

WORLD MODELS OF DUAL EDUCATION AND FEATURES OF THEIR FUNCTIONING

^aOLHA KRAVCHENKO, ^bTETIANA STAROVA, ^cRADION NYKYFOROV

^{a,b} Kryvyi Rih Pedagogical University, 54, Gagarin Ave., 50086, Kryvyi Rih, Ukraine

^c Mykhailo Tuhan-Baranovskyi Donetsk National University of Economics and Trade, 16, Tramvaina Str., 50005, Kryvyi Rih, Ukraine

email: ^agluschenkoo@ukr.net, ^bk_chemistry@kdpu.edu.ua, ^cnykyforov@donnuet.edu.ua

Abstract: One of the modern education tasks is to provide the production sector with qualified personnel that is competitive in the labor market. Despite the high level of theoretical knowledge of the graduates of higher educational institutions, most of them have an insufficient level of formation of practical skills and abilities. Due to the lack of an effective system of interaction between "state-educational institution-enterprise", graduates' level of training does not always meet employers' requirements. This is one of the reasons for the low employment rate of graduates. In this regard, there is a need to introduce such innovative forms and approaches to organizing the educational process that would increase students' level of activity, create the conditions for their self-organization, professional orientation, self-development, and integrate theoretical knowledge with practical skills and abilities. The article reveals the essence of modern models of dual education and justifies introducing a dual form of education or its elements in higher education. The analysis of each of the indicated models was carried out.

Keywords: Dual education, Education development, Innovative forms of education, Pedagogy, Training system.

1 Introduction

There is a particular interest in the dual training system [8]. Vocational education has never been conceived without a connection with the production sphere, without a certain way of organized practice [19].

A clear distribution of responsibilities characterizes the organization of the dual system of vocational education. The main role in the field of vocational education within the dual system belongs to enterprises, that concludes an agreement with each student separately, specifically allocate the funds for the training of instructors, the mentors who provide the educational process at the enterprise, draw up an individual training plan for each student for the entire duration of the educational program, providing the practical training at the enterprise and theoretical training at a vocational school. The enterprise bears general responsibility for the student [25]. It controls the student's attendance at the school, successes under the program, and organizes the final certification (certification of qualifications) in the chamber of commerce, industry, or crafts.

Vocational schools perform a supporting function – theoretical training is carried out in them [10]. As a rule, in the dual education system, students attend an evening vocational school once or twice a week, where they receive mainly theoretical and practical knowledge related to their profession; also, they attend classes in general subjects, such as economics, social studies, and foreign languages. Systematic training in a vocational school is a necessary addition to technology-oriented training in the enterprise.

There are also professional schools with full-time education. In this case, they provide students with an internship at the enterprise or practical training in the Centers of Competence, and sometimes the practical training is carried out at the workshops of the professional schools themselves. As a rule, these are those students who, for some reason, could not conclude a contract with a particular enterprise; often, they are the so-called "difficult" teenagers from disadvantaged families [21]. At the same time, a full-time vocational school may be attended by pupils who have not completed a full secondary education (it is compulsory in the dual system of education) and/or whose profession requires reaching the age of majority [23]. In this case, the enterprises are interested in students receiving full secondary education during the year and then have been studying at the enterprise. As already noted, professional

schools carry a socializing, cultural and educational function. Pupils (students), while visiting a professional school, have an opportunity to participate in amateur performances, sports competitions, excursions, and foreign trips.

The third possible participant in the training process is the Competence Center [9]. This is a fairly common case when a student receives the program's theoretical part in a professional school, initial professional skills in the Competence Center, and basic practical training in the enterprise. In this case, the number of weeks spent in the Competence Center decreases every year of training in favor of the enterprise.

2 Literature Review

Socio-economic changes in modern society require such transformations in the higher education system that able to improve specialist training quality [13, 14, 15]. It is worth agreeing with the opinion of academician N. Nichkalo, who believes that "each stage of society's development has its socio-economic problems. Their solution requires new approaches that take into account the dynamics of changes in the life of various social systems" [22, p. 136]. One of the conditions for the modernization of higher education in Ukraine is the strengthening of cooperation between educational institutions and the production sector (enterprises, organizations). That is, there is a need to create a modern pedagogical model for training specialists in accordance with the requirements of employers, that is, with real production conditions. One such model is the dual form of education.

The professional skills and abilities should be formed in the conditions of a real production process [20]. We believe that the introduction of the elements of the dual form of education is the pedagogical innovation that allows us to combine the theoretical and practical, audience and distance components of the educational process.

