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Research Article

EXPERIMENTAL TEST RESULTS ON THE METHODOLOGY OF DEVELOPING THE PROFESSIONAL-PRACTICAL COMPETENCE OF STUDENTS BASED ON THE INNOVATION APPROACH

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ABSTRACT

The article presents the results of the experiment-test conducted on the methodology of development of professional-practical competence among the students of the "Production of construction materials, products and constructions" educational field in technical higher education institutions.

KEYWORDS

Professional-practical competence, competence, experimental test, general professional sciences, future construction engineer, control group, experimental group.

INTRODUCTION

It is necessary to create organizational and pedagogical conditions for the development of components of professional and practical competence of students in technical higher education institutions. The main stages of pedagogical conditions are as follows: management of student activities by the professor-teacher; joint management of the process of formation of professional-practical competence by the professor-teacher and the student; self-management of the process of professional self-development by future engineers.

The main potentials of the individual were identified as psychological and pedagogical determinants that determine the direction in the organizational-pedagogical conditions created for the implementation of the methodological model of the development of professional-practical competence of students of the construction major in technical higher education institutions based on the interdisciplinary integrated teaching of general professional subjects:

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cognitive, including dynamic qualities that ensure the effectiveness of cognitive activity and are determined by the time, volume and quality of information in short-term and long-term memory;

active, including dynamic qualities that ensure the productivity of practical activities and are determined by the time, volume and quality of practical activities that the student can perform;

moral, manifested in the unity of psychological and ideological influences on the individual's professional consciousness and self-awareness. It is evaluated by spiritual and moral standards, beliefs and life goals and worldview of the student;

is manifested in the speed and direction of formation of creative, competences (knowledge, skills, abilities) and competence (creating new professional skills for creative activity and personal life plan related to issues of future professional activity);

communicative, manifested in students' relationships with others and strength. Content-dynamic communicative potential is expressed in the teaching of general professional and social sciences;

It is determined by the student's activity in establishing a system of relations in the personal-professional environment and forming professional and personal development needs during its development.

At the same time, we consider the important management of the professional development of the student's personality "Self-concept" - a set of ideas related to self-esteem. In this case, the "I-concept" plays three roles: it contributes to the development of the student's personality and professional-practical competence of future engineers; determines the nature and characteristics of the professional experience gained by the student in the form of positive and negative experiences; serves as a source of professional activity related to one's own behavior for self-expression in professional activity.

The purpose of the experimental work was to determine the level of effective use of pedagogical conditions that allow the development of components of professional and practical competence of future construction engineers in the educational direction of technical higher educational institutions 5340500 - "Production of construction materials, products and structures" .

In developing the acceptable content of general professional subjects, he defined the role of "Drawing geometry", "Building constructions and materials" and "Building constructions" in the professional activity of a construction specialist.

Experimental work was carried out in three stages during the 2019-2022 academic years.

In the first stage - experimental research stage (2019-2020 academic year) "Manufacture of construction materials, products and structures" in the process of training future construction engineers in the process of training them to form professional competencies, to determine the level of formation of skills and qualifications related to competencies and competencies directed pedagogical activity was organized. In order to achieve the goal set before us, the educational activities of students studying in the direction of higher education institutions "Manufacture of construction materials, products and structures " were observed, interviews and questionnaires were conducted and analyzed with them. These works made it possible to determine the research direction and program. Scientific works of leading scientists and experienced pedagogues on the research topic were analyzed. In order to develop the components of professional-practical competence of future construction engineers, the content of practical

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tasks and methods, forms and means of their execution were defined.

In the second stage - experimental-analytical stage (2020-2021 academic year) "Manufacture of construction materials, products and structures" in the process of training bachelor teachers in the field of education , practical instructions, guidelines, methodical developments and assignments recommended by us - methodical activity was organized. With the help of direct and indirect pedagogical observation of students' activity, organization of practical training with their participation, interviews, questionnaire survey and methods aimed at practical creative work, skills and qualifications related to professional competences and professional qualities were formed in them. The level of formation of components of professional-practical competence of future construction engineers was analyzed.

