

# Development of Professional-Practical Competence on Teaching the Subject of Building Constructions

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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 major "Production of building materials and constructions" in technical higher education institutions.

**Keywords:** professional-practical competence, experimental test, general professional sciences, future construction engineer, control group, experimental group.

**I. Introduction.** Modernizing the education system in the Republic of Uzbekistan, "supplying professional pedagogic personnel for the training of highly qualified specialists who have the skills to apply modern knowledge and pedagogical technologies and make a worthy contribution to the socio-economic development of our country, introducing advanced educational technologies into the field" [1] innovative educational principles, the future allows improving the professional competence of specialists.

The concept of "competence" entered in the field of education as a result of psychological research. Therefore, competence means "how a specialist behaves in unconventional situations, unexpected situations, engages in communication, takes a new way in relations with opponents, performs ambiguous tasks, uses information full of contradictions, has a plan of movement in consistently developing and complex processes" [2]. Professional competence does not mean the acquisition of separate knowledge and skills by a specialist, but the acquisition of integrative knowledge and actions in each independent direction.

**II. Methods.** 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 field of education of technical higher educational institutions "Production of building materials and constructions".

In developing the optimal content of general professional subjects, it clarified the role of "Building materials" and "Building constructions" subjects in the professional activity of a construction specialist.

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

**III. Result and discussions.** Thoughts were held on the organization of the pedagogical experiment on teaching "Building constructions" and its methodology. In this paragraph, we will get acquainted with the analysis of the results of the experiment. Experimental tests in 2019-2022 future construction engineers studying in the field of "Production of building materials and structures" in Tashkent Institute of Architecture and Civil Engineering (TIACE), Namangan Engineering Construction Institute (NamECI) and Jizzakh Polytechnic Institute (JizPI) were participated.

During the experimental work, the levels of formation of the components of professional-practical competence of future construction engineers based on the competent approach of the modules of the subject "Building constructions" were determined based on the established criteria and levels. The analysis of pedagogical experiments was first studied separately for each higher education institution.

Pedagogical experimental work was conducted for 63 students from the experimental group and 62 students from the control group at the TIACE (2019-2022 academic years).

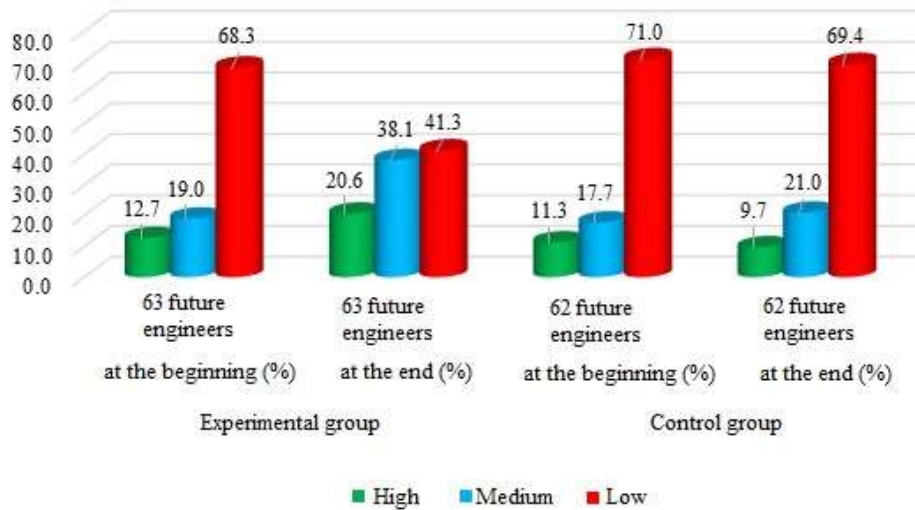
In the process of experimental work, the levels of formation of the components of professional-practical competence of future civil engineers in teaching modules of the subject "Building constructions" among students were determined (Fig. 1) and the effectiveness of the conducted experimental work was determined mathematically and statistically (Table 1).

