

## РОЗДІЛ II. ПРОБЛЕМИ ПЕДАГОГІКИ ВИЩОЇ ШКОЛИ

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Vasyl Humeniuk

Danylo Halytsky Lviv National Medical University

ORCID ID 0000-0003-2736-3875

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### ANALYSIS OF THE RESULTS OF TRAINING OF FUTURE MASTERS OF MEDICINE FOR PEDAGOGICAL ACTIVITY

*The purpose of the article is to prove the reliability of the results of research and experimental work on the formation of the readiness of future masters of medicine for pedagogical activity as a result of their training in institutions of higher medical education. Methods of theoretical analysis of scientific literature, methods of mathematical statistics, comparison, ranking, calculation of indicators of Fisher's criterion, generalization were used in scientific research. The obtained results of the experimental study were verified for reliability using the methods that scientists recommend to use in professional pedagogy. Fisher's test (F-test) was used to prove the reliability of the results. The values of the critical F-criterion were compared ( $F_{krit}$ ) according to standardized tables with empirical, calculated according to the indicators of formation of each level of readiness for pedagogical activity in future masters of medicine of control and experimental groups ( $F_{emp-CG}$  i  $F_{emp-EG}$ ).*

*Checking the reliability of the results of the formation of axiomatic, infocognitive, communicative-activity and personal-reflexive components of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG, on the base of a comparison of Fisher's criterion allows to generalize, that numerical value of  $F_{emp-CG}$  goes out beyond the theoretical indicator  $F_{krit}$  (1,3 – 1,7), and calculated  $F_{emp-EG}$  is within the specified limits, which indicates on the reliability of the obtained results.*

*Comparative analysis of statistical materials indicates on the reliability of the results of the research. This makes it possible to recommend the use of the author's pedagogical system in institutions of higher medical education in order to form the readiness of future masters of medicine for pedagogical activity in the field of health care, which emphasizes the practical importance of research.*

*We see prospects for further scientific researches in expanding the areas of training of future masters of medicine for pedagogical activity in various medical educational institutions (colleges, institutes, academies, universities) with the use of innovative pedagogical technologies, modern information support, digitalization of education and the medical field in order to form highly qualified and competent professionals.*

**Key words:** *masters of medicine, training, pedagogical activity, methods, Fisher's criterion, educational institutions, readiness, education.*

**Formulation of the problem.** Reforming the educational and medical sectors at the present stage of social development in Ukraine includes the involvement of doctors-masters in teaching and educating patients to self-preserving behavior as organizers and assistants capable for stimulation, correction, normalizing such a process. Ideally – these are highly competent specialists who have certain personal and professional

qualities and carry out medical and diagnostic activities considering the psychological and psychosomatic characteristics of patients, focused on improving medical and hygienic education and upbringing of the population, that is carry out pedagogical activities integrated into medical practice. The avoidance by doctors of the pedagogical function in medical practice causes the loss of the meaning of the healing process, which becomes only a set of manipulations with the flesh, the engineering of the flesh. The solution of this problem is possible by training future masters of medicine of various specialties for pedagogical activity.

**Analysis of current research** shows that the scientific basis for the modernization of the system of preparation of future masters of medicine for pedagogical activity is numerous studies, which reveal modern concepts and ideas for the modernization of domestic and international system of medical education (T. Bakhtyeyeva, A. Barzylovych, O. Lazurenko, I. Melnychuk, O. Ovcharenko, T. Popchenko, A. Giddens, T. Kyryan, N. Yachina, G. Zeynalov et al). Researchers present studies aimed at introduction of models of training future doctors-masters into the educational process of the institutions of higher medical education (IHME) on the basis of integrated approaches to education (I. Humenna, V. Yekhalov, O. Lysachenko, M. Paykush, T. Svyatenko, N. Khobotova, A. Shulhay et al); study of the processes of acquisition of psychological and pedagogical competencies, knowledge, skills and experience of medical students in IHME (Yu. Aseyeva, S. Bukhalska, V. Bobryyov, S. Bilash, O. Belyayeva, V. Zhdan, K. Magrlamova, L. Nikogosyan, L. Ostrovska, H. Stechak et al); research of various (pedagogical, psychological, clinical) opportunities of the educational environment of IHME (M. Demyanchuk, O. Zavhorodnya, O. Ivanytska, V. Medintsev, O. Nykonenko, Yu. Shapran et al).

**The purpose of the article** is to prove the reliability of the results of made research and experimental work on the formation of the readiness of future masters of medicine for pedagogical activity as a result of their training in institutions of higher medical education.

**Research methods.** Methods of theoretical analysis of scientific literature, methods of mathematical statistics, comparison, ranking, calculation of indicators of Fisher's criterion, generalization were used in scientific research.

**Presenting main material.** In order to prove the reliability of the results of research and experimental work, diagnostic procedures were performed. Representatives of the faculties of medicine, dentistry and pharmacy became the participants of the ascertaining stage of the

experimental research in order to diagnose the state of readiness of future masters of medicine for pedagogical activity as a result of their training in medical institutions of higher education – 20 representatives from each faculty of six medical IHME: Danylo Halytsky Lviv National Medical University, Dnipro State Medical University, Ivano-Frankivsk National Medical University, Bukovynian State Medical University, Odessa National Medical University, Luhansk State Medical University – 360 people in total who were completing their master’s degree.