According to the UNESCO International Standard Qualification, dual education is "an organized educational process combining part-time employment of a student at work and part-time education in the university system" [29].

The dual learning system is the most common and popular in society, among young people, and professional education trajectory in Germany. In no country in the world has it been possible to repeat the German dual system itself [25].

The German dual system, its popularity, stability, and efficiency are based on centuries-old traditions and deep philosophical roots. In the very distant past, impoverished Germany, which was exhausted by the thirty-year war, had to find an instrument of competitiveness with England and France in order to survive. And the tool began to be built on the basis of studying the best ideas of neighboring European countries and their own traditions.

The idea of an "industrial school" as an association of adults where children can learn based on the principle of combining mental and physical productive labor [22].

The idea for high-quality familiarization of children with crafts is that there is a need for full days of practice several times a week [24]. Now, this is one of the main elements of the German dual system – two days of theoretical training in a vocational school and four days of practice at the workplace at the enterprise [25].

The idea about the self-sufficiency of the manual labor of children for the scientist himself ended in collapse – the children were too small by age and the school organized by Pestalozzi fell into decay. However, in modern Germany, the balance between a scholarship to students at the enterprise and the quality of their

work from the second year of study of three, allows enterprises to recoup their tuition costs.

The dual system has grown from the consistent development of the best ideas in pedagogy and economics, aimed at solving the problem of training qualified personnel as the basis for the competitiveness of a country [27]. The quality and well self-sustaining labor force become the key to the prosperity of the State [1]. This goal forced the search for new methods of education, combined with the efforts of enterprises, schools, and state authorities.

The acquisition of knowledge through personal observations, personal experiments in the process of their work is something that is completely not taught during education or, at best, what they look at as something secondary [18]. This is because they still stand on the point of view of school science and "see the main task of education in teaching", wrote the German scientist Hoisinger back in 1798. As I.G. Fichte considered, not the knowledge itself, but behavior following the knowledge and the activity determines the value of a person. These ideas are seen in the modern principles of the German dual system "learning through action", "learning through the process".

For example, Siemens's modern training center uses the project method as its main activity. Students from the second semester of the first year have already completed projects in subgroups. They are given certain funds for the independent purchase of materials, and these expenses need to be calculated, justified. They can independently complicate the task and find ways to solve it while using computer programs (for example, drawing – CAD), programming since the work requires operations on software-controlled machines. Students receive advice in physics, mathematics, and chemistry if it is needed. They are highly motivated to learn, as they need effective mastering of theory to solve a general practical problem. They themselves prepare all the project documentation, including drawings, calculations, performance reports, and presentations.

Meaningful action is important, which leads to a qualitative result due to the conduct of a high-quality process of the activity [17]. In German traditions – craft guilds, associations of people of the profession, transferring their skills from generation to generation, people of entrepreneurial, they are able to conduct their business from the purchase of raw materials and tools to the sale of finished products; people who jointly solve the problems of developing the profession, preparing their own shift. The craftsmen in Germany were considered the foundation on which all classes hold, hence the special respect for them in society, the pride of artisans for belonging to the profession. The concern about the collapse of this foundation due to the development of manufacturing, where the worker performed only one recurring function, was expressed in the works by K. Marks and F. Engels. Despite the fact that they have never written any works on pedagogy, their idea of a harmoniously developed person was picked up not only in Germany but also in many other countries. It was one of the leading ideas of Soviet pedagogy.

3 Materials and Methods

We analyze the features of the functioning of various models of the dual form of education:

1. Duty pattern. Students are trained according to the scheme: the theoretical cycle of training, the acquisition of theoretical knowledge, elementary skills and abilities takes place in an educational institution, and the formation of complex skills and abilities – at the workplace. University (theoretical) education periods alternate with practical training periods at the enterprises. This dual education model strengthens the practical training of university graduates.

2. Dual consortium model. This model includes a theoretical (remote) part of the training, based on Internet technologies and a practical component, implemented in production. Theoretical training takes place in the evening, obtaining practical skills and abilities in the workplace during the day. The implementation of

such a dual education model allows a significant reduction in the length of study.

3. Higher education is integrated with professional activities. The indicated model of dual education allows specialists with professional education, who have been working at the enterprise for many years in any specialty, to receive higher education in a certain direction. Training, according to this model, provides for the retraining of specialists in related specialties, ensures the continuity of the educational process.

