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CULTUROLOGY, UPBRINGING AND EDUCATION AS COMPONENTS OF PEDAGOGICAL AND PHILOLOGICAL ACTIVITY

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Authors – Бабкіна О., Бабкіна М., Іванюк Г., Венгловська О., Буклів Р., Носкова М., Хомич О., Виноградова О., Коляда І., Писарева Л., Шахова К., Василенко О.О., Федотова О., Томаз І., Лобур Н., Іващук А., Stadnyk V., Конох А., Конох А., Конох О., Петелько М., Гвоздьов М., Коваленко О., Голота Н., Карнаухова А.. Попиченко С., Скрипник Н., Aleksieienko-Lemovska L., Bukliv S., Bukliv O., Bukliv R., Zhygalo I., Blavt O., Dubovyk O., Kolisnyk-Humeniuk J., Holiiad I., Matiikiv I., Holiiad R., Slipchyshyn L., Dynko V., Аксьонова О., Авдєєва С., Мінакова І., Тонне О., Hutyria S., Cherniakova V., Shevchuk A., Таточенко В.І., Гаран І.О., Ковтун Л., Ковтун С., Nikolaeva S., Chernysh V., Diachkova Y.

REVIEWERS

Kazachiner Olena – Doctor of Pedagogical Sciences, Associate Professor of the Department of Human Health, Rehabilitation and Special Psychology, Kharkiv National Pedagogical University named after G.S. Skovoroda.

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11.3 Multi-level training of future teachers in the dual form of training

Transformational changes in the technological world have led to the search for new approaches, methods and means of training focused on the modern competencies of competitive specialists. With the transition of production to a new philosophy of the functioning of technology (the transition from Industry 3.0 to Industry 4.0), the relevance of solving the problem of improving the quality of training of specialised and professional education teachers has increased. The dynamic development of society is characterised by high technology, innovation and creativity in all spheres of the economy. As a result, external conditions are constantly changing, which contribute to the obsolescence of acquired knowledge and skills and put forward new requirements. The need for specialists who can demonstrate responsibility, independence, activity, and creativity, constantly improve their qualifications and increase professional competence is becoming more urgent. Since the pedagogical system of a higher educational institution is under the constant influence of the social environment, it must respond in a timely and adequate manner and adapt the elements of the system to it. However, a crisis has arisen in vocational education with the provision of educational institutions with modern teachers who possess the competencies demanded by the labour market.

In the context of sustainable development, the role of higher education institutions is changing; they must become unique intellectual spaces for training new generations of professionals, scientists, and labour, who, by the nature of their professional activities, will become agents of change, trained to understand and solve various problems.

Today, to guarantee modern labour market requirements, it is necessary to combine the best ideas for the socio-economic development of society. One such idea is to unite different participants for the exchange of ideas and joint work to form the ability to jointly solve problems of economic, social, and environmental issues. The transition of production to new production technologies has exacerbated the problem

of the quality of professional training of specialists since these technologies are focused on a different philosophy of the functioning of technology, as well as on the creative and intellectual potential of employees.

Pedagogical science has gained significant experience in solving the problem of improving the professional training of specialists, particularly in professional pedagogy, theoretical foundations of professional pedagogy, methodological foundations of the formation of professional competence of specialists, and dual education. Among the various research topics, multi-level training of future teachers in the dual form of education is not sufficiently covered. The study aims to characterise the theoretical foundations of training future teachers of specialised and professional education in the dual form of education.

Quality as a systemic category in education is related to the concepts of education and specialist training. The quality of professional training of future teachers characterises their ability to perform professional activities at a high level. To determine the quality of professional training, it is necessary to comprehensively assess the system of professional education according to external and internal parameters and establish its compliance with the intended goals. The modern approach to determining quality involves identifying the quality of three interrelated components - the education system, the educational process and personal qualities.

As practice shows, in Ukraine, more and more applicants seek to combine education and practical experience, however, due to the lack of the necessary material and technical base, scientifically sound regulatory and legal and high-quality educational and methodological support, this process is slowed down. The problem of the lack of the necessary material and technical base has also affected the training of teachers of specialised and professional education, which may affect the innovative development of pedagogical education in this area. By the recommendations developed by the Third UNESCO World Conference on the Contribution of Higher Education Institutions to the Sustainable Development of Society, the cluster model is considered a promising approach. It allows for the systematic integration of interacting and interdependent institutions and production, as well as zoning in the educational sphere

with an orientation towards the needs of specialised schools, institutions of vocational (vocational) and professional pre-higher education.

The accelerated development of technologies changes the content of professional activity, and therefore, the goals and content of training are transformed. The new content of work requires specialists to have new competencies that can be formed in the conditions of modern production. In the process of modernisation of the content of professional training, attention is increasing to improving the organisation of teaching professional disciplines, using the possibilities of the dual form of training of future specialists.

The Concept for the Development of Pedagogical Education [268, p.2] states that the narrow specialisation of education has led to various side effects, which, in general, have negatively affected the assimilation of the content of education. In particular, this primarily concerns the insufficient development of integration processes in related fields, which results in an unsatisfactory state of interprofessional communications and weak implementation of interdisciplinary and inter-sectoral ties. The competency-based approach allows for the activation of integration processes and the transition from the assimilation of facts to the development of competencies. In general, the Concept provides for the following areas of education reform: “1. Development of a modern model of the pedagogical profession in the context of the needs of society, prospects for the development of the national economy and global technological changes. 2. Transformation of higher and professional pre-higher education in pedagogical specialities. 3. Identification of promising ways of continuous professional development and advanced training of pedagogical workers” [268, p.5].

When developing a model of a modern teacher, a new vision of the prospects of the teaching profession and the influence of factors that can affect the process of reforming education are taken into account. One of the system-forming factors of the reform is the formation of a sectoral system of qualifications, which combines a set of standards (professional, digital competence, higher and professional pre-higher education), requirements for educational programs of higher and professional pre-

higher education, a code of ethics for a pedagogical worker and requirements for pedagogical internships.

A positive impact on the quality of training and professional development of teachers can be achieved through additional requirements that include: “assessment of the ability and aptitude for the pedagogical activity of applicants to programs of professional pre-higher education, initial level (short cycle) and first (bachelor) level of higher pedagogical education (psychological testing and/or other methods of confirming personal abilities and abilities for pedagogical activity”, as well as “combining the training of applicants for higher and professional pre-higher pedagogical education with pedagogical activity in the formats of volunteering, practical training, internship, dual form of education, work during the holiday period, part-time and/or weekly. [268, p.6-7].

In modern conditions, according to N. Nichkalo, the strategic priority of educational policy should be based on the following key principles: “1) new basic knowledge for all; 2) a significant increase in investments in human resources in order to raise the priorities of the most important achievement of Europe - its people; 3) innovative teaching and learning methods; 4) a new system of assessing the quality of education obtained; 5) development of mentoring and counseling; 6) bringing education closer to the place of residence” [269, p. 134]. It is necessary to modernize vocational education in the following areas: “legislation; formation and implementation of state orders; improvement of the content of vocational education; expansion of cooperation with employers; management of vocational education; increasing the prestige of working professions in society and information support of vocational education and training and the introduction of innovative teaching technologies; vocational training in production; improving the quality of teaching staff; scientific and methodological support for vocational education, as well as financial and material and technical support for this industry” [269, p.134].

Of particular importance for the organisation of high-quality training of pedagogical personnel is the orientation towards modern promising models used in world practice. In particular, these are two mutually complementary models, each of

which has its own conditions for effectiveness. The first model is the practice of preparing an integrated master's degree with early pedagogical specialisation and thorough cross-curricular pedagogical practice in the learning process. It is effective for integrated pedagogical education and is appropriate for use in preschool and primary education. The second model is a two-cycle bachelor's degree with later specialisation and the introduction of the pedagogical internship. Accordingly, it is effective for training teachers of individual subjects and disciplines and is appropriate for specialised and professional (vocational and technical) education [270, p. 104]. Orientation towards such a model is laid down in The Concept for the Development of Pedagogical Education.

At all levels of education, the issue of strengthening practical training, expanding educational independence, and involving applicants in research activities to deepen and expand the acquired competencies that are in demand in the labour market is acute.

A qualitatively new result of training future teachers of specialised and professional education is provided by modern approaches and technologies for the formation of professional competence. Taking into account the realities, needs and opportunities of the educational sector requires finding new models of cooperation between the participants in the process. In many countries of the world, this is solved using dual education technologies.

In connection with changes in the content of work in many industries and the complication of labour functions, new, flexible formats for obtaining vocational education appear, in which the criterion for the quality of training of specialists is the acquisition of competencies and competencies expected by employers. Among these formats, the dual form of training stands out. The experience of implementing the system itself or its elements in various countries (Austria, Canada, etc.) has shown its viability and potential. In response to the new challenges of society today, dual education is considered by many scientists and practitioners as an important tool for eliminating the main shortcomings of traditional training of specialists and the associated difficulties for employers.

To bring the level of Ukrainian higher education institutions closer to the world level and the demands of the economy, all participants in the process need to be constantly in dialogue, looking for effective mechanisms to eliminate educational shortcomings. Let us consider the developments that have already been made in Ukraine to introduce the dual form into higher education in Ukraine and identify mechanisms for its implementation with a view to continuous professional education.

The German experience of dual education formed the basis of the "Concept of training specialists in the dual form of education in Ukraine" developed in Ukraine [271]. By the theoretical principles of the Concept, employers can contact an educational institution with an initiative to implement a dual form of education in the specialities in which they are interested. In the case of training pedagogical personnel, such employers are educational institutions where graduates of pedagogical specialities will be employed. Thus, these institutions influence the development of the educational program and individual curriculum, the selection of education seekers for internships in the institution, providing conditions for training on their base, and adaptation to the performance of their professional duties. The advantages for employers are the influence on the training process, obtaining qualified personnel and the possibility of selecting education seekers for employment after graduation.

According to V. Drel, L. Senogonova, and V. Volodavchyk, dual education can be considered in three aspects: as a social phenomenon associated with the transition to sustainable development of society, which requires competitive specialists; as a scientific phenomenon capable of ensuring their training; as a process (technology) of "integration of scientific-theoretical and professional-practical training of specialists in higher education institutions and enterprises, institutions, organisations" [272, p. 67]. At the same time, O. Prystaya and O. Vrublevska emphasise that in dual education, an important role is played by employers who can influence the training of personnel for the industry by investing in educational institutions or by admitting students to their material and technical base. In turn, the role of higher education institutions is to create a learning environment and appropriate educational and methodological support for the process of professional training [273, p. 149].

As the analysis of the consolidation of graduates of pedagogical universities, the adaptation of young teachers to their first workplace shows, they have, on the one hand, an insufficient level of practical pedagogical experience gained in an educational institution, in particular, this applies to teachers of professional and specialised training, and on the other hand, with good theoretical training, they have an insufficient level of practical experience working on technological, and even more so on high-tech equipment. Since the customer of such personnel is the education system, for confident work in it in their specialisation, it is advisable to use dual education technologies, elements of which have been used in vocational education since 2015 [271], and since 2019, the dual form in it has been regulated by the relevant provision [274]. That is, the vocational education system has already gained important positive experience in using the dual form of education, which is being replenished as the system is modernised.

Based on the analysis of the features of the functioning of the dual form of education in different countries, O. Yakovchuk identified the main approaches to understanding its essence. The dual form of education is considered a mechanism for the social adaptation of graduates of educational institutions, a mechanism for social mobility of graduates of educational institutions, a way to improve the professional competence of future specialists by the content, main tasks of the production process and technological innovations; a way to form the professional competence of future specialists by the tasks, content of the production process, technological innovations, preparation for changing the type of activity [275, p.88]. In this context, an educational cluster is a modern, appropriate form of education [276, p.153].

Today, there is a discrepancy between the requests and requirements of employers regarding the real preparedness of graduates of educational institutions of different levels who are starting their careers. There are many reasons for the existence of this phenomenon, but the most acute problem is the low level of practical professional skills. Accordingly, the production sector lacks qualified specialists of the younger generation, and those who are available are mostly of the older generation, who are valued for their professionalism and willingness to work as long as there is a

need for them. This violates the natural laws of reproduction and effective use of labour and aims at a new concept of vocational training, which should be based on professional motivation and prevent labour migration of young people.