Numerical value of levels and average score (AvSc) for each component and in general the readiness of future masters of medicine for pedagogical activity is presented in table. 1.

*Table 1*

**Readiness of future masters of medicine for pedagogical activity at the ascertaining stage of experimental research (2017-2018 academic year)**

Components of readiness	Levels of readiness (360 persons)								AvSc
	High		Sufficient		Satisfactory		Low		
	NM	%	NM	%	NM	%	NM	%	
Axiomotivational	72	20,0	173	48,06	115	31,94	0	0	3,88
Infocognitive	67	18,61	161	44,72	132	36,67	0	0	3,82
Communicative and activity	64	17,78	158	43,89	138	38,33	0	0	3,79
Personality-reflexive	70	19,44	169	46,94	121	33,61	0	0	3,86
Readiness in general	66	18,33	163	45,28	131	36,39	0	0	3,82

The formative stage of the study, which begins in 2018-2019 academic year, covers masters of medicine of dental and pharmaceutical faculties – 10 people from each faculty in CG and EG. Thus, in general, in the experimental and control groups that were formed in each IHME, there was the same number of participants – 120 people, as shown in table.2.

*Table 2*

**Division of future masters into control (CG) and experimental (EG) groups**

Institutions of higher education	CG	EG
1. Danylo Halytsky Lviv National Medical University	20	20
2. Dnipro State Medical University	20	20
3. Ivano-Frankivsk National Medical University	20	20
4. Bukovynian State Medical University	20	20
5. Odessa National Medical University	20	20
6. Luhansk State Medical University	20	20
The total number of masters	120	120

In order to analyze the results of training of future masters of medicine for pedagogical activity there were determined statistical indicators of the formation of each component of readiness for the specified activity of participants of CG (120 persons) and EG (120 persons) at each stage of research (SR) – at the stage of initial (IC) and final (FC) control.

Thus, the results of defining the formation of the axiomotivational component of the readiness of future masters of medicine for pedagogical activity at different stages of control (EC) are shown in table. 3, where in quantitative and percentage indicators the number of masters (NM) is shown, which is characterized by a certain level of researching readiness.

Table 3

**The results of defining the formation of the axiomotivational component of the readiness of future masters of medicine for pedagogical activity**

Group-NM	SR	Levels of formation of the axiomotivational component of readiness								AvSc
		High		Sufficient		Satisfactory		Low		
		NM	%	NM	%	NM	%	NM	%	
CG-120	IC	21	17,5	55	45,83	41	34,17	3	2,5	3,78
	FC	24	20,0	57	47,5	39	32,5	0	0	3,88
EG-120	IC	20	16,67	54	45,0	42	35,0	4	3,33	3,75
	FC	35	29,17	65	54,17	20	16,66	0	0	4,13

Comparative analysis of numerical values in table. 5.3, which indicate about the formation of a certain level of axiomotivational component of the readiness of future masters of medicine for pedagogical activity, allows us to conclude that according to all four levels and the average score in EG were better results than in future masters who studied according to traditional methods in CG. Changes in the indicators of table 3 are visualized using the diagrams in Fig. 1.

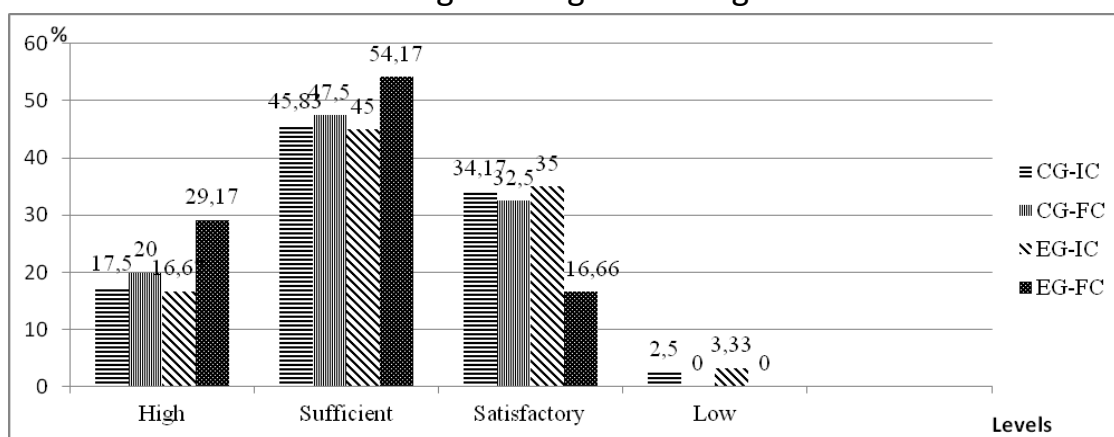


Fig. 1. Changes in the indicators of the formation of the axiomotivational component of the readiness of future masters of medicine for pedagogical activity

The obtained results of the experimental study were verified for reliability using methods of mathematical statistics. The basis is the methods that scientists recommend to use in professional pