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Review Article

COMPETENT MODEL OF PRACTICE-ORIENTED EDUCATION OF STUDENTS OF THE CONSTRUCTION PROFILE

[1]Zukhra Ismailova, [2]Ruzimurat Choriev, [3]Gulzoda Ibragimova, [3]Shokhida Abdurakhmanova, [3]Navruz Abdiev

[1]Doctor of Pedagogical Sciences, Professor, Department of Pedagogy, Psychology and Teaching Methods, Tashkent Institute of Irrigation and Engineers of Agricultural Mechanization, Tashkent, Uzbekistan.
[2]Doctor of Pedagogical Sciences, Associate Professor, Department of Pedagogy, Psychology and Teaching Methods, Tashkent Institute of Irrigation and Engineers of Agricultural Mechanization, Tashkent, Uzbekistan.
[3]Lecturer, Department of General Technical Sciences, Tashkent Institute of Irrigation and Engineers of Agricultural Mechanization, Uzbekistan. E-mail address: z.ismailova@tiiame.uz

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Abstract
The article substantiates the need to improve the quality of professional training of engineering workers in the process of their training at a technical university. The distinctive features of professional competencies of students of construction specialties are formulated, descriptors are described and their development levels (threshold, advanced, productive) are described. The competency-based model of practice-oriented teaching of construction students is presented, its theoretical justification and the results of experimental testing are given.

Key words: vocational training, professional competencies, descriptors, levels of competency formation, competency model, practice-oriented training.

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INTRODUCTION

In accordance with changes in the legislation in the field of education, domestic higher education has moved to a tiered system of higher education and new federal state educational standards [7]. This required universities to review the content of education, the paradigm and technology of instruction. The foregoing fully applies to the preparation of bachelors and masters in the construction field, who, under the conditions of modern production, should be capable and ready to produce competitive construction products that have high environmental, aesthetic and economically acceptable properties.

To solve the problem of training such specialists, organization of practice-oriented training is necessary, the result of which should be the mastery of students by professional competencies. An analysis of the current situation in the preparation of bachelors and masters in the construction field indicates the need to develop a model of practice-oriented training for university students, taking into account the main provisions of the competency-based approach.

In the course of the study, methods of analysis of scientific works in the context of the problem being studied, synthesis of the obtained data, a transforming experiment aimed at testing the model and pedagogical conditions for the formation of professional competencies among students of construction specialties were used. The experimental base of the study was the Cheboksary Polytechnic Institute (branch) of the Moscow State Engineering University (MAMI) of the Federal State Budgetary Educational Institution of Higher Education. The study at its various stages involved 118 students studying in the field of training Professional education "- (5450400- Use of hydraulic structures and pumping stations), profile" Industrial and civil construction ". Research results and discussion. The modern construction industry makes new demands on the specialists working in it. These requirements are reflected both in professional standards and in federal state educational standards of higher education in the field of training "Construction".

Analysis of recent research and publications

In accordance with the aforementioned standards, we developed professional competency cards and descriptors of the levels of development of professional competencies by students of construction specialties (Table 1). Based on the results obtained and the analysis of the curriculum, we have developed a model of practice-oriented training of bachelors in the direction of training Professional education "- (5450400- Use of hydraulic structures and pumping stations), profile" Industrial and civil construction**".**

The model includes target, technological, activity and productive blocks (Fig. 1). The model reflected the purpose, tasks of practice-oriented training, the principles of design and construction of the educational process, the means, forms and methods of training, the interaction of the teacher, employer and student. According to the provisions of the competency-based approach (E. F. Zeer [8], I. A. Zimnyaya [9], Yu. P. Pokholkov [11], N. A. Seleznev [14], Yalalov F. G [16]) preparation "Bachelors and masters of any direction and profile of training should be aimed at mastering their competencies, representing the ability and willingness to perform the main types of professional activities in a qualified manner."

The general professional and specialized specialized competencies and characteristics of their mastery levels presented in Table 1 served as the basis for determining the content of education and developing work programs for academic disciplines and all types of practices. A practice-oriented approach (L. V. Bayborodova [7], I. V. Petrova [10], V. A. Sadovnichy [12], Z. S. Sazonova [13-12], Yu. G. Tatur [15]) involves the improvement of the educational process in the university by its focus on mastering future professional activities. Accordingly, the theoretical knowledge acquired by students should find application in solving quasi-professional problems in the process of training and professional tasks in the process of passing practice.

RESULTS AND DISCUSSION

At the same time, the main means of implementing the practice-oriented approach is production practice, in the process of which the development of professional

competencies and the acquisition of professional experience by students occur. It is important in the practice process to continue to conduct diagnostics of the formation of students' competencies, to develop tasks requiring application learned [3].

Table 1. Levels of development of professional competencies by students of construction specialties

Name of competency, its content	Competency Levels		
	Threshold	Advanced	Productive
	General professional competencies		
OPK-1. Ready for calculations based on the regulatory frame-work in the field of engineering surveys, technical and architectural design documentation, principles for the design of buildings, structures, engin-eering systems and equipment, planning and development of populated areas	He knows the calculation method on the basis of the regulatory framework in the field of engineering surveys, technical and architectural and construction docu-mentation, principles of designing buil-dings, structures, engineering systems and equipment, plan-ning and develo-pment of populated areas	Able to perform calculations on the basis of the regulatory framework in the field of engineering surveys, technical and architec-tural and construction documentation, prin-ciples of designing buildings, structures, engineering systems and equipment, planning and deve-lopment of populated areas	He has experience in settlements based on the regulatory frame-work in the field of engineering surveys, technical and archi-tectural and con-struction documen-tation, principles of designing buildings, structures, engine-ering systems and equipment, planning and buil-up areas
OPK-4. Ready to carry out refinement and mastering of techno-logical processes in the course of preparation for construction production, production of building materials, products and struc-tures, manufacturing of machinery and equi-pment; prepare docu-mentation on the management of the quality of techno-logical processes at production sites	He knows the structure and content of the implementation of refinement and mastering of techno-logical processes during the preparation of construction produ-ction, production of building materials, products and struc-tures, manufacturing of machinery and equipment; prepa-ration of documen-tation on quality management of tech-nological processes at production sites	Able to carry out refinement and mas-tering of technological processes in the course of preparation for construction produc-tion, production of building materials, products and str-uctures, manufacturing of machinery and equipment; to prepare documentation on the management of the quality of technological processes at production sites	He owns the methodology of fine-tuning and mastering of technological pro-cesses during the preparation of cons-truction production, production of building materials, products and structures, manufac-turing of machinery and equipment; preparation of docu-mentation on quality management of technological processes at production sites
He is fluent in the methodology of fine-tuning and mastering technological pro-cesses during the preparation of con-struction production - production of con-struction materials, products and struc-tures, manufacturing of machinery and equi-pment; preparation of documentation on the management of the quality of techno-logical processes in production areas. Has a basic knowledge system for the preparation of initial data for the selection and justification of scientific, technical and organizational solutions based on economic analysis	Able to draw up instructions, work schedules, plans, estimates, requests for materials and equipment	Makes decisions on the organizational and legal basis of mana-gerial and entrepren-eurial activity in preparing the initial data for the selection and justification of scientific, technical and organizational decisions based on economical knowledge and methods of professional activity.	Makes decisions on the organizational and legal basis of managerial and entrepreneurial activity in preparing the initial data for the selection and justification of scientific, technical and organizational decisions based on economic analysis

Levels of development of professional competencies by students of construction specialties

Name of competency, its content	Competency Levels		
	Threshold	Advanced	Productive
	General professional competencies		
PSK-1 +. Able to predict urban planning social needs and use them at various design stages	Has a basic knowledge system for forecasting urban planning social needs and using them at various design stages	Has a basic knowledge system for forecasting urban planning social needs and using them at various design stages	Has a basic knowledge system for forecasting urban planning social needs and using them at various design stages
PSK-4 +. Able to pre-dict real estate market conditions and finan-cing of urban develop-pment programs, as well as an information and legal base on the issues of urban econo-mics and urban eco-nomy	**PSK-4 +.** Able to predict real estate market conditions and financing of urban development programs, as well as an infor-mation and legal base on the issues of urban economics and urban economy	**PSK-4 +.** Able to predict real estate market conditions and financing of urban development programs, as well as an informat-ion and legal base on the issues of urban economics and urban economy	**PSK-4 +.** Able to predict real estate market conditions and financing of urban development programs, as well as an informa-tion and legal base on the issues of urban economics and urban economy
He is fluent in the methodology of fine-tuning and mastering technological processes during the preparation of construction production - production of construction materials, products and structures, manu-facturing of machinery and equipment; preparation of docu-mentation on the management of the quality of technological processes in production areas. Has a basic knowledge system for the preparation of initial data for the selection and justification of scientific, technical and organizational solutions based on economic analysis	Able to draw up instructions, work schedules, plans, estimates, requests for materials and equipment	Makes decisions on the organizational and legal basis of managerial and entrepreneurial activity in preparing the initial data for the selection and justification of scientific, technical and organizational decisions based on economical knowledge and methods of professional activity.	Makes decisions on the organizational and legal basis of managerial and entrepreneurial activity in preparing the initial data for the selection and justification of scientific, technical and organizational decisions based on economic analysis
He is fluent in the methodology of fine-tuning and mastering technological processes during the preparation of construction produ-ction - production of construction materials, products and structures, manufacturing of machinery and equ-ipment; preparation of documentation on the management of the quality of technological processes in production areas. Has a basic knowledge system for the preparation of initial data for the selection and justification of scientific, technical and organizational solutions based on economic analysis	Able to draw up instructions, work schedules, plans, estimates, requests for materials and equipment	Makes decisions on the organizational and legal basis of managerial and entre-preneurial activity in preparing the initial data for the selection and justification of scientific, technical and organizational decisions based on economical know-ledge and methods of professional activity	Makes decisions on the organizational and legal basis of managerial and entrepreneurial activ-ity in preparing the initial data for the selection and justi-fication of scientific, technical and organizational decisions based on economic analysis