The competitiveness of specialists in the labour market revealed the main reasons for the unsatisfactory state of the existing vocational training: "a significant gap between the content of educational programs and the needs of the labour market, ineffective short-term production practice, low level of development of personal and professional resources and creative potential of student youth" [272, p.23]. These problems can be solved through a dialogue between the labour and education markets, which is supported by legislation. Taking into account the needs of the main players – the state, the employer, the specialist – and the problems of meeting their needs actualises a new form of vocational training, which is flexible about regional characteristics and types of production and effective in increasing youth employment. This form is dual education, which has shown its effectiveness in many European countries. Therefore, introducing a dual form of training in Ukraine requires studying the best foreign experience in various aspects.

The Ukrainian education system is in a state of modernisation, which is not proceeding fast enough, as the time requires. The most common complaints from employers are that graduates of higher education institutions are not ready to fully engage in the work process from the first days of employment without a long adaptation period. They use this time to get acquainted with the operation of modern equipment and study industry technologies and new software, which they should have done while receiving education. At the same time, there is a lack of their own professional experience. In this regard, it is advisable to turn to the study of those systems of professional training of future specialists that provide the study of the most relevant and appropriate content of professional disciplines, taking into account the options for its mastery.

The quality of professional training of specialists depends on many factors, among which the following are the most important: the quality of applicants, the quality of the material and technical base of the educational institution, the level of

organisation of teaching professional disciplines, the level of psychological and pedagogical training of the teaching staff, the effectiveness of the methodological training system.

When choosing a profession, modern Ukrainian applicants often succumb to the external attractiveness of the profession, not realising the difficulties associated with both its mastery and the realities of professional activity. In Ukraine today, the biggest problem for students to acquire practical professional skills is the lack of modern bases of production practice, where you can immerse yourself in the production environment for a long time. As a result, society receives an insufficient number of highly qualified, competent specialists. The use of a competency-based approach to training specialists eliminates the gap between academic training and production reality and contributes to increasing the efficiency of performing job functions. Thus, the strategic path is to bring training closer to production with the identification of those competencies that are needed in future professional activity.

The problem of updating pedagogical personnel working in the field of professional training of specialists by the requirements of society and market conditions is becoming increasingly acute. In the system of professional training and education of many countries of the world, this problem is solved using technologies of the dual form of education. The search by modern universities for new approaches, forms and models of interaction with the main players of the labour market - educational institutions, employers, and the state - is initiated by their motivation to ensure, first of all, their competitiveness. In education today, the cluster model is considered effective for functioning and optimal for financing, which makes it possible to find common points of interest and unite and optimise the efforts of participants for innovative development.

Due to changes in the content of work in many industries and the complexity of labour functions, new formats for obtaining professional education are emerging, in which the criterion for the quality of training is the acquisition of competencies and competencies expected by employers. Among these formats, the dual form of training stands out. The experience of implementing the dual system or its elements in various

countries (Austria, Canada, Switzerland, etc.) has shown its viability and potential. In response to new challenges in society today, dual education is considered by many scientists and practitioners as an important tool for eliminating the main shortcomings of traditional training of specialists and the associated difficulties for employers. The training of future teachers in technological education is no exception. In this aspect, it is necessary to consider the developments that have already been made in Ukraine to introduce the dual form into higher education in Ukraine and identify mechanisms for its implementation with a view to continuous professional education.

According to the theoretical principles of the "Concept of Training Specialists in the Dual Form of Education" (2018), employers can contact an educational institution with an initiative to implement a dual form of education in the specialities in which they are interested. In the case of training pedagogical personnel, such employers are educational institutions where graduates of pedagogical specialities will be employed. Thus, these institutions influence the development of the educational program and individual curriculum, the selection of education seekers for internships in the institution, providing conditions for training on their basis, and adaptation to the performance of their professional duties. The advantages for employers are the influence on the training process, obtaining qualified personnel and the possibility of selecting education seekers for employment after graduation [271].

Analysing regulatory documents, the source base of dual education, the authors [272, p. 67] concluded that it could be considered in three aspects: as a social phenomenon associated with the transition to the sustainable development of society, which requires competitive specialists; as a scientific phenomenon capable of ensuring their training; as a process (technology) of "integration of scientific-theoretical and professional-practical training of specialists in higher education institutions and enterprises, institutions, organisations". At the same time, in work [273, p. 149], attention was focused on the fact that in dual education, an important role is played by employers who can influence the training of personnel for the industry by investing in educational institutions or by admitting students to their material and technical base.

As the analysis of the consolidation of graduates of pedagogical universities, the adaptation of young teachers to their first workplace shows, they have, on the one hand, an insufficient level of practical pedagogical experience gained in an educational institution, in particular, this applies to teachers of professional and specialised training, labour training and technologies, and on the other hand, with good theoretical training, they have an insufficient level of practical experience working on technological, and even more so on high-tech equipment. Since the customer of such personnel is the education system, for confident work in this area by specialisation, it is advisable to use dual education technologies, elements of which have been used in vocational education since 2015 [273] and since 2019, the dual form has been regulated by the regulation [274]. As the vocational education system is modernised, important positive experiences in using the dual form of education are being accumulated.

The active phase of modernisation of the vocational education system began in 2016 with the opening of modern training and practical centres in educational institutions. During 2016-2020, 198 training and practical centres were created in vocational education institutions [277, p.29], which work using new production technologies, the development of which requires modern competencies. At the same time, objective difficulties have arisen in the vocational education system related to an acute need for a younger generation of teachers who possess professional competencies and can teach students at the required level in training and education centres in the context of digitalisation, the methodology of professional theoretical and practical training is also changing, which is difficult for supporters of traditional education to reorient to; the potential of training and education centres is not being used sufficiently.

Having analysed the source base, we concluded that dual education is one of the forms of solving the problem of training teachers of specialised and professional education, which is appropriate in the current circumstances (demographic problems, lack of modern equipment in the higher education institution, etc.); the introduction of the dual form in higher education should be based on the synergy of world, European and domestic experience; when implementing the model of dual higher education, the features of cooperation between the participants in the process should be taken into

account. That is, taking into account the specifics of work in the speciality; it is necessary to find the optimal model of organising simultaneous training in an educational institution and a base for gaining practical professional experience. Special attention is paid to completing full-fledged production and pedagogical practices.