4. Sandwich education – provides for the alternation of periods of theoretical and educational-industrial (production) training. The theoretical part of such training takes place in an educational institution, while the educational-production or production part takes place in dual enterprises, institutions or organizations. Sandwich education is an innovative form of study, mainly at the undergraduate level, "the educational process is carried out for four years. Of these, a student has been studying at a higher educational institution for three years, one year at a university in another country, or interns at an enterprise or firm" [10].

Alternation of study periods is practiced in educational institutions around the world [28]. In particular, in the UK and France, there are "sandwich courses." Two years of study at the university alternate with a year of professional practical training at work, then a year again of theoretical study at the university, which alternates with industrial practice.

5. Co-operative learning, which is widely practiced in educational institutions in the USA and Canada. The training of specialists in this dual education model determines the cooperation of an educational institution and a company or enterprise where the practical component of the training takes place. The number of companies or enterprises that are dual partners of an educational institution can reach several thousand. This model of dual education has gained wide recognition in the USA, Canada, and France [9].

Co-operative education was introduced in Germany as a model of learning, integrated with work. The goal of *Berufsakademie* was to consider the implementation of the traditional German system of dual education in higher education [6].

4 Results

The objectives of each of the indicated models of dual education are to eliminate the shortcomings of traditional education, to bridge the gap between the theoretical and practical training of future specialists, to improve the quality of training of student youth, taking into account the requirements of employers and leading trends in the labor market [28].

Among the expected results of the implementation of the indicated models of the dual form of higher education can be noted:

- Development of a system for forecasting the needs of the labor market for skilled personnel [7];
- Co-financing of education by the State and enterprises [16];
- Development of a system of independent assessment of the quality of training of graduates;
- A significant increase in the quality of the educational process;
- Development of new forms of education.

Now, in Ukraine, events are being held to introduce dual models of obtaining education in a bachelor's degree at a higher school (sandwich education, duty model). The effectiveness of the implementation of these dual education models depends on forecasting the needs of the labor market in specialists of certain specialties, ensuring the training and retraining of teachers of a higher school, and developing the system of professional self-determination of students.

5 Discussion

We believe that the main task of introducing the dual form of education or its elements is the integration of the theoretical and practical components of the educational process to increase the competitiveness and quality of training of future specialists.

The need to introduce a dual form of higher education or its elements in higher education is due to several factors:

- Lack of motivation in the modern education system to develop practical skills in the labor market [1, 3];
- Limited possibilities of the practical component of the educational process [12];
- Lack of uniform requirements for the competence of graduates by higher education institutions and employers;
- Separation of educational institutions from the production process;
- Lack of effective mechanisms for integrating educational institutions into relations with enterprises, organizations, and firms.

That is, the dual form of obtaining an education is interconnected with the trends in the development of society and the needs of the labor market in highly qualified personnel [5, p. 284].

The combination of theoretical training with the practical activity of students in the workplace is not an innovation. Institutions of higher education for many countries of the world (Germany, Austria, France, the Netherlands, the USA, Poland, Kazakhstan, and Canada) dominate the practical component of the educational process.

By analyzing the features of dual educational models in different countries of the world and the positive experience of their functioning, it is possible to form the theoretical foundations for increasing the competitiveness of the higher education system:

1. Integration of the theoretical (formal) component of the educational process in the institution of higher education and the practical (non-formal), which is happening at the enterprise. Improving the innovation activities of higher education institutions through the introduction of elements of duality;
2. Optimization of the structure and activities of higher educational institutions by the requirements of the labor market and its dynamic changes;
3. Assessment of competencies of graduates according to the requirements of potential employers;
4. Improvement of financial and economic mechanisms in higher education institutions;
5. Ensuring continuous professional self-development and self-improvement of enterprise specialists through interdisciplinary knowledge acquisition during advanced training.

Today, it is necessary to form a wide range of mechanisms for cooperation between business and educational institutions so that future specialists can obtain the necessary skills directly at enterprises, and those who are already working can improve their qualifications, change their profession, and the sphere of activity if necessary. We need to think about how to revive the institution of mentoring. Many of those who work successfully in production today have already passed this school, and today we need the modern forms of the experience transfer at the enterprises.

It is not someone's corporate or private task to make training for highly skilled workers, for example, the engineering personnel for the real economy [11]. It is a national necessity, one of the main conditions for a significant increase in labor productivity, and this is one of the key development tasks. The dual education system involves the co-financing of job-specific training programs by commercial enterprises, which are interested in skilled personnel and regional authorities, which are interested in economic development and improving the living standards in the region.

6 Conclusion

To conclude, it should be emphasized that the main elements that together give a dual system are difficult to separate from each other and require balanced, thoughtful decisions from top to bottom [4]. The system is based on the philosophical relationship of goals and the tools for their achievement, where, it would seem, the obvious pragmatism turns into a concern for a person.

The strategic goal is the competitiveness of the economy, diversification, and high quality of products is supported by the historically established idea of developing the middle class [6], skilled and entrepreneurial workers, as the basis of statehood and stability. To achieve the goal, the necessary tools are built. At the management level, there is collegial decision-making and the division of functionality. It needs to ensure the quality of training results between the authorities, enterprise, and center of competence, professional school, chamber of commerce, and industry. Also, a well-designed and developed system of vocational guidance and professional self-determination is needed, as well as the following points:

- Ensuring scientific and methodological support of the educational process at all its stages;
- The formation of general didactic principles of training through action and process, based on the meaningful performance of work tasks, which provides a qualitative result of professional activity;
- Attention to the aesthetics of labor, its conditions (from the workplace to the appearance of the worker);
- Observance of principles of independent assessment of the learning results of both students and teachers.

Special attention to the institution of mentoring: on the one hand, high requirements for competencies enshrined in official documents at the federal level, on the other hand - ensuring a sustainable positive image, prestige in society, and career growth.

The study of international experience in dual education models' functioning makes it possible to determine the most promising ways to integrate the domestic education system, the labor market, and production.

The introduction of the dual form of higher education forms and improves society's productive forces, ensure the development of the education system, exports of educational services, and update the accumulation of knowledge and skills of students [2].

Literature:

1. Aasebo, T.S., Midtsundstad, J., & Willbergh, I. (2015). Teaching in the age of accountability: Restrained by school culture? *Journal of Curriculum Studies*, 49(3), 273-290. DOI: <https://doi.org/10.1080/00220272.2015.1072249>.
2. Abashkina, N.V. (1998). *Principles of development of vocational education in Germany*. A monograph. Kyiv: Higher School, 207.
3. Aini, N.A., Sunardi, S., & Sunardi, H. (2017). Student's Mathematics Creative Thinking Skills in Terms of Logical Mathematical Intelligence. *International Journal of Science Research and Management (IJSRM)*, 5, 6930-34. DOI: <https://doi.org/10.18535/ijrm/v5i9.01>.
4. Apergis, N. (2018). Education and democracy: New evidence from 161 countries. *Journal of Economic Modelling*, 71, 59-67. DOI: <https://doi.org/10.1016/j.jeconmod.2017.12.001>.
5. Astakhova, V.I. (2006). *Continuing education in the context of educational reforms in Ukraine*. A monograph. Kharkiv: Publishing house of NUA, 299.
6. Darbi, W. (2012). Of mission and vision statements and their potential impact on employee behaviour and attitudes: The case of a public but profit-oriented tertiary institution. *International Journal of Business and Social Science*, 14(3), 95-109.
7. Denig, S. (2004). Multiple intelligences and learning styles: Two complementary dimensions. *The Teachers College Record*.

