Modeling Future Professional Activities of A Specialist in A Vocational Educational Institution


Abstract: The process of future graduates’ professional activities development is a complex multi-stage process that requires continuous improvement. Preparation of students in construction majors requires special attention, since this area is constantly changing as technical progress is developing. The purpose of the article is to develop a model for future specialists’ professional activities development in the field of construction and operation of buildings and structures. This article analyzes the college curriculum for the major “Construction and maintenance of buildings and structures.” Based on the data obtained, the objective necessity of improving the process of students’ future professional activity development was established. The authors developed a model for future specialists’ professional activities development in the field of construction and operation of buildings and structures, the target component of which is mastery of professional activities and development of professional competencies. This model includes necessary elements that are aimed at a more perfect development of students’ professional activities. The model includes targeted, meaningful and effective components. The content component reveals the documents on which the process of modeling future specialists’ professional activities development should be based; methodological approaches ensuring implementation of modern educational paradigm; main functions of professional activity, its principles and stages of model implementation. Conclusion: the process of professional development of students requires constant improvement. The model developed by the authors is able to update it and improve the dynamics of professional competencies development.

Keywords : About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

Future specialists’ professional activities development is impossible in the process of traditional teaching at a substantive level, it is necessary to search for new forms and methods of organizing educational activities to solve this problem [1].

With regard to the training of future specialists in the field of operation of buildings and structures, the urgency of the problem is due to increasing demands for the quality of middle-level workers training as well as employees and structural managers who are ready in their professional activities to carry out large-scale tasks of modernizing industry [2]. In modern educational conditions, the need for continuous improvement of any types of activity is especially urgent. Professional development of future graduates is one of the first tasks that any educational institution solves.

II. PROFESSIONAL ACTIVITY

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Professional activity is a socially significant activity, the implementation of which is based on special knowledge, skills, as well as professionally determined personality traits [3].

Vocational training of specialists differs from general education in that it is aimed at developing labor potential of a person, that is, a person acquires professional competencies in the process of vocational training [4].

According to the professional standard, in a professional educational institution with a major “Construction and operation of buildings and structures” students are taught to get qualifications of masons, riggers, fitters, concrete workers, installers, electric fitters, roofers, plasterers, painters, veneers, each of whom performs his professional labor functions [5]. The objects of their professional activity are: construction sites (civil, industrial and agricultural buildings and facilities); building materials, products and structures; construction machines and mechanisms; regulatory and production-technical documentation; technological processes of design, construction, operation of buildings and structures; primary labor collectives [6].
The future technician should be prepared for the following activities: participation in buildings and structures design; performance of technological processes in construction, operation and reconstruction of construction objects; organization of activities of structural units in the performance of work related to operation and reconstruction of construction projects; performance of work in one or more professions or positions of employees [7].

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A. Modeling professional activities of future specialists in the field of buildings and structures

The presence of a clear idea of nature, structure and content of future specialists’ professional activities development in the field of operation of buildings and structures requires an appeal to the process of modeling the phenomenon under the study [8]. In the generally accepted interpretation, a model is a diagram, image, or description of a phenomenon or process in nature and society [9]. A model can be called an object or system, the study of which serves as a means to obtain knowledge about another original object or prototype model [10]. The choice of modeling as a research method is explained by the fact that using the model it is easier to understand the nature of the relationship between the structural elements of the complex phenomenon under the study, to synthesize and identify the most significant aspects of future specialists’ professional activities development in the field of operation of buildings and structures [11]. The operation of a building for any purpose is a complex, multi-factor process which includes implementation of a large number of works related to ensuring proper maintenance of various structural parts and engineering systems of a building [12]. During the operation of the building there is a need to comply with a variety of regulatory and technical documents that settle regulatory conditions for maintenance of various elements of the building [13]. The main regulatory document is the Code of Practice “Buildings and Structures. Rules of Operation. Basic Provisions” which was approved by the Ministry of Construction and Housing and Communal Services of the Russian Federation in 2016 [14]. We single out the main characteristics of specialists’ professional activities in the field of building and structure maintenance. First, engineering and technical workers must be multifunctional [15]. Secondly, engineering and technical workers should know orders and instructions of management, regulations, methodological, regulatory guidance materials; basic requirements of technical documentation; samples, forms, templates and standards of documents adopted in organization; types and structure of documents, methods, rules and features of their preparation, execution; current standards, regulations and instructions for the preparation and execution of technical documentation [16]. And they also need to follow the changes made to the current regulatory documents [17]. Thirdly, since work in the field of operation of buildings and structures includes work with people, a specialist must know methods and techniques of effective communication [18]. First of all, it is necessary to be emotionally stable in order to avoid conflict situations and have the right approach to clients who are addressing various issues, be able to correctly answer them and explain the current situation [19]. An engineer and technical worker must be able to correctly navigate in critical situations, find ways out of them and make decisions promptly [20]. We have identified the main activities that should be mastered by future experts in the field of buildings and structures: the execution of technological processes in the operation of construction sites; organization of activities of structural units in the implementation of construction and assembly work and repair of buildings; organization of various types of work during the operation of construction sites; participation in the design of buildings and structures [21]. At the same time, students must develop certain competencies [22]. To identify these competencies, we analyzed the Federal State Educational Standard of Secondary Professional Education in the major “Construction and operation of buildings and structures” [23]. The student must: organize and carry out preparatory work at the construction site; carry out activities to control the quality of work performed; plan the activities of structural units promptly; participate in diagnosis of technical content of the structural elements of the buildings in operation; take measures to assess technical condition and reconstruction of buildings [24].