Based on the analysis of the features of the functioning of the dual form of education in different countries, O. Yakovchuk identified the main approaches to understanding its essence. The dual form of education is considered a mechanism for the social adaptation of graduates of educational institutions, a mechanism for social mobility of graduates of educational institutions, a method of improving the professional competence of future specialists by the content, main tasks of the production process and technological innovations; a method of forming the professional competence of future specialists by the tasks, content of the production process, technological innovations, preparation for changing the type of activity [275, p.88]. The educational sphere has a complex structure that integrates the efforts, on the one hand, of the system of educational institutions and, on the other hand, of the system of scientific institutions, information support and innovative production. The implementation of educational and scientific results into production determines the strategic direction of education development. In this context, the modern expedient form of education is the educational cluster [276, p.153].

The advantage of the cluster model is that it is not limited to one industry, it can integrate the cooperation of interacting and interdependent institutions production. The main criterion is the development of the economic system of the region in all the complexity of the relationships of its components. The principle of clustering allows zoning in the field of education. Therefore, the system of training modern teachers of specialised and professional education for the regional needs of specialised schools and vocational education institutions requires the formation of an educational cluster, which acquires the features of a production cluster, which allows regulating and optimising the structure according to the principles of vertical and horizontal integration. Based on the classification of educational clusters proposed in [276, p.40],

it is possible to detail the characteristics of such a cluster according to various characteristics.

We believe that today, there are optimal conditions for training modern teachers of profile and vocational education in a dual form in the conditions of an educational cluster based on higher professional schools. In our opinion, the solution to the above problem lies in an approach that takes into account three aspects: taking into account the abilities of school and school students for pedagogical work and the desire to implement them; maintaining continuity in the training of future teachers in the system of "general education school - vocational institution - higher education institution"; providing access to modern educational and practical centres that are already operating in the vocational institution, not only to students of the profile school but also to students who are acquiring relevant pedagogical specialities. Based on this approach, a system has been developed to ensure the training of future teachers of profile and vocational education in a dual form of organising education in the conditions of a professional and pedagogical cluster in combination with the created system of multi-channel financing.

Thus, based on the above, we can conclude that the training of future teachers of specialised and professional education in the context of the reform of general secondary and vocational (vocational and technical) schools is extremely relevant. It should correspond to the leading global trends: strengthening the practical orientation achieved by the dual form of education, using the optimal opportunities for providing educational services, which involves the use of distance and online learning, and maximum consideration of the needs and capabilities of each applicant. The authors consider the main factors inhibiting the implementation of Industry 4.0 technologies to be low educational motivation, low or insufficient level of digital literacy, underdevelopment of the system of non-formal and informal education, insufficiently practically oriented and outdated content of education, outdated material and technical base of educational institutions [278, pp. 65-73].

Since the quality of human capital is one of the most important factors of economic growth and competitiveness of the country in the global dimension, domestic

employers use those strategies that are recognised as the best global practices. The authors [278, pp. 140-149] identified these practices: search for talented youth (within the country and abroad); talent management, creation of programs to promote professional self-development of employees; investments in advanced training and retraining; intra-industry cooperation (training) and internships in different companies within the industry; cooperation with educational institutions in the form of dual education and industrial practice; use of inter-industry cooperation of companies; mobility and rotation of personnel, online and distance learning. However, employers most often choose strategies to search for talented youth, programs to promote professional self-development and investments in advanced training and retraining of personnel.

The specificity of dual education is that it is an integrated form that combines the possibilities of such forms as distance learning, on-the-job training and correspondence. This means that the student has made a choice for in-depth mastery of the profession and is ready to gain experience in real conditions. At the same time, the process of obtaining vocational education in the dual form complicates the organisational and methodological support of the educational process and requires mechanisms for solving problems and eliminating difficulties. Therefore, three models have been formed at the global level that correspond to the method of managing and regulating dual education in a particular country: market, cooperative and a model with strong state administration [279, p.11].

Among European countries, Germany has the greatest experience in introducing dual education. The dual form of education has many options, which allows a young person to choose the path that he considers most appropriate for mastering a profession. In total, 1600 dual programs operate, almost each of which can have several options for practical training. Some registers contain important information about dual programs, terms of study, higher education institutions, cities, partner enterprises, models of training organisations, etc. Information is also posted on special pages at the level of individual states and the national level [280, p.15].

Features of the dual form of higher education models used in Germany are given in [281, p.9-10]:

1. Higher education with integrated vocational (vocational and technical) education, which is regulated by the Law on Vocational Education, involves a combination of training in higher and vocational institutions, where the student has the status of a student and obtains two diplomas of education.

2. Higher education with integrated practical training, which involves the student's stay at the enterprise as an intern/trainee, as well as alternating periods of study at an educational institution and the enterprise, the distribution of study credits between the institution and the enterprise.

3. Higher education with integrated professional activity for specialists who work and simultaneously receive an academic education, but is applied only to persons who already have a first higher education (bachelor's degree).

4. Higher education without interruption from professional activity, that is, in your free time from work.

As practice in Germany shows, the most popular among higher education applicants is higher education with integrated practical training, which shortens the time of academic study (with the consent of the employer) is higher education with integrated professional activity, and the least popular is obtaining higher education in free time.

The paper [279] presents the results of the development and implementation into the educational practice of the concept of integrating the training of future engineers with production to improve the quality of professional training and increase readiness to perform engineering duties at enterprises. Experimental work was carried out from 2013-2016 by the plans of the National Academy of Sciences of Ukraine and Vinnytsia National Technical University (research laboratory of higher education problems as a structural unit of the university, operating based on a cooperation agreement with the National Academy of Sciences of Ukraine). The study involved: scientific structure - department of Higher Education of the National Academy of Sciences of Ukraine, educational institution - Vinnytsia National Technical University (research laboratory

of higher education problems, departments of specialised technical disciplines and the department of integration of training with production), enterprises and companies for practical training in 15 fields of knowledge at the bachelor's level.

The main idea of the study was that the integration of students during their stay at enterprises and factories into production processes would eliminate the main drawback of traditional practical training - the contemplation by students of someone else's work or the functioning of some technological equipment. This actualised the need to create conditions for mastering a working profession, which allows working in a real workplace and mastering the engineering field, starting with working jobs. The task was to "develop such integrated curricula, according to which a student after the first two years of study, in parallel with mastering theoretical knowledge according to the program of the first two years of bachelor's degree, would also receive a working profession" [279, p. 66]. The basic principles of building the educational process in this context are the first principle - integration of curricula of working professions with curricula of the first two trimesters of study of first- and second-year students. The second principle is the consistent distribution of educational material from specialised disciplines by trimesters and years of study, taking into account the features of previous training and the given final result. All working professions correspond to engineering specialities. Therefore, licensed working professions were selected for different faculties. For example, the faculty of mechanical engineering and transport corresponded to the working professions of a car repair mechanic, a turner, a turner-operator of machine tools with program control, and an electric and gas welder.