Table 1

The results of the pedagogical experiment-testing conducted at TIACE

Level of formation of components of professional-practical competence	Experimental group				Control group			
	63 future civil engineers at the beginning of the experiment		63 future civil engineers at the end of the experiment		62 future civil engineers at the beginning of the experiment		62 future civil engineers at the end of the experiment	
	amount	%	amount	%	amount	%	amount	%
High	8	12.7	13	20.6	7	11.3	6	9.7

Medium	12	19.0	24	38.1	11	17.7	13	21.0
Low	43	68.3	26	41.3	44	71.0	43	69.4
<b>Total</b>	<b>63</b>	<b>100</b>	<b>63</b>	<b>100</b>	<b>62</b>	<b>100</b>	<b>62</b>	<b>100</b>



**Figure 1. A diagram of the results of the pedagogical experiments conducted at TAQI**

The level of formation of the components of professional-practical competence of future civil engineers in teaching the modules of "Building constructions" in the experimental group was 12.7% higher at the beginning of the experiment and 20.6% higher at the end of the experiment. The medium level increased from 19% at the beginning of the experiment to 38.1% at the end of the experiment, while the low level decreased from 68.3% to 41.3%.

In the control group showed a high level of 11.3% at the beginning of the experiment to a low level of 9.7% at the end of the experiment. The average level was 17.7% at the beginning of the experiment and 19.1% at the end of the experiment, while the low level decreased from 71% to 69.4%.

In *NamECI* (in 2019-2022 academic years), 58 students from the experimental group and 60 students from the control group were subjected to pedagogical experiments.

In the process of experimental work, the levels of formation of the components of the professional-practical competence of future construction engineers in teaching modules of the subject "Building constructions" were determined (Fig. 2) and the effectiveness of the experimental work was determined mathematically and statistically (Table 2).

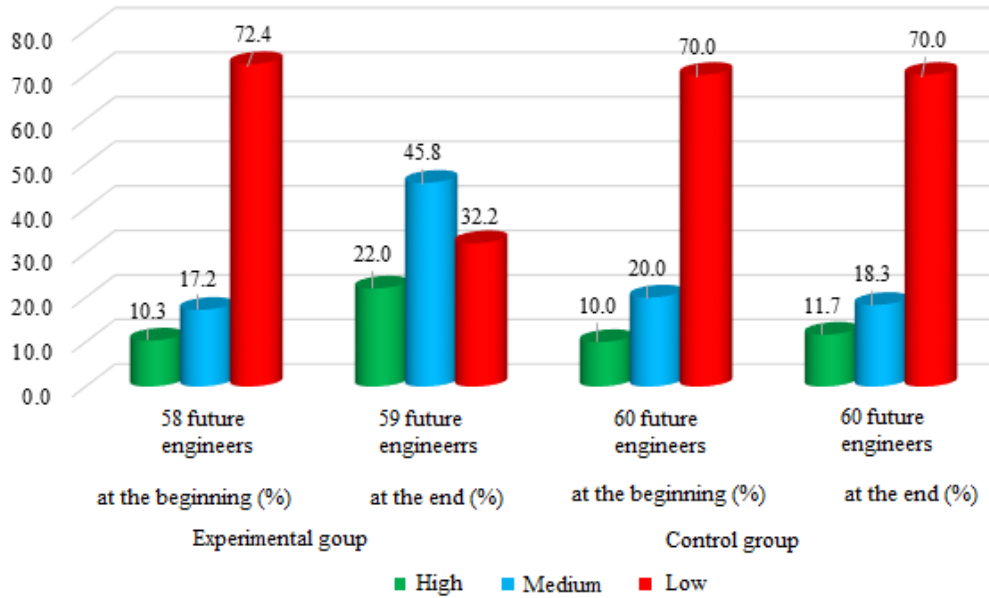
Table 2

**Results of pedagogical experiments conducted at *NamECI***

Level of formation of components of professional-practical competence	Experimental group				Control group			
	58 future civil engineers at the beginning of the experiment		59 future civil engineers at the end of the experiment		60 future civil engineers at the beginning of the experiment		60 future civil engineers at the end of the experiment	
	amount	%	amount	%	amount	%	amount	%
High	6	10.3	13	22.0	6	10.0	7	11.7
Medium	10	17.2	27	45.8	12	20.0	11	18.3
Low	42	72.4	19	32.2	42	70.0	42	70.0
<b>Total</b>	<b>58</b>	<b>100</b>	<b>59</b>	<b>100</b>	<b>60</b>	<b>100</b>	<b>60</b>	<b>100</b>

The level of formation of the components of professional-practical competence of future civil engineers in teaching the modules of "Building constructions" in the experimental group was 12.7% higher at the beginning of the experiment and 20.6% higher at the end of the experiment. The medium level increased from 19% at the beginning of the experiment to 38.1% at the end of the experiment, while the low level decreased from 68.3% to 41.3%.

In the control group showed a 10.3% higher level at the beginning of the experiment and a 22% higher level at the end of the experiment. The medium level increased from 17.2% at the beginning of the experiment to 45.8% at the end of the experiment, while the low level decreased from 72.4% to 32.2%.



**Fig. 2. The diagram of the results of pedagogical experiments conducted at NamECI**

In JizPI (in 2019-2022 academic years), 62 students from the experimental group and 61 students from the control group were subjected to pedagogical experiments.

Table 3

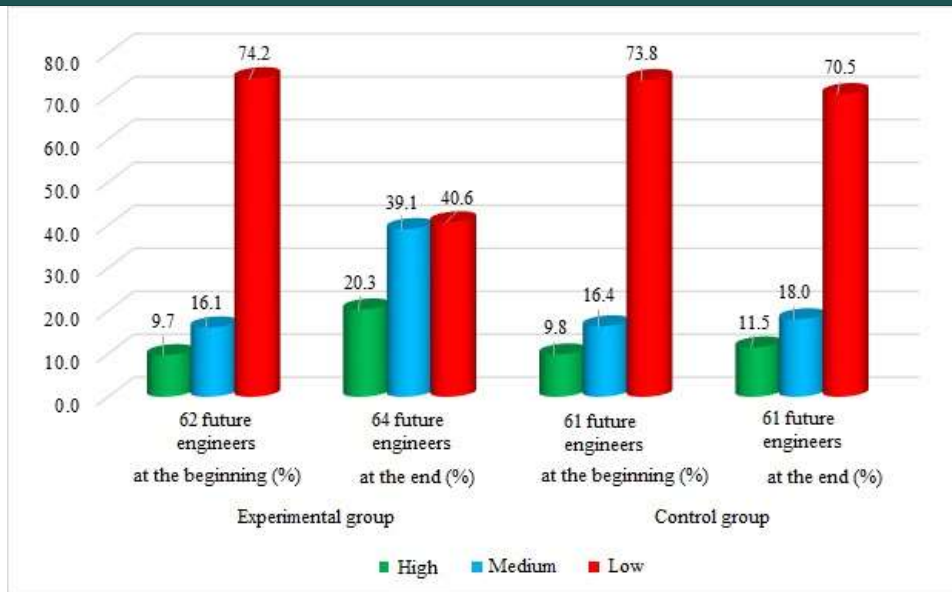
**Results of pedagogical experiments conducted at JizPI**

Level of formation of components of professional-practical competence	Experimental group				Control group			
	62 future civil engineers at the beginning of the experiment		64 future civil engineers at the end of the experiment		61 future civil engineers at the beginning of the experiment		61 future civil engineers at the end of the experiment	
	amount	%	amount	%	amount	%	amount	%
High	6	9.7	13	20.3	6	9.8	7	11.5
Medium	10	16.1	25	39.1	10	16.4	11	18.0
Low	46	74.2	26	40.6	45	73.8	43	70.5
<b>Total</b>	<b>62</b>	<b>100</b>	<b>64</b>	<b>100</b>	<b>61</b>	<b>100</b>	<b>61</b>	<b>100</b>

In the process of experimental work, the levels of formation of the components of the professional-practical competence of future construction engineers in teaching modules of the subject "Building constructions" were determined (Fig. 3) and the effectiveness of the experimental work was determined mathematically and statistically (Table 3).

The students who participated in the experimental group showed a higher level of 9.7% at the beginning of the experiment and 20.3% at the end of the experiment. The medium level increased from 16.1% at the beginning of the experiment to 39.1% at the end of the experiment, and the low level increased from 74.2% to 40.6%, decreased by 6%.

In the control group showed a 9.8% higher level at the beginning of the experiment and 11.5% higher at the end of the experiment. The medium level increased from 16.4% at the beginning of the experiment to 18% at the end of the experiment, while the low level decreased from 73.8% to 70.5%.



**Fig. 3. The diagram of the results of pedagogical experiments conducted at JizPI**

Pedagogical experimental work was conducted for three years in TIACE, NamECI and JizPI in 2019-2020, 2020-2021, 2021-2022. At the end of the experiment, 186 students from the experimental group (EG) and 183 students from the control group (CG) participated (Fig. 4).

Table 4

**Results of pedagogical experiments conducted at TIACE, NamECI and JizPI**

Level of formation of components of professional-practical competence	Experimental group				Control group			
	62 future civil engineers at the beginning of the experiment		64 future civil engineers at the end of the experiment		62 future civil engineers at the beginning of the experiment		62 future civil engineers at the beginning of the experiment	
	amount	%	amount	%	amount	%	amount	%
<b>High</b>	20	10.9	39	21.0	19	10.4	20	10.9
<b>Medium</b>	32	17.5	76	40.9	33	18.0	35	19.1
<b>Low</b>	131	71.6	71	38.2	131	71.6	128	69.9
<b>Total:</b>	<b>183</b>	<b>100</b>	<b>186</b>	<b>100</b>	<b>183</b>	<b>100</b>	<b>183</b>	<b>100</b>

The students who participated in the experimental group showed a 10.9% higher level of formation of the components of professional-practical competence of future construction engineers on teaching modules of the subject "Building constructions" at the beginning of the experiment, and 21% higher at the end of the experiment. The medium level increased from 17.5% at the beginning of the experiment to 40.9% at the end of the experiment, while the low level decreased from 71.6% to 38.2%.

In the control group was 10.4% higher at the beginning of the experiment and 10.9% higher at the end of the experiment. The medium level increased from 18% at the beginning of the experiment to 19.1% at the end of the experiment, while the low level decreased from 71.6% to 69.9%.

**IV. Conclusions.** Pedagogical experiment-test consisting of three stages was conducted: experiment-research, experiment-analysis and experiment-test. At the end of the experiment, the following conclusions were obtained:

1. According to the results of the experiment, it was proved that the research topic is relevant.
2. The results of the conducted experiment - test work show that, based on the improvement of the methodology of organizing educational practices in the preparation of future secondary medical workers for professional activities, it was mathematically and statistically proven that the level of formation of their practical competence is 1,123 times (12%) higher than that of the control groups.
3. Project-research, technological, design-construction work and professional-practical competence components introduced into the educational process, as well as pedagogical technology testing, professional-practical in them based on the performance of professionally-oriented design tasks that allow the development of concepts and knowledge skills, professional competences in future construction engineers diagnosis of levels of formation of competence components was carried out. The analysis of the results of the expert assessment of professional readiness of future construction engineers showed that their professional readiness has

increased, and this, in turn, made it possible to conclude that the designed pedagogical technology of professional competence formation is effective.

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