



Pedagogical Technologies of Oil and Gas Education in the Study of Theoretical Material

Sagdullaeva F. B.

Teacher, Karshi International University

Abstract: The article examines the issue of selection of pedagogical techniques in oil and gas education in study of professional disciplines. Based on the analysis of the special aspects of the oil and gas industry the author determines the composition of controversial components of professional competencies. Substantiation is made of the conclusion on the priority of organization of student activity on execution of logical-technological analysis of the educational material. The complex of the aforementioned actions is determined only in a general form and requires further concretization in organization of education of each separate discipline (module). The main contribution to the pedagogical science is the description of the composition of the logical-technological analysis of educational material studied in the professional disciplines of oil and gas training.

Key words: oil and gas formation, training activities, logical-technological analysis, educational material, bearing components of competence, scientific and technological awareness, professional competence, regulatory logic and technological analysis, illustrative logical-technological analysis.

Learning activities of students in the modern system of education are considered in the format of learning outcomes and the main goal of higher education is the formation of professional competencies. Understanding of educational material is characterized by those mental actions, which the student can perform using the content components of this material. Therefore, the degree of mastering (understanding) of theoretical material is characterized by such a level of knowledge operation, which provides reformulation of knowledge, establishing connections between concepts, constructing correct judgments, giving examples and counter-examples, and so on. This is what students' activity should be aimed at. According to psychologists (S. L. Rubinstein, A. N. Leontiev, G. S. Kostyuk, etc.), "in order for the student to really engage in the work, it is necessary to make the training tasks set in the course not only understandable, but also internally accepted by them, i.e., that they assume significance for the student" [9, p. 81]. Thus, the more productive the learning is, the better the learning motivation is, because "comprehension of material is always characterized by a certain orientation" [7, p. 197] and depends on "how the student understands the task set for him (her)"; it determines "the nature of the mental processes that are activated in this case". [7, p. 199], because conscious learning of material requires "a clear understanding of why we need to learn" [8, c. 377].

The current situation in Uzbekistan is characterized by rapidly changing content and working conditions, requiring specialists of all levels of professional mobility, rapid adaptation to new realities, and compliance of professional qualities with the needs of production and society as a whole. Often there is a need to reorient the professional activities of specialists, retrain them, receive additional professional education and higher education in the specialties that are in demand in a particular region. In the oil regions of Uzbekistan, such specialties are "Development and operation of oil and gas fields", "Drilling of oil and gas wells", "Design, construction and operation of gas and

oil pipelines and gas and oil storage facilities". In the conditions of the rapidly developing oil industry in the republic, higher education is the most relevant for the following reasons: employees of enterprises will have an expanded range of knowledge and the opportunity to apply them in their professional activities. One of the most important is the task of organizing targeted vocational education that provides training for the adult population in a shortened time (correspondence education based on existing higher education). Such education has a number of advantages: short deadlines, the ability to take into account the specifics of adult students, flexible response to changes in the situation on the labor market, and close ties with the employer [3, P.97]. The effectiveness of the training of a petroleum engineer in the adult education system is associated with an innovative educational process.

The main difference between the innovative educational process and the traditional one is that it sets other goals and values of education. They are not only the knowledge, skills and abilities necessary to perform certain functions of professional activity (design, constructive, gnostic, etc.) and solve professional problems. Knowledge and skills are important not in themselves, not as the ultimate goal of training, but only as a means of achieving a more significant goal - the formation of an active creative, creative activity of a specialist. And this means that activity comes to the fore in the educational process. And the world should be presented to the future specialist not as a system of knowledge, but as a field of activity. Innovative educational process in cooperation with research and production processes create conditions for the training of specialists on the basis of activity. It is legitimate to consider that innovations in the educational process are actions aimed at meeting the new need for training specialists capable of accelerating the development, transfer, implementation of new types of equipment, new technologies, and the production of new high-tech products demanded by the consumer. Innovations in the educational process are necessary when there are contradictions, problems, an objective need to search for new ideas, new means, ways to solve emerging problems [6, P. 203]. As follows from the above, innovation in the education system should take place in all the main areas of its activity.

Relevant is the need for a scientifically based approach to resolving the contradictions that appear in the process of professional training of petroleum engineers in the adult education system. The most significant of them for the research problem are the contradictions between the urgent need to design a professional training process that makes it possible to train a specialist in the education system that meets the increased needs of the modern oil and gas industry, and the insufficient development of pedagogical conditions for the professional training of petroleum engineers in the adult education system [4, P.57]. This contradiction determined the problem of pedagogical conditions for the professional training of petroleum engineers in the education system.