The transition from two-semester training to three-semester training is caused by the need to allocate one semester for mastering a working profession (in the first year) and working in this speciality in production (in the second and third years). The authors understand the concept of “working trimester” as “the period of students’ work at workplaces at enterprises, companies, institutions, organisations of various forms of ownership ... departments and university departments” [279, p. 86]. The Department of Integration of Learning with Production constantly selects enterprises and organisations in different parts of the country, the level of innovations which meet the

requirements of the educational process. The results of the study are the identified organisational and pedagogical conditions and methods for assessing and improving the quality of practical training in the context of the concept of integration of learning with production.

The results of the experimental study in real conditions of Vinnytsia National Technical University allowed us to recommend the tested concept of integration of training and production as one of the options for dual education in other higher education institutions of Ukraine.

In April 2019, the composition of the National Qualifications Agency and an action plan for the implementation of the dual education concept in Ukraine were approved, which provided for the development of: "provisions on the dual form of education and standard contracts for its acquisition; methodological recommendations for the formation of educational programs and the organization of training in higher education institutions in the dual form; organizational and methodological support for the training of specialists in the dual form of education; organization of training for compilers of educational programs and training of experts in their development; Procedure for assessing the results of obtaining educational and professional qualifications in the dual form with the participation of employers and educational institutions; educational programs and curricula in the dual form of education; monitoring measures and measures to popularize and disseminate domestic and international experience in their implementation" [282, p. 85]. This was aimed at creating conditions for the effective implementation of the dual form of education and solving labour market problems [282, p. 85; 275].

By order of the Ministry of Education and Science of Ukraine (No. 1296, dated October 15, 2019), within the framework of the USAID Economic Support to Ukraine Project, a pilot project was carried out in 2019-2021 to introduce and adapt the dual form of education in the training of specialists in institutions of professional pre-higher and higher education. The first participants in the program were five universities and their partner companies - Donetsk National Technical University, Luhansk National Agrarian University, Azov State Technical University, V. Dal East Ukrainian National

University, and D. Motorny Tavria State Agrotechnical University. The main goal of the Project is to develop labour potential in Eastern Ukraine, and after the beginning of armed aggression (on February 22, 2024), the activity expanded to all regions, and the goal was adjusted - to establish interaction between education and business, and the dual form of education is considered another effective tool.

Based on the study of real examples (case studies) of the implementation of the dual form of education, the existing educational experience of universities and the experience of effectively organising work with stakeholders were summarised, and methodological recommendations were developed, which highlighted the answers to the main questions that concern educators and employers, and draft documents were proposed for the introduction of the dual form of education and ensuring an individual trajectory of professional development [283].

In the conditions of the Federal District, the educational program is adapted to the needs of the employer by integrating profile tasks into the educational process, in particular at the level of disciplines - content adapted to the material and technical base, technological processes of production and their features; course and qualification works - applied tasks are solved as needed (for course works), and the task performed is part of the real work of the enterprise (for qualification works); practices - conducting all practices provided for by the training programs at the enterprise to study the methods, techniques, algorithms, technologies, and processes used at it; documentation - using documents in circulation at the enterprise; evaluation - involvement in commissions that determine the quality of the work performed according to the enterprise's criteria (filling out documents, preparing qualification work, etc.) [283, p. 81].

In addition to the positive result obtained, this pilot project highlighted several unresolved problems. In this regard, from 01.07.2022, the USAID Project began implementing the next project, “Dual Education for Ukraine”, in cooperation with the NGO “Ukrainian Marketing Association”. Thanks to this cooperation, it is expected to improve the capacity of target vocational educational institutions and their partners to regularly update curricula and provide practical training at local manufacturers, solve

common problems, train personnel with appropriate qualifications, continuously improve skills, and develop professional knowledge. The main objectives of this project are familiarising stakeholders (educational institutions, enterprises, education seekers) with the goals, procedures, features, tools, and results of the dual form education; implementing organisational and management procedures taking into account each stage of the dual form education and cooperation (developing a roadmap, using methodological recommendations and document templates); ensuring long-term awareness of target group representatives about the opportunities and advantages of dual form education on the websites of educational institutions [281, p. 13].

Currently, the training of future teachers is carried out by a competency-based normative model. The requirement to improve the quality of training actualises the need to implement innovative approaches, develop a new generation of educational and methodological complex and make adjustments to the training process – a dual form of training, digitalisation of the educational process, optimisation of the organisation of training, increasing the role of independent work, etc. This, in turn, makes adjustments to the methodological principles, in particular in the context of the topic under study.

The main methodological principles of dual education are taking into account the specifics of the profession and its need for systematic and consistent mastery of practical skills, which affects the organisation of the educational process and the duration of training; a clear definition of the list of necessary knowledge, skills and abilities required for work in production, which focuses on creating a program on a competency basis, taking into account the characteristics of training; changing the roles of teachers from the educational institution and the enterprise specialists involved in dual training, which affects the methodological support of the learning process and the technologies of pedagogical communication.

In modern higher education, the following trends can be identified: the hours of classroom classes are being reduced, and the volume of educational information for independent study is increasing; there are problems with finding modern bases of practice; the digitalisation of the educational process is considered an important factor

in its optimisation; the introduction of training according to an individual educational trajectory; the strengthening of the role of stakeholders in the development of educational programs and the identification of necessary competencies. At the same time, these trends highlight the need to develop and design new methodological tools that would contribute to increasing the efficiency of the educational process in the context of a competency-based approach, independent work of students, and optimise organisational and didactic requirements for the implementation of the learning process.

Since there are a large number of types of dual education in practice, it is useful to study foreign experience and its features. Let us consider the experience of Germany, where, in 1969, a dual form of organisation of vocational education was officially launched. Germany has many options, information about which is posted on special pages at the level of individual states and the national level. This allows a young person to choose the path that he considers most appropriate for mastering a profession. In total, 1,600 dual programs are currently operating in Germany, almost each of which can have several options for practical training. Some registers contain important information about dual programs, duration of study, higher education institution, city, partner companies, models of training organisation, etc. In our opinion, this is extremely relevant information for those who want to gain real professional experience. Unfortunately, in Ukraine, this process is just beginning [280].