B. Methodology

We analyzed college curricula in 2018 and 2019 in the major “Construction and maintenance of buildings and structures.” It was found such professional modules as participation in buildings and structures design; performance of technological processes in construction, operation and reconstruction of construction objects; organization of technological processes in construction, operation and reconstruction of construction sites. These modules are the most voluminous and the most hours are allocated to them. The main types of activities that should be mastered by students are formed. If in 2018 938, 651 and 456 hours were allocated for the study of modules, then in 2019 there were significantly more hours which makes it possible to study the content in more depth (1596, 1317 and 882 hours, respectively). With the increase in the number of hours for studying modules, it becomes necessary to update the process of future specialists’ professional activities development [25]. Therefore, we have developed a model in which students develop professional activities using various methods necessary in modern educational process with clearly arranged steps.

III. RESULT AND DISCUSSION

The process of future specialists’ professional activities development is extremely important, especially when it comes to construction specialties since this area is constantly changing as technical progress develops [26].

We have analyzed college curriculum in the major “Construction and Operation of Buildings and Structures” Figure 1 shows relationship between professional modules and hours allocated to study them in 2018 year. The diagram shows three professional modules: a part in the design of buildings and structures; implementation of technological processes during construction, operation and reconstruction of construction sites; organization of technological processes in construction, operation and reconstruction of construction sites. These modules are the most voluminous and have the largest number of hours.
The axiological approach directs vocational education to development of a student’s system of universal and professional values that determine his attitude to himself, his activities and to the world as a whole.

The personal-activity approach assumes that a student himself is at the center of training, his goals and mindset, psychological mindset, that is, a student as a person. Educational purpose of the lesson is determined based on students’ interests, experience and level of knowledge. The purpose of each lesson is determined from the position of each individual student.

The contextual approach involves immersing a student in the framework of his real future professional activity by creating professional conditions in educational process by solving specific professional problems.

Professional-technological approach allows you to build a systematic learning process that takes into account vocational education quality.

A competent approach allows students to develop the ability to solve problems in various fields and activities independently and creatively.

Among the main functions that contribute to the development of future specialists’ professional activities in the field of operation of buildings and structures, we identified: ensuring normal functioning of the building in accordance with its functional purpose; ensuring planned operational characteristics of the facility throughout entire service life; ensuring the established level of security; ensuring trouble-free operation of the engineering systems of the building; maintaining an established internal climate; maintaining the normal sanitary and hygienic condition of the facility and the local area [28]. Also, for future specialists’ professional activities development in the field of operation of buildings and structures, it is necessary to form the principles of professional activity among students - these are abstract, generalized ideas that enable those who rely on them to correctly form their behavior and their actions in business sphere. These principles in the field of professional ethics help to solve problems in professional environment successfully. Principles: Humanism; the principle of impartiality regarding the client and the desire for objectivity in making various decisions; customer focus principle; the principle of accurate performance of professional duties; The principle of respect for one’s profession and for people; the principle of striving to improve one’s professional activities; the principle of confidentiality, non-disclosure of personal information obtained in the process of professional activity; the principle of avoiding potential and explicit conflicts.

The model reveals the method of problem-based learning, the project method, case methods which allow creating conditions close to professional for the student. Thanks to these methods, students learn to solve real professional problems. Solving the problem of teaching method is a problem situation. The teacher does not communicate knowledge in a finished form, but poses a specific task for students prompting them to action. The essence of the project method also lies in solving a specific problem.
The project method includes use of research methods (discussions, heuristic conversations); search (brain attacks); scientific (role-playing games). A case is a description of a specific situation or case in any field and contains not only a description, but also a problem or a contradiction built on real facts. The essence of the case solution is to analyze the proposed situation and find optimal solutions. The effectiveness of these methods is due, firstly, to practical orientation, secondly, to interactive format (each method allows each student to be involved in educational process as much as possible), and thirdly, to the development of specific skills that will be required in a real workflow.

The model involves passing through several stages: analytical; informational and preparatory; organizational and technological; control and productive; reflective. Next, we will consider the stages of implementation of the model we developed in detail for future specialists’ professional activities development in the field of operation of buildings and structures. Analytical. At this stage, there is a selection and formulation of a specific goal and objectives, study (diagnosis of conditions) of educational process development, forecasting achievements, designing and planning educational process development. Informational and preparatory. At this stage, the search for information sources, collection, study of information and content selection is necessary to achieve the goal. The organizational and technological stage is implementation of the plan for solving the tasks, interaction of the teacher and student, management and regulation of pedagogical process. The control and effective stage includes monitoring and evaluating knowledge and skills gained, that is, identifying volume, depth and quality of educational material perception by students, identifying existing knowledge gaps and finding ways to address them, identifying the degree of gained knowledge assimilation, generalizing and systematizing it. Also at this stage, the planned results are compared with the actual results. Reflective. At this stage, students carry out self-assessment of the results of their own educational activities, acquired knowledge and practical skills. Students correlate the purpose and results of their educational activities as well as set goals for further action for in-depth self-training and self-education.

The productive level of the model is mastery of professional activities; professional competencies development.

IV. CONCLUSION

Our analysis of the college curriculum for the major "Construction and operation of buildings and structures" in 2018 and 2019 showed that the number of hours for studying the largest professional modules has increased significantly. The increase in hours allows you to expand the scope of training, but at the same time, updating the process of future specialists’ professional activities development is also required. In the process, the goal was achieved - a model was developed for future specialists’ professional activities development in the field of construction and operation of buildings and structures which will allow the student to develop necessary competencies at a high level for future professional activities implementation. The model reflects all the aspects necessary for this: modern teaching methods are used; the stages of professional activity development are shown; main approaches are reflected; functions and principles of professional activity are disclosed. Using the model developed by us allows us to form the process of future specialists’ professional activities development and train highly qualified graduates.

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