In the third stage - pilot test stage (2021-2022 academic year), the model of formation of components of professional-practical competence of future construction engineers of "Manufacture of construction materials, products and structures" was tested and justified on the basis of experience. The obtained results were compared with the studied initial data and hypothesis, and general conclusions were drawn.

The first stage of experimental work was carried out in the process of forming the components of professional and practical competence of future construction engineers studying in the field of education "Manufacture of construction materials, products and structures" of the Tashkent Institute of Architecture and Construction, Namangan Engineering-Construction Institute and Jizzakh Polytechnic Institute. Test sites were selected and work was carried out according to the plan.

In order to determine the effectiveness of pedagogical experimental work, the respondents were assigned to experimental and control groups on an equal basis. In the experimental group, practical activities were carried out based on the methodology that helps to ensure the formation of the components of professional-practical competence of future construction engineers, and in the control groups, educational work was carried out in a traditional manner. The results of the control and experimental groups were regularly analyzed and conclusions were drawn by comparison.

Total of 366 (at the beginning of the experiment) students of future construction engineers studying in the field of education "Manufacture of construction materials, products and structures" took part in the experiment-test work at Tashkent Institute of Architecture and Construction, Namangan Engineering-Construction Institute, and Jizzakh Polytechnic Institute. 183 students participated in the experimental group, and 183 participated in the control group.

Tests and practical work were developed to assess the results of students' mastery of the modules of the "Building constructions" subject based on a competent approach. The complex of professional competences formed on the basis of theoretical knowledge, practical skills and qualifications acquired in the study of "Building constructions" educational modules based on a competent approach was considered at three levels: low, average, high. The level of formation and indicators of the components of professional-practical competence of future construction engineers are presented in Table 1. Table 2 shows the levels of formation of the components of professional-practical

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competence based on the competent approach of the modules of general professional science "Building constructions" at the beginning of the experience of future construction engineers.

Table 1

Criteria and indicators of the formation of components of theoretical knowledge and professional-practical competence in the requirements for learning "Building constructions" academic modules based on a competent approach

Criteria	Indicators	Levels
Reproductive	He cannot conduct independent professional activity in the field of construction, his professional-practical competence is poorly developed	Low
Searcher	He carries out independent professional activities in the field of construction, his professional-practical competence is moderately developed	Medium
Creative	He carries out independent professional activities in the field of construction, his professional-practical competence is highly developed	High

A test-assignment system was used to assess the level of acquisition of theoretical knowledge and the formation of components of professional-practical competence of future construction engineers in studying the modules of the "Building constructions" subject based on a competent approach. In this, the professional activity of the future construction engineers was evaluated based on the results of completing the coursework tasks, practical training and the examination of the product of the educational work. As a result of studying the modules of the subject "Building constructions" on the basis of a competent approach, the indicators of students' knowledge acquisition and formation of the components of professional-practical competence are presented in Table 2.

Table 2

Levels of formation of components of professional-practical competence based on a competent approach to the modules of general professional science "Building constructions" at the beginning of the experience of future construction engineers

The academic year in which the experiment was conducted	Objects	Number of future civil engineers		Levels	Experimental group		Control group	
		Experimental group	Control group		Number	%	Number	%
	Stone	22	21	High	3	13.64	2	9.52