Employers play an important role in dual education and can influence the training of personnel for the industry by investing in educational institutions or by admitting students to their material and technical base. The role of higher education institutions (HEI) is to create a learning environment and appropriate educational and methodological support for the process of professional training [273, p. 149].

Since partner-enterprises, on their part, must have mentors for training both dual HE and vocational (vocational and technical) education applicants, strict criteria are put forward to them in the case of integration of the latter into higher education. Accordingly, for each speciality, the enterprise must have specialists with the necessary qualifications.

In cooperation between a higher education institution and enterprises, the main responsibility lies with the first participant, while the enterprise must confirm its suitability as a training centre. Work on drawing up or changing the dual education program is carried out in stages. First, working groups are created by representatives of the institution and companies, who make their proposals on how they see the ways of combining academic and practical training. Then, coordination meetings are held with the presence of a third party, which helps to eliminate differences in the views of the educational institution and enterprises. This makes it possible to make an informed decision in cases where the institution's curriculum lacks the necessary competencies and needs to be mastered within elective courses, which is not always convenient.

Work on the development and improvement of dual-form curricula should solve the following priority tasks: integrate academic and educational-production content and divide them into topics; distribute and coordinate hours between the educational institution and the enterprise; align the student's expectations with the realities of practical professional work. The first and second tasks are coordinated using three models: integrated, block or partial. The integrated model involves several days of study at the institution, the rest at the enterprise (split-week model); in the block model, the hours between the institution and the enterprise are distributed in blocks within the calendar period (weeks, months, semester); in the partial model, a certain number of hours of study at the institution can cover the hours of practice at the enterprise [284].

Our attention was drawn to the German experience in training vocational teachers, as Ukrainian vocational (vocational and technical) education has been in decline for a long time, and its modernisation began actively in 2015, along with the introduction of the dual form of education. To highlight this experience, we used information obtained during participation in an international seminar within the framework of the PAGOSTE project [280].

Unlike other specialities, the system of training teachers of vocational education in German higher education institutions has its characteristics caused by the requirements for teachers. Only a specialist with a master's degree who has confirmed practical work experience in companies or enterprises can take up the position of a

teacher of vocational education. Gaining professional experience by a future teacher is ensured by the mandatory completion of an 18-month compulsory practical training course, which ends with a state exam. Passing this course is controlled by the federal state. The student has two options for completing this course: before studying at the institution and during his studies. The first option allows the student to focus on theoretical training. Moreover, he has to master the main speciality and specialisation. After completing the master's degree, the second phase of gaining professional experience begins - 18 months of practical training. After completing the second phase, the graduate can apply for the position of a teacher. The vocational education institution is responsible for passing this phase. The second phase is important in the sense that it eliminates the shortcomings of previous training and improves skills.

The University of Konstanz (Germany) is a modern institution focused on the interdisciplinary orientation of education and scientific activity. The training of teachers of vocational education is carried out at the Faculty of Economics, where students master the specialisation "Vocational Education. Economics". The curriculum has two directions: scientific, focused on studying at the university, and practice-oriented, which includes a teacher training course based on a vocational school with mandatory passing an exam and attending seminars. For the second specialisation, 13 elective disciplines are provided.

A structure called a seminar manages students' practical and advanced training during their university studies. This structure stores documentation on the practical and advanced training for 5-10 years. During the internship, students attend four seminars, which offer courses that correspond to internships under bachelor's and master's programs (10 weeks) with an orientation to practice in a vocational school. The seminars also provide basic guidance for the preparatory 18-month internship.

Practice-oriented disciplines include “Introduction to Teaching in Vocational Education and Training Institutions” and “Didactics of Teaching Economics” at the bachelor’s and master’s levels, to which practice in vocational schools is added. During the study of “Introduction to Teaching in Vocational Education and Training Institutions”, students analyse teaching methods in great detail and only when they

have mastered them theoretically do they move on to practice. A significant part of the time is allocated to analysing practical situations that are implemented in practice. In the event of failures, the reasons that caused them are discussed. In the process of professional training of future vocational teachers, there is a focus on achieving a high level of methodological competence rather than on mastering a large number of modern technologies and all skills. This is the basis of the quality of preparation for practical pedagogical work. The professionalisation of both students and practising teachers takes place in courses where various interesting methods, models, and technologies are analysed. In our opinion, this is what the Ukrainian system of teacher training lacks.

Practice is carried out in two forms - passive and active. During passive learning, students visit experienced teachers, observe what methods they use, determine for themselves the part of the information that is important for their professional growth, and prepare reports. Active learning involves the independent conduct of lessons with subsequent discussions in which students and the teacher participate. The purpose of such lessons is to verify in practice whether the plan was drawn up and the methods and means chosen were appropriate. Before the start of practice, the administration sets clear requirements for the number of hours allocated for practice and what results should be achieved.

At the University of Konstanz, obtaining the profession of a vocational teacher includes three modules: the first module has 52 weeks of practice, for which the university is responsible; the second module is 42 weeks of practice in companies or enterprises; the third module is 10 weeks of practical training in vocational schools. The peculiarity of the practices is that the training is conducted not by university teachers but by teachers from vocational schools.

The value of the German experience for Ukraine is that it has been tested over time and has had a positive impact on the training systems of specialists in many countries of the world that have implemented it.

Let us give another example of a vocational educational institution in Biberach, which trains carpenters for the needs of the state of Baden-Württemberg (Germany) [285, p. 69]. The very fact of the existence of an educational institution for training

specialists in one profession speaks of its uniqueness and the value of the experience for Ukraine.

The latest technologies and the developed eco-friendly thinking of the Germans have led to the popularity of building eco-houses. Accordingly, the demand for labour for workers who install and assemble houses, install and mount windows and doors, and mount roofs has increased. The institution specialises in training carpenters for the manufacture of roofs and wooden structures, wooden construction and assembly of houses. Dual training lasts two and three years. During the training period, there is a quantitative redistribution of time between theory and practice, as well as the contribution of the main partners to the overall process. In the first year, a full vocational school operates, in which professional theoretical and professional practical training alternate. In the second and third years, schooling is quantitatively reduced, and work is added in the training centre and a carpentry training company, where students undergo practical training. The institution has 15 workshops and mechanical shops attached to it, where 17 highly qualified master carpenters work. The number of groups ranges from 12 to 20 students. The training workshops employ from 12 to 20 people, and the mechanical shops employ no more than 12 people.

