

**The development of professional training of students
in the dual system of education**

Yu. N. Petrov, A. Yu. Petrov, N. S. Petrova

Abstract

This article summarizes studies on the development of vocational training of students in the dual system of education, since students development today is characterized by rather contradictory trends.

Experimental procedure is a complex use of interviews, methods of observation, testing, and surveys. The real state of the pedagogical issue as the development of vocational training of students in the dual system of education has been studied earlier. we found out earlier. The essence and significance of self-regulation in the professional activity of students, especially in the dual education system has not been fully developed yet. The sphere of self-regulation allows everyone to learn how to manage their states, and regulate your mental and physical state to achieve success in life. Scientific novelty is grounded in the methodological basis of the research, which describes the activity of a learner in the dual system of education as a process of managing the forms of external and internal activity, as well as its organization and structuring aimed at achieving goals.

The study has paid attention to the awareness of activities, that allows students to assess their own state in the process of professional training more accurately and make the right decisions. Much attention is paid to the practical significance of conscious activity, which brings "ideas perceived by the mind as a reflection on their own internal activity." We single out a concept that would point to the human relations, revealing opportunities to rise above one's inner states and see them from the point of view of an external observer.

The results of the research article were discussed at the meeting of the Council of the Faculty of Professional Technological Education of the Nizhny Novgorod Institute for the Development of Education, at the meeting of the Department of Decorative and Applied Art and Design of the Nizhny Novgorod Pedagogical University

and the joint meeting of the Methodological Council of Professional Educational Organizations - Nizhny Novgorod Radio Technical College and Sormovo Mechanical College. Accepting the emergence of conscious professional activity, individual components of the learner's life activities, such as thinking, has become an object of self-knowledge, and the thoughts about goals, utterances and inner state allow students to progress in their professional lives.

Key words: professional training of students, a dual system of education and development of students

Introduction

This article is devoted to the special role of the functional part of life-sustaining activity in the professional dual training of learners, the theoretical aspects of the ability of learners to analyze their actions and relationships through awareness of activities, as the issue of essence identification of the sphere of self-regulation when training students in the dual system of education has not been paid sufficient attention to from the pedagogical science. A professional school with highly qualified teachers conducts professional training, which is related to technological experiment and design, as it is necessary for small and medium-sized enterprises that do not have an opportunity to create highly developed forms of training for skilled workforce.

Literature review

In pedagogy, the concept of "dual system of education" was firstly used in the mid-1960s in Germany to define a new form of organization of vocational training. A. Shelton highlights the following distinctive features of the dual system of vocational training [15]:

–pedagogical interaction of two work training environments, an enterprise and a vocational school, takes place in the dual system of education;

–in a professional educational organization, training is conducted during classes in study rooms, and at industrial enterprises' educational workplaces;

–at an industrial enterprise, training is of a professional and practical nature, while in a vocational school it is practical and theoretical and provides for the continuation of general education.

In modern production professional qualifications become more and more theoretical and the difference in the learning process is not evident. In the past it was obvious that "what" and "how" was acquired at the industrial enterprise, and the professional educational organization answered the question "why", today knowledge and experience at the industrial enterprise can be transferred only with increasing theoretical content. Theoretical training in a professional educational organization becomes more complex and needs a direct, action-oriented transformation: classroom instruction should be conducted on practical examples to obtain feedback for theoretical reasoning, therefore these forms of education intersect, and this intersection has led to practice-oriented training in special classrooms equipped like professional laboratories [9].

Various methods and means of teaching are used in the dual system of education depending on the curriculum of the training module. If you want to choose a particular class, you should consider relatedness, simplicity and interest. Our study has revealed that technological organization is the core of the educational process of dual training. B.S. Gershunsky[6] describes it in the following way : "The pedagogical process takes place in certain organizational forms (individual, group, collective) involving a wide variety of means of education - educational and methodological texts, visual aids, computers with appropriate technical and program-pedagogical support, technical audio and video equipment, telecommunication equipment, etc. In addition, the educational process is specific for its purposefulness. It depends on the goals set and the expected results of educational activities according to content and organization. In this respect , we can speak of a fairly rigid technological development of this process, since the activity of the teacher is fundamentally determined by the primary need to achieve the goals of teaching, , educating and developing the trainees in the organic trinity of these complementary pedagogical actions, in their integrity. "

Materials and methods

The methodological basis of the study was:

- theoretical and methodological analysis of national and foreign methodological literature, a conceptual analysis of scientific articles on the problem concerned;
- study and generalization of both domestic and foreign developments and the introduction of projects on the development of vocational training of students in the dual system of education;
- application of methods of generalization, comparison and forecasting.

The diagnostic tool used allowed to form pedagogically grounded individual routes of educators in the dual system of training highly qualified specialists.

According to legal regulation and legal control there are two components of the dual system of vocational training, since this system has two major advantages.

Firstly, vocational training in the dual system is associated with professional practice, but professional and practical knowledge and experience can be obtained in the training workshop of a professional educational organization, however, practical knowledge in the training workshop can only be copied and not actually apply. Depending on reality, it is possible only at the industrial enterprise. It should also be noted that technological changes that occur in modern production of the industrial enterprise are taken into account and are immediately introduced into vocational training. An industrial enterprise to survive, manufactures products in accordance with the needs of the market, so it requires an immediate introduction of new technology, which can easily find access to professional education, while the school system of vocational training practically does not respond to technological changes in the industry.

Secondly, the dual system of vocational training increases its educational value, since young people enter the adult world early. Trained in specific production situations: in a workplace, in a work team, through his work he learns a lot about other people, about production drawbacks, and also about the production of a professional organization itself. In an industrial enterprise, a learner is not simply a learner, but an independent person who must be responsible and creative. During professional training, he really learns to build relationship that he can build in the system of schooling

for a full academic week. Professional relations are functional and pedagogical, however, school cannot establish them.

The above mentioned advantages of the dual system of professional training make it possible to single out a feature that arises interest among educational managers in other countries: to cover expenses for the professional training of highly skilled workers [11]. In some countries, the cost of vocational training is fully covered by the state, as well as for the school system of education, at the same time imposing strict financial constraints. The rapid implementation of breakthrough technologies in vocational training, requires substantial financial investments, in this respect the invariant characteristics of the dual system of vocational training prove its viability as a model for organizing a system of professional education at any level. The special significance of the dual system lies in the fact that it allows to remove the gap in the relations between the production and educational systems of training highly qualified professional staff, which, as practice shows, is the objective reality of the professional situation in Russia . Coordinated interaction will make it possible to bridge the gap between production and educational structures, since professional staff are trained to ensure production, and this is the most acute problem. The quality of training highly qualified specialists depends on the right solution of this problem .

The state is interested in the development of the dual system of education, since it develops the production sphere and allows to meet the needs of production and society.

Необходимым условием реорганизации учебного процесса является пересмотр содержания обучения в дуальной системе в соответствии с теоретико-методологической основой, а это позволяет отнести дуальную систему к системе активных инновационных поисков отечественных педагогов [15]. A necessary condition for the reorganization of the educational process is a reevaluation of the content of training in the dual system in accordance with the theoretical and methodological basis, and this allows us to classify the dual system as a system of active innovative studies of domestic educators [15].Заслуживает внимания двойственная сторона содержания обучения в дуальной системе подготовки обуча-

ющихся – это социальный опыт и деятельность обучающихся с этим опытом, организованная педагогом. The dual content of instruction in the dual system of training students is worth paying attention to. It reflects social experience and implementation of this experience organized by the teacher.

The core of the content of the learning process is the quality of self-organization, which gives meaning to the subjects studied, and an -activit system learning of the content in dual education makes it possible to use active pedagogical forms. This problem is quickly resolved by modern pedagogy, as a lot of various forms of education are accumulated, ensuring the activity of the student in the educational process.

The dual training in the educational process requires various types of teaching technologies to implement the content of professional disciplines and to build relations between a teacher and a student. Therefore, based on the technological approaches known in the world of pedagogy, two fundamentally different groups can be distinguished. These two approaches solve the problem of innovative vocational training of dual professional education.

The development and self-development of students creativity in the altered content and technology of the educational environment under dual professional training require a new goal-setting strategy. [9]. An important didactic condition for the innovative technological organization of the educational process in the dual system of vocational education is training a new type of a teacher for a professional educational organization. Innovative technological implementation of dual professional education has been established in the natural-reflective technology of human self-development.

The didactic approaches that correspond to the goal-setting and practical-oriented principles of building a dual system of vocational education in a professional educational organization, make it possible to implement this system in the field of professional education. It should be noted that the main conditions for this implementation are the cultivation of a professional teacher and a system of modular content of training, as well as the technological development of practice-oriented educational

relations in the educational and production environments of a professional educational organization and an enterprise.

The activity of the professional educational organization in the dual system of vocational education according to the practice-oriented and didactic bases is connected with the content development and the structure of vocational training of highly qualified specialists, considering the conditions of this educational environment.

Having analyzed and comprehended the issues of professional training of highly qualified specialists, we used a systemic approach in the dual system of vocational education, which represents it in the form of successive stages interconnected by repeated cycles. These stages are the analysis of needs and programs development, implementation and evaluation.

Results

The analysis of the research activities of students has revealed that the content of vocational training plays the role of vital activity.

Analysis of the results of training in the dual system of education highlights the modular structuring of the content, allocates knowledge that form the scientific theory, convenient for being stored in the long-term memory of students, therefore such knowledge is the subject basis of competence in the content domain.

Our research has shown that the wide application of system-modular organization of the content under different approaches raises the problem of identifying modules that meet the goals of structuring a dual system of vocational education. These goals focus on structural interactions of professional environment.

The systematic approach makes it possible to understand the stages from the definition of the requirements to the result of the completed program, and therefore the preparation becomes manageable and operational, and it gives an opportunity to imagine how all the stages are interrelated.

The opportunity to achieve goals and independently manage educational activities, that is, to develop the ability to learn has become an urgent problem in the dual system of education [2; 3]. Reflection helps to understand educational possibilities. It allows students to search for ways and means to solve educational problems, and also

develop an individual capacity for self-change. It helps understand the importance of the dual learning process, where reflection becomes the main factor in the development of student self-regulation. It is proved that this phenomenon in the life activity is the core for self-development of the individual, therefore the process of skills development is not complete unless there is a reflective component [18]. It should be noted that student's development as a subject of educational activity is possible when self-regulation is formed during the process of reflexive preparation and further life activity.

Discussion and Conclusions

The discussion of the research outcomes related to the theoretical and practical training of students was carried out by stages. Two professional educational organizations took part in the experiment such as the Nizhny Novgorod Radio Technical College and the Sormovo Mechanical College (engineering specialties), with a total of about 100 people. The curriculum and the content of the training have been changed based on the results of the research.

The technology of managing social and professional relations in the learning process has become the determining didactic condition for the implementation of a dual system of vocational education.

Scientific attitudes regarding the awareness of professional activities in our life allow us to make a conclusion that we accept conscious professional activity as the basis for the formation of a self-regulatory component, that manages through purpose, analysis, planning, control and evaluation.

References

1. *Anokhin, P. K.* Fundamental problems of General theory of functional systems. Principles of the system organization of functions / P. K. Anokhin. – M. : Pedagogy, 1973. – 323 p.
2. *Barmin, N. Yu.* Adult education in the new economy: socio-philosophical aspect : monograph / N. Yu. Barmin. – N. Novgorod : NIRO, 2010. – 155 p.
3. *Bahtigulova, L. B.* Psycho-educational workshop, as an innovative form of education / L. Bahtigulova // Forestry Bulletin. – 2013. – № 5 (97). – P. 169–172.

4. *Bechtold, A. E.* The dual training: the experience of Germany and the Russian realities / A. E. Bechtold // Production management. – 2008. – № 1 [Electron. resource]. – Access: <http://www.up-pro.ru>.

5. *Bukhalkov, M. I.* Human Resource Management : A Textbook / M. I. Bukhalkov. – M. : INFRA-M, 2012. – 400 p.

6. *Gershunsky, B. S.* Educational-pedagogical prognostication: theory, methodology, practice : textbook / B. S. Gershunsky. – Moscow : Flint ; Science, 2003. – 764 p.

7. *Derevianko, V. A.* An Integrated assessment of health when mental and physical labor: methodical recommendations / V. A. Derevianko, V. K. Huhlaev, etc. – M. : Economics, 1976. – 76 p.

8. *Petrov, A. Y.* Designing the content of adult supplementary education / A. Y. Petrov, M. N. Bulaeva, K. E. Klychkov // In the world of scientific discoveries. – 2014. – № 11.7 (59). – P. 2568–2580.

9. *Petrov, Y. N.* Continuing professional education: theory, problems, forecasts : monograph / Y. N. Petrov. – M. : Vldos, 2006. – 332 p.

10. *Petrov, Y. N.* The foundation of vocational education – content : educational-methodical manual / Y. N. Petrov, A. Yu. Petrov. – N. Novgorod : NGPU im. K. Minina, 2012. – 137 p.

11. *Petrov, Y. N.* Method of evaluation of overall health of the person : patent of Russia № 2354282 / Y. N. Petrov, F. G. Alikperov, T. E. Egorova, M. M. Sedikh. – B. i., 2009. – № 13. – 16 p.

12. *Petrov, Y. N.* The dual system of engineering and teacher education – innovative model of modern professional Obration / Y. N. Petrov. – N. Novgorod, 2009. – 280 p.

13. *Petrov, Y. N.* Designing of working capacity as a way to increase the professionalism of the teacher / Y. N. Petrov, A. H. Shklyar, M. N. Bulaeva // Innovations in vocational and vocational education : materials of the 21st International Scientific and Practical Conference, 2016. – P. 284–287.

14. *Chapaev, N. K.* The integration of education and production: methodology, theory and experience / N. K. Chapaev. – Chelyabinsk : CHIRPO, 2007. – 408 p.

15. *Sheltie, A.* Introduction in professional pedagogy: Teaching aid / A. Sheltie. – Ekaterinburg : Izd-vo Ural. gos. prof. ped. un Press, 1996. – 288 p.

16. *Domer, P.* Self-reflection and problem-solving / P. Domer // Human and artificial intelligence. – Berlin, 1978. – P. 101–107.

17. *Veenman, M. V. J.* Metacognition and learning: conceptual and methodological considerations / M. V. J. Veenman, B. H. A. M. Van Hout-Wolters, P. Afflerbach // Metacognition and Learning. – 2006. – № 1. – P. 3–14.

18. *Hassin, R. R.* Nonconscious control and implicit working memory / R. R. Hassin, J. S. Uleman, J. A. Bargh (eds.) // The New Unconscious. – N. Y. : Oxford University Press, 2005. – P. 196–224.

19. How the dual system – practical vocational and academic – works in Germany. – Bonn, Germany : BIBB, 2012. – 31 p.

20. Ordinance on Vocational Education and Training in the Occupation of Mechatronics Fitter (English Version). – Bonn, Germany : BIBB, 2013. – 41 p.

Affiliation

Petrov Yurii Nikolaevich, ORCID: 0000-0002-0614-385X

Doctor of pedagogical sciences, professor, the head of the design and network center of education of specialists of NNIED professional educational organizations

,Nizhny Novgorod , t. 8 910 790 01 06

petrov.43@mail.ru

Petrov Alexey Yur'evich, ORCID: 0000-0001-7402-1814

Doctor of pedagogical sciences, professor , dean of the faculty of professional technological education NNIED t. 8 910 121 03 55

a.j.petrov@niro.nnov.ru

Petrova Nina Sergeevna, ORCID: 0000-0001-8875-367X

Candidate of pedagogical sciences, associate professor ,the department of applied art and design, Kozma Minin Nizhny Novgorod State Pedagogical University, Nizhny Novgorod, t. 8 987 753 68 92

dnspetrova@mail.ru

Co-authors' input

Petrov Yu.N. – scientific supervision, critical analysis and text revision

Petrov A. N. –work on the draft text, the performance of the experiment

Petrova N. S. – data collection, the performance of the experiment