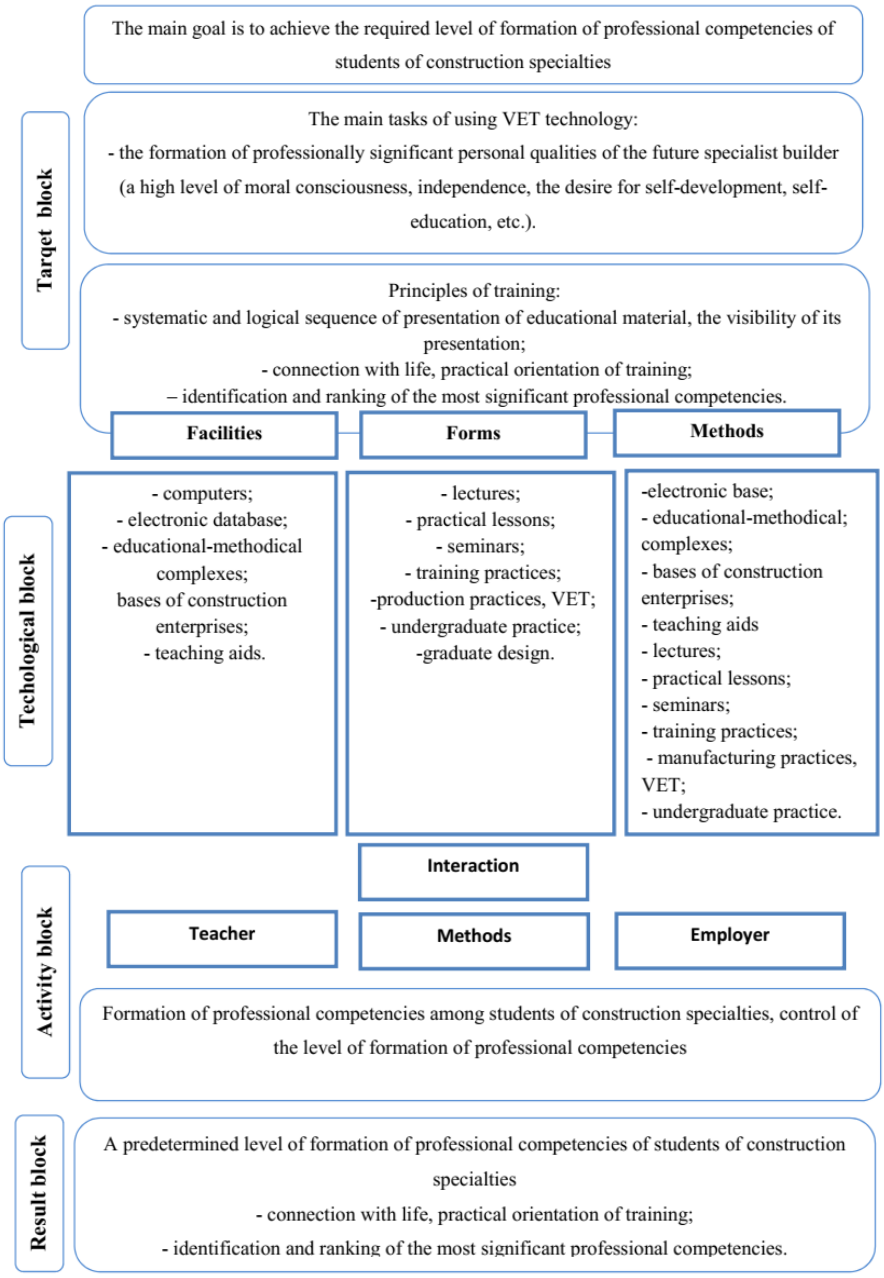
The methodological basis for the development of the model has become competency-based and practice-oriented approaches. The model was introduced into the process of teaching students of the Faculty of Hydrotechnical Construction of the Tashkent Institute of Irrigation and Mechanization of Agriculture. Common crawlen As propaedeutics for teachers who participated in the experimental work, refresher courses "New educational standards of the third generation" were held. To conduct the courses, colleagues from the Tashkent Institute of Irrigation and Agricultural Mechanization were invited. To implement the design of the experiment, two control (KG1 and KG2) and two experimental (EG1 and EG2) groups were created [17].

When choosing the required number of students, we took into account the specifics of the organization of the educational process at the faculty of construction and transport technologies (design and production and technological activity). The introduction of the practice-oriented learning model began in 2005. In accordance with the model, 3-5 year students practice at various enterprises related to the construction industry, design institutes and construction organizations.

At the institute, students receive a task in which a list of questions is needed to study during the internship directly at the enterprise. One day a week or one week a month is allocated for the implementation of practice-oriented training to work at enterprises in the city of Cheboksary, where older students gain experience in professional activity, and then acquire theoretical knowledge in the university.

CONCLUSIONS

Practice-oriented training in relation to EG1 was used in this version: one day of training at the enterprise after a week of classroom studies. Based on the results of pedagogical diagnostics of the effectiveness of using such a technology, some changes were made to it, and in the process of teaching EG2, the adjusted technology was used: one week of training at the enterprise after three weeks of theoretical training in the classrooms of the university. It is important to note that such changes were made after the end of the school year, i.e., after a certain stage of technology application in EG1.



As a result of the introduction of the developed model, there have been positive changes in the level of formation of professional competencies among students of experimental groups. So, more than 40% of students reached a productive level in mastering competencies, more than 50% of students reached an advanced level. At the same time, in KG1 and KG2, the results were significantly lower - there were no students who reached a productive level of professional competency formation, the percentage of students with a threshold level of competency formation (more than 30%) remained rather high.

As our study showed, the application of a model of practice-oriented training allows you to specify the tasks of industrial practice so that the student in the process of passing it is not only in the professional environment, but also is able to increase the level of formation of their professional competencies and professionally significant qualities.

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