Master carpenters and engineers undergo internships at the training centre, during which they study restoration courses, sealing, working with other building materials (brick, concrete, etc.), 3D construction, and assembling wooden frame houses.

Graduates of the institution demonstrate high-quality work, which is evidence of high-quality professional training. In 2016, the German International Center for Carpentry Skills was established based on the institution. Its partners are institutions from countries where eco-construction is developing (Great Britain, Denmark, Ireland, Hungary, and others). They direct groups to study carpentry. In addition, German graduates are also employed abroad, which has both negative and positive aspects: graduates migrate to other countries but carry out a kind of career guidance, which turns into a recruitment of foreign students for the institution. Work on international relations is initiated by a separate marketing department.

Thus, in the conditions of dual education, there is effective cooperation between production and educational institutions, the result of which is the formation of practically oriented skills in graduates, which has a positive effect on both employment and the provision of production with trained personnel, reducing the risks of unemployment among young people.

Events and situations of the last decade in Ukraine have demonstrated the dependence of the education system on the level of development of digital platforms, ICT and computer-oriented learning systems, as well as the organisation of learning itself. These include, in particular, the education of schoolchildren from the occupied territories in Ukrainian schools, the functioning of the education system during the COVID-19 pandemic, and the forced migration of the population due to the full-scale invasion of the enemy into Ukrainian territory.

At the same time, with the change in computer-oriented learning systems, new technological tools appear that expand and deepen various areas and aspects of learning. In the field of technical means, there is a constant improvement of personalised digital learning tools in the direction of minimisation, universalisation, increased power, speed, reliability and ergonomics. In line with the requirements of the time, the attention of teachers and the business sector to the types of distance learning, in particular electronic, digital and mobile learning, has increased.

One of the directions of training future teachers is the use of dual education in the conditions of educational and scientific and educational and industrial clusters, in which the professional orientation and competence of applicants are developed. This corresponds to the leading global trends, which include increased cooperation with the labour market, practical orientation in professional training and the use of distance, online, electronic and mobile learning opportunities. To increase the educational activity of applicants, modern (non-traditional) methods and technologies of learning are becoming increasingly popular. All this actualises the creation of innovative educational and methodological support on a digital basis and the formation of teachers' readiness to work with it.

Personnel for production are prepared by educational institutions of various levels and types; therefore, in this process, special attention is paid to the training of pedagogical personnel themselves. As our research has shown, the relevance of the topic is caused by several contradictions, without the resolution of which it is impossible to obtain high-quality human capital, in particular, these are contradictions between: labour market requirements, demand from institutions of general secondary, vocational, and specialised pre-higher education for teachers of profile and professional training of a new type and the inability of the traditional higher education system to fulfil them due to insufficient financing of the educational process and the lack of the necessary material and technical base, scientifically substantiated regulatory and legal and high-quality educational and methodological support prepared based on a digital educational resource; the desire of applicants to study and gain practical experience in the conditions of personally oriented flexible forms of organising training based on horizontal educational structures (educational-production, educational-scientific-production centres, complexes and clusters) and the practice of centralised management and ordering the training of pedagogical personnel with dominant linear vertical connections, the orientation of education towards the employment of applicants and their receipt of the corresponding diploma, etc.; the widespread practice of general recruitment of applicants to higher education institutions for pedagogical specialities without taking into account the presence of predispositions for this activity and the need for applicants prepared within the framework of pre-university education for training, with the conduct of appropriate psychological and professional diagnostics, career guidance, professional selection and the performance of professional tests.

As our research has shown, in this context, training in the conditions of an educational-scientific-industrial cluster solves a significant part of them but requires the development of scientific and methodological foundations that reflect the specifics of the influences of the main partners (educational institutions, scientific institutions, employers), namely the creation of content, the technological and organisational foundation of a multi-level system that provides the conditions for achieving high-

quality training of future teachers of specialised and professional training. The developed scientific and methodological foundations should reflect changes in methodological systems of professional training, the teaching of specific disciplines and types of activities, which are caused by the dual form of training and the influence of the competency approach, employers and digitalisation.

According to the concept of the study, the training of competent, information and communication-literate teachers of specialised and professional education is possible provided that such psychological factors as the presence of predispositions and abilities for pedagogical activity, professional motivation and self-determination, and orientation to self-development are taken into account. Early selection of applicants during the career guidance period makes it possible to design work with them on scientific principles, focusing on the developed model of a modern teacher.

The main influence of the competency approach is aimed at achieving such a level of formation of the future teacher at which he possesses the basic foundations of the profession (by the requirements of the qualification level), can plan and control his activities, pedagogically design the educational process at the level of the educational group, and predict the development of his professional competence. To implement these tasks in the institution where the future teacher works in the workplace, he is assigned a mentor from among the most experienced teachers, who helps to implement the individual educational plan of the applicant, drawn up in advance together with the supervisor from the university. However, the educational institution where the future teacher studies is responsible for the preparation of the applicant, the implementation of the educational program and the quality of the educational process. The independence of the applicant is manifested in the fact that he identifies gaps in his knowledge and skills and, on his initiative, together with the mentor, revises or improves his educational trajectory and is engaged in the work specified in the educational program. The mentor's support at the applicant's workplace is extremely important, as it is a guarantee of gaining positive professional experience and, at the same time, a good example of influencing the formation of methodological competence.

Considering the possibilities of various types of organisational pedagogical interaction in the educational process, special attention during training is paid to coaching support, which is focused on positive qualitative changes in professionally important personal qualities and professional competencies of applicants. Since support for the applicant's self-development process should occur at all stages of the implementation of the teacher's model of profile and professional training, coaching methods are used in the process of studying each discipline, as well as those activities where the applicant is involved. They are aimed at the psychological side of educational activity, at the disclosure and realisation of the applicant's internal potential.

Changes in the methodological systems of disciplines and activities are associated with the use of electronic, mobile and digital learning, mastering a working profession through the acquisition of microqualifications, and the wide use of electronic and distance learning opportunities. In these conditions, microqualifications contribute to the formation of flexible professional and digital skills.