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2019-2020 academic year				Medium	4	18,18	3	14.29
				Low	15	68,18	16	76.19
	NamMQI	19	18	High	2	10.53	2	11.11
				Medium	3	15.79	4	22,22
				Low	14	73.68	12	66,67
	JizPI	19	19	High	2	10.53	2	10.53
				Medium	3	15.79	3	15.79
				Low	14	73.68	14	73.68
Average for the 2019-2020 school year		**60**	**58**	**High**	**7**	**11.67**	**6**	**10.34**
				Medium	**10**	**16.67**	**10**	**17,24**
				Low	**43**	**71.67**	**42**	**72.41**
2020-2021 academic year	Stone	20	21	High	2	10.00	2	9.52
				Medium	3	15.00	4	19.05
				Low	15	75.00	15	71.43
	NamMQI	19	20	High	2	10.53	2	10.00
				Medium	3	15.79	4	20.00
				Low	14	73.68	14	70.00
	JizPI	22	22	High	2	9.09	2	9.09
				Medium	4	18,18	3	13.64
				Low	16	72,73	17	77.27
Average for the 2020-2021 school year		**61**	**63**	**High**	**6**	**9.84**	**6**	**9.52**
				Medium	**10**	**16.39**	**11**	**17.46**
				Low	**45**	**73,77**	**46**	**73.02**
2021-2022 academic year	Stone	21	20	High	3	14.29	3	15.00
				Medium	5	23.81	4	20.00
				Low	13	61.90	13	65.00

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	NamMQI	20	22	High	2	10.00	2	9.09
				Medium	4	20.00	4	18,18
				Low	14	70.00	16	72,73
	JizPI	21	20	High	2	9.52	2	10.00
				Medium	3	14.29	4	20.00
				Low	16	76.19	14	70.00
Average for the 2021-2022 school year		**62**	**62**	**High**	**7**	**11.29**	**7**	**11.29**
				Medium	**12**	**19.35**	**12**	**19.35**
				Low	**43**	**69.35**	**43**	**69.35**
Average of total 20 19-2022 academic years		*183*	*183*	*High*	*20*	*10.93*	*19*	*10.38*
				Medium	*32*	*17.49*	*33*	*18.03*
				Low	*131*	*71.58*	*131*	*71.58*

As a result of experimental work carried out within the framework of the research, practical training on the subject of "Building constructions" was conducted using active and interactive methods, appropriate pedagogical and information technologies in multimedia devices or computer rooms equipped in the established order. As a result, it was found that the level of formation of components of professional-practical competence of future construction engineers has increased.

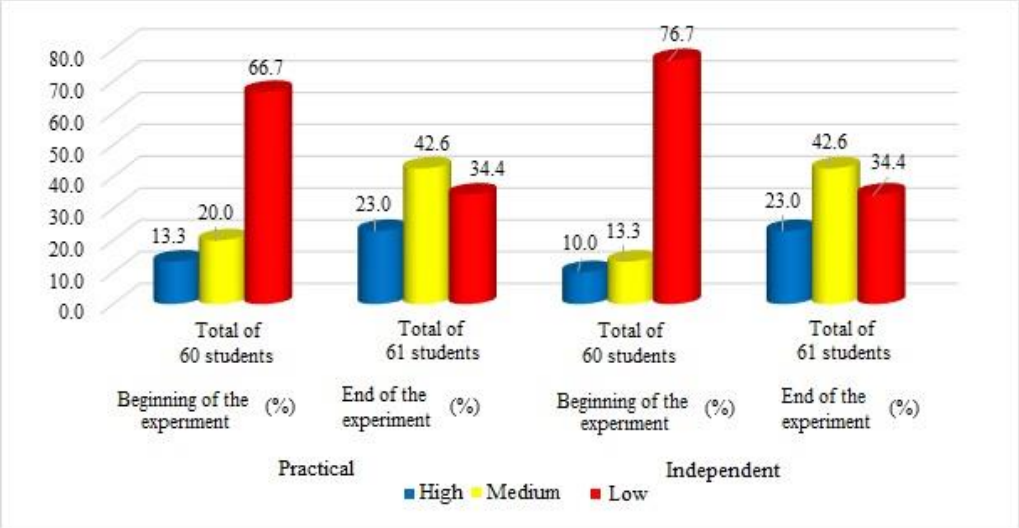

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Figure 1. Results of the experimental test conducted in the 2019-2020 academic year in the field of "Building constructions" in the experimental group

In order to determine the effectiveness of the teaching of general professional subjects on the basis of new pedagogical technologies, the results of final questions, tests and summative exercises from students were analyzed in terms of quality and quantity.

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