanisms for providing graduates with employment at enterprises and disclosing proposals for joint provision of professional qualifications to graduates by employers and educational institutions. It is essential to encourage large organizations to provide professional education schools with patronage, provide practical training for students and internships for teachers and masters of vocational training at basic enterprises and grant sectoral and nominal scholarships to the best pupils or students by enterprises and organizations. Finally, one should provide assistance to enterprises and organizations in maintaining and developing facilities, introduce financial and moral stimulation of teachers and masters of vocational training by enterprises and organizations, ensure mutual dissemination of information on issues related to the development of professional education, advertising and promotion in the media, web-resources [18].

The participation of teachers and students in all-Ukrainian and regional competitions of professional skills (“World Skills Ukraine”, “The Fair of Professions”, “The Workshop of Professions”, “The Competition of Professional Skills”) is of great importance in the development of professional competence in actors in the educational process.

In the context of the updates in Ukrainian professional education and European integration processes, the process of developing professional competence in actors in the educational process should include some important aspects. They refer to international cooperation (according to tripartite agreements on an industrial placement, masters of vocational training need to organize internships at the leading foreign companies); the participation of teachers and students in international projects and competitions (“BEST Cook FEST Junior – 2016”, “Food Land Bukovina – 2017”, “Best Pastry Chef – 2017”, “Best Cook Fest-Podillia – 2019”); internships abroad (within the Erasmus+ project “Improving teacher education for applied learning in the field of vocational education (ITE-VET)”). The participation of teachers and students in the national and international projects significantly enhances their professional competence, which can be confirmed by the introduction of innovative pedagogical practices and production technologies in the educational process.

In applying production technologies, the following forms of learning are the most expedient ones: professional and practical training (industrial training and industrial placement), dual training, research-based training, extracurricular activities, socially useful work, tour lessons, creative laboratories, workshops, competitions of professional skills, tournaments, as well as methods of analysis and solving of specific industrial and problematic situations, including non-standard ones.

5. Conclusions

Up-to-date technologies for developing professional competence in professional training teachers include distance and project-based learning technologies. One should also add to them production technologies since they aim to increase teachers’ readiness to provide professional training to specialists based on innovative principles.

The development of professional competence in teachers from professional (vocational) education schools should be considered as a purposeful process. Therefore, it should include certain innovative pedagogical and production technologies, modern forms of training future skilled workers, as well as the interaction between actors in the educational process.

Such an assertion relies on the results of the ascertaining experiment. They indicate that teachers do not use e-learning resources systematically. Next, they show a low level of skills in project-based management. Finally, they do not always adjust professional training of future qualified specialists to dynamic technological changes in production.

The use of distance learning technologies in the development of professional competence in actors in the educational process allows integrating the learning system into the global educational field and expanding the space of the national informational and educational environment for actors in the educational process. It can be possible due to using modern methods and information technologies, meeting the personal needs of students in obtaining new knowledge based on the individualization of the educational process and telecommunications and enhancing professional competence in teachers based on mastering programmes of training for introducing professional distance training and doing distance courses.

Project technologies enable the transition from the “knowledge-generative” to the competency-based system of professional education, which lies in interaction, cooperation, partnership, motivation for success, reflective processes. They contribute to the professional development of the individual by independently creating a certain material or intellectual product based on knowledge, personal qualities and personal experience. Finally, they strengthen knowledge and skills and develop professional competence in actors in the educational process due to searching, cognitive and research activities.

In the context of developing professional competence in actors in the educational process, production technologies make it possible to take into account the strategic socio-economic objectives in the development of a particular industry, labour market conditions. Besides, they ensure the organization of the educational process in terms of social partnership and practically implement current scientific innovations in pedagogy and psychology, production and services. Most importantly, they respond to technical and technological changes, structural and content-related innovative production transformations timely and productively.

Further research should aim to justify the conceptual principles of managing the system of professional (vocational) education under today’s transformation. It might be a good idea to analyze theoretical and methodical principles of developing a professional culture in teachers from professional education schools during the course and in-between course periods of advanced training. Besides, it should contribute to disseminate the determined successful experience in its implementation in the system of professional (vocational) education in Ukraine.

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