The real implementation of the integration of pedagogical and professional disciplines occurs with a gradual increase in the level of professional-pedagogical, methodological and psychological knowledge and, at the same time, the development of pedagogically significant qualities of future teachers. The content of pedagogical practical training of students is consistent with the content of working professional and practical training and is designed in such a way as to more widely master the basics of the teaching profession and, at the same time, develop pedagogically significant qualities. Much attention is paid by the educational institution where the applicant studies to ensure that the applicant in the workplace is engaged in those types of activities that correspond to the educational program and individual educational trajectory.

Thanks to the dual form of training, a real integration of training and production has taken place; introductory production practices have turned into work in the workplace, during which students master the profession as full-fledged subjects of educational production; there is an improvement in professional readiness for teaching;

the opportunity to simultaneously master a working profession and acquire practical skills of a teacher is realised. In the context of training in the conditions of an educational-scientific-production cluster, it is advisable to divide employers into two groups, which reflects the direct and indirect influence on the methodological system of training future teachers of specialised and professional training.

The first group of employers includes enterprises (production) that orient educational institutions, where they train workers for them on professional competencies. This implies that pedagogical workers of the vocational education institution (masters and teachers of special disciplines) must undergo internships in production to familiarise themselves with and learn how to work on modern equipment. The applicant, as a future teacher of specialised and professional training, should also be involved in this process. This group of employers has an indirect but no less important influence on the content of professional training of future teachers. Employers' observation of the performance of labour functions by interns in relevant positions, participation in conducting current and final control, and certification of applicants allow them to formulate proposals for changes in the criteria for assessing learning outcomes.

The second group of employers includes educational institutions where the applicant works in the workplace as a novice teacher. The main task of employers in this group is to create appropriate conditions for the formation of a young teacher who can remain in the institution after completing his studies at the higher education institution. Taking into account their requirements for professional training is reflected in the content of the applicant's educational trajectory. At the same time, these requirements for the university are a source for improving the educational program. An undeniable advantage of such cooperation is that the mentor already has professional and pedagogical competence. As a rule, a mentor in an educational institution is a highly qualified, experienced employee who has independently expressed a desire to transfer his own experience to the younger generation of teachers and has at least 5 years of teaching experience. The effectiveness of cooperation between a mentor from the practice base and an applicant for the State Educational Service depends on the

motivation of both parties, mutual understanding and awareness of the level of responsibility. As a result, a dual education student will adapt to teaching activities, receive proven knowledge and practical skills, gain practical experience, and learn the values of the educational institution and corporate culture.

The introduction of coaching support for professional training in an educational institution is aimed at realising the possibility of simultaneous personal and professional development of future teachers of specialised and professional training. According to O. Kurant, educational professional coaching focuses on developing professionally oriented personal and intellectual resources of future specialists, which involves the development of components of the self, as well as properties that ensure professional development and self-realisation [286, p. 189]. For this purpose, the vector of individual professional realisation of each applicant is modelled based on theoretical training and practical experience.

The process of professional training of future teachers of specialised and professional education includes the following methodological and didactic requirements. The integrity of the methodological training system, in which the forms and methods inherent in the selected educational processes are harmoniously combined (forms and methods of traditional education; forms and methods of distance learning; forms and methods of blended learning; forms and methods of dual education). The variety of forms, methods and means that must be used, taking into account the fact that future teachers learn these methodological tools both during their training and apply them during practical activities within the framework of the dual form. Therefore, with the help of a teacher, they must realise their potential and appropriately apply them independently.

Today, special attention is paid to the quality of vocational (vocational and technical) education because, in the post-war period, its graduates will be most involved in the post-war reconstruction of Ukraine. Enterprises will be restored with a modern material and technical base of modern production technologies. Therefore, in the educational aspect, when training future teachers of specialised and vocational education, it is necessary to pay attention not only to the content, forms, methods and

means that correspond to the traditional methodological system (explanatory and illustrative type of teaching) but also to modern, effective methodological systems that have arisen as a response to the demand of the time - project, modular, problem-based, contextual learning, etc. Future teachers must know the basic theories of learning and understand the feasibility of their use, which can be verified in practice.

Using the capabilities of modern learning tools that change along with the achievements of modern technologies. In this aspect, it is worth paying attention to the Agile approach, the idea of which is to gradually move applicants forward through the achievement of intermediate goals with constant monitoring of achievements. In practice, this approach assumes the presence of a set of methods that, firstly, help management manage professional training; secondly, it is focused on an adequate response to new requirements, identification of problems and feedback to determine the results of training, taking into account their dynamics. New requirements force the introduction of more modern tools that can simultaneously solve the identified problems. The effectiveness of the educational process of training is determined by feedback, which can also be obtained using modern, relevant technologies.

Consideration of different options for mastering competencies with the ability to choose the optimal one. Depending on the set of circumstances, different options for mastering competencies can be developed [280]. The conditions of the educational-scientific-industrial cluster reduce the number of options and make it possible to find the optimal option for professional training faster, as evidenced by the results of our study.

Paying special attention to educational and methodological support. The preparation of traditional educational and methodological support is long, and it is it that can lose relevance and become obsolete. Because of this, the most relevant information, taking into account external objective factors (distance learning, dual, e-learning), must be sought in other ways. However, the modular construction of educational and methodological support makes it possible to take care of the constant improvement of didactic units, especially since modern digital technologies contribute to this process. As our research has shown, in the conditions of an educational-

scientific-production cluster, mobile learning is appropriate and effective, as it allows studying individual technological operations and technological processes in an asynchronous mode, taking into account the student's own pace of learning.

Thus, based on the above, we can conclude that the training of future teachers in the context of education reform is extremely relevant. It must correspond to leading global trends: strengthening the practical orientation achieved by the dual form of education; using optimal opportunities for providing educational services, which focuses on the use of distance and online learning; maximum consideration of the needs and capabilities of each applicant, which involves the implementation of professional tests. Today, optimal conditions have been created for the training of modern teachers of specialised and professional education in the dual form in the context of an educational cluster based on higher professional schools6, based on which modern educational and practical centres are being opened. The solution to the above problem lies in an approach that takes into account three aspects: taking into account the abilities of school and college students for pedagogical work and the desire to implement them; maintaining continuity in the training of future teachers in the system of “general education school – vocational education institution – higher education institution”; providing access to modern educational and practical centres not only to students of specialised schools but also to students who are acquiring relevant pedagogical specialities. The effectiveness of the system of multi-level training of future teachers of specialised and professional education in the dual form of organising training in the conditions of a professional and pedagogical cluster will increase in combination with a system of multi-channel financing.

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