- 106(1), 96-111. DOI: <https://doi.org/10.1111/j.1467-9620.2004.00322.x>.
8. Fatimah, M. & Utama, A. (2020). Religious culture development in community school: A Case Study of Boyolali Middle School. *Central Java, Indonesia*, 8(2), 381-388. DOI: <https://doi.org/10.18510/hssr.2020.8243>.
9. Göhringer, A. (2002). University of Cooperative Education. Karlsruhe: The Dual System of Higher Education in Germany. *Asia Pacific Journal of Cooperative Education*, 3(2), 53-58.
10. Grigorieva, N.V. & Shvets, N.A. (2016). A model for training specialists in a dual learning environment. *Modern problems of science and education*. Available at: <https://science-education.ru/ru/article/view?id=25763>.
11. Grow, G. (1995). *Writing and the Seven Intelligences*. Dated on 14 November, 2015. Available at: www.bookzz.com.
12. Gul, R., Kanwal, S., & Khan, S.S. (2020). Preferences of the Teachers in Employing Revised Blooms Taxonomy in their Instructions. *SJESR*, 3(2), 258-266. DOI: [https://doi.org/10.36902/sjesr-vol3-iss2-2020\(258-266\)](https://doi.org/10.36902/sjesr-vol3-iss2-2020(258-266)).
13. Imashev G., Kuanbayeva, B., Rakhmetova, M., Uteshkaliyeva, A., Tumysheva, A., Mardanova, L., Turkmenbayev, A., & Abdykerimova, E. (2020). The implementation of the specialized-education model at the present stage. *Ad Alta-Journal of Interdisciplinary Research*, 10-13.
14. Imashev, G., Kuanbayeva, B., Rakhmetova, M., Uteshkaliyeva, A., Karimova, A., Turkmenbayev, A., Zhanuzakova, Z., Shyganakova, A. (2020). Socio-economic basics of schoolchildren's polytechnic training in the modern industrial environment. *Ad Alta-Journal of Interdisciplinary Research*, 14-17.
15. Imashev, G., Kuanbayeva, B., Rakhmetova, M., Salykbayeva, Zh., Tulegenova, A., Turkmenbayev, A., Abdykerimova, E., & Mardanova, L. (2020). Specialized Education as a New Stage in the Improvement of Modern Education. *Ad Alta-Journal of Interdisciplinary Research*, 6-9.
16. Indrawati, N. (2014). Management by inspiration: Implementation of transformational leadership on business at Pondok Pesantren) Sunan Drajat. *Procedia – Social and Behavioral Sciences*, 115, 79-90. DOI: <https://doi.org/10.1016/j.sbspro.2014.02.417>.
17. Isaacs, A.C. & Carroll, W.M. (1999). Strategies for basic-facts instruction. *Teaching Children Mathematics*, 5(9), 508.
18. Jordan, A., Lindsay, L., & Stanovich, P.J. (1997). Classroom teachers' instructional interactions with students who are exceptional, at risk, and typically achieving. *Remedial and special education*, 18(2), 82-93.
19. Kornhaber, M.L., Fierros, E.G., & Veenema, S.A. (2004). *Multiple intelligences: Best ideas from research and practice*. Allyn & Bacon.
20. McCafferty, M. (2018). Kokomo: The history and meaning of a remarkable and elusive. *Journal of Onomastics*, 66(2), 75-84. DOI: <https://doi.org/10.1080/00277738.2017.1415535>.
21. Mulyasa, H.E & Aryani, W.D. (2017). Developing religious culture in school. *The International Journal of Scientific & Chnology Research*, 6(7), 263-267.
22. Nychkalo, N. (2007). Vocational education and training: problems of the relationship with the labor market. Formation of a broad qualification of workers. The contribution of the Planning and technical department to the development of labor potential of the XXI century. *Collection of training materials prepared as part of the implementation of the Ukrainian-German project "Support to the reform of vocational education in Ukraine"*. Nizhyn: LLC Aspect-Polygraph, 134-148.
23. Patriadi, H.B., Bakar, M.Z., & Hamat, Z. (2015). Human security in local wisdom perspective: Pesantren and its responsibility to protect people. *Procedia Environmental Sciences*, 28, 100-105. DOI: <https://doi.org/10.1016/j.proenv.2015.07.015>.
24. Quay, J. (2016). Not “democratic education” but “democracy and education”: Reconsidering Dewey’s of misunderstood introduction to the philosophy of education. *Educational Philosophy and Theory*, 48(10), 1-17. DOI: <https://doi.org/10.1080/00131857.2016.1174098>.
25. Schipper, T.M., De Vries, S., Goei, S.L., & Van Veen, K. (2019). Promoting a professional school culture through lesson study? An examination of school culture, school conditions, and teacher self-efficacy. *Professional Development in Education*, 1-18. DOI: <https://doi.org/10.1080/19415257.2019.1634627>.
26. Sharma, S. (2019). Democratic values, freedom, control, and life satisfaction. *Economic Affairs*, 64(1), 217-231. DOI: <https://doi.org/10.30954/0424-2513.1.2019.26>.
27. Stegman, H. (1986). The dual system in focus: structures, developments and future problems in in-company vocational training in materials from the labor market and occupational research. *Nurnberg*, 9.
28. Tereshchenkova, E.V. (2014). Dual education system as the basis for training specialists. *Concept*, 4, 41-45.
29. UNESCO. (2012). *Lack of education contributes to the crisis*. Available at: <https://www.dw.com/ru/unesco-education-facilitates-crisis/a-16307327>.

Primary Paper Section: A

Secondary Paper Section: AM