To solve the set tasks and test the hypothesis, the following research methods were used: study and theoretical analysis of psychological and pedagogical literature and dissertations on this issue, analysis of the content of regulatory documentation (professional qualification characteristics, state educational standards for oil specialties), curricula and programs, study, experience and results of activities of educational institutions of the education system. Formative experiment, including diagnostic methods (study of the results of the activities of teachers and students, conversation, observation, questioning, testing, etc.), statistical methods for processing experimental data.

The features of the designed model of professional training of petroleum engineers in the education system are its access through modular educational programs to the bank of educational elements, which ensures openness and development of the model, improves the efficiency of training petroleum engineers in the education system, and develops the independence of students. Training, organized in accordance with the developed model of professional training of oil engineers in the education system, makes it possible to better take into account the modern needs of the labor market and the individual.

The pedagogical conditions that determine the professional training of petroleum engineers in the education system are content-target and methodological-instrumental conditions. The content-targeted pedagogical conditions include: building the learning process based on a systematic analysis of the professional activity of petroleum engineers; actualization of the subjective professional

experience of students and its inclusion in the content of training, compliance with the requirements and basic provisions of student-centered learning. The methodological and instrumental conditions include: the use of innovative methods during the training of petroleum engineers that stimulate the learning process and form motivation for learning; application of a modular training system; using the capabilities of the enterprises of the oil and gas industry of the republic in the learning process [1, P.307].

The fact that in the experimental groups this dependence is closer to the base line suggests that the innovative model of professional training of oil engineers in the adult education system involves the internal motivation of students in the learning process to a greater extent, is built on their own activity and is more effective. Thus, the effectiveness of the implementation of the identified pedagogical conditions for the professional training of petroleum engineers in the education system was confirmed.

Adult education has a number of features, both facilitating and complicating this process. The advantages include high motivation to receive a new education, the presence of life and professional experience, a conscious desire to realize one's strengths and weaknesses. To difficulties - the termination of the action of sensitive periods of development (deterioration of the work of perception, memory and thinking). In the system of adult education, the solution of tasks focused on the implementation of officially set programs and educational standards is much more complicated due to the limited time allotted for it. Therefore, such forms and methods are needed that can intensify this process. The system of adult education is designed to solve the most important tasks,

The system of adult education as a factor in realizing the professional and personal potential of a specialist in the oil and gas industry basically has a flexible network of interrelated programs and forms of education that can serve different age groups of the population. The contradictory and ambiguous transformations of the functions, content and process of work taking place in the sphere of professional activity necessitate profound changes in vocational education, improving the systems of training and retraining of specialists, which allow not only quickly responding to changes in the sphere of production, but also anticipating them [5, P.165]. Current trends in the development of higher professional education and the adult education system determine the orientation towards the modernization of existing and the development of new educational technologies,

It is possible to single out two directions for the introduction of an innovative educational process: adaptation of innovative technologies to traditional forms of training sessions, organization of a full technological cycle of innovative learning to solve educational and professional problems: the second direction is implemented with modular training for specialists of various specializations. The process of introducing innovative technologies predetermines the need to use innovative forms of education that are most appropriate to the specifics of each of the areas of innovation. At the heart of innovative learning as a self-development of properties is a combination of "task-dialogue-game" methods, which forms a technological complex of student-centered learning and predetermines the technological system of students' cognitive activity.

The peculiarities of the designed organizational and pedagogical model of professional training of oil engineers in the adult education system are its access through modular educational programs to a bank of educational elements, which ensures openness and development of the model, improves the efficiency of training in the adult education system, and develops the creative potential of students. Training organized in accordance with the developed model of vocational training makes it possible to better take into account the modern needs of the labor market and the individual. The pedagogical conditions that determine the professional training of petroleum engineers in the adult education system are content-target and methodological-instrumental conditions. The content-targeted pedagogical conditions include: construction of the learning process based on a systematic analysis of the professional activities of petroleum engineers, updating the subjective professional experience of students and its inclusion in the content of training, compliance with the requirements and basic provisions of student-centered learning. The methodological and instrumental conditions include: the use of innovative methods during the training of petroleum engineers that stimulate the learning process and form motivation for learning; application of a modular training system; using the

capabilities of the enterprises of the oil and gas industry of the region in the learning process [2, P.63]. The data testify to the positive impact of the implementation of the selected set of pedagogical conditions on the process of assimilation of the material by students, the formation of interest in educational activities.

The composition of the presented logical-technological analyses includes the procedures aimed at scientific and technological awareness of the design of production processes and their implementation, justification of accuracy in the execution of instructions, correctness in their development. The performance of this type of learning activity by students will allow to form a reference framework of actions for the supporting components of the engineer's professional competences. In this regard, in the choice of pedagogical technologies when studying the teaching material, priority should be given to those technologies that contribute to teaching the ability to perform logical-technological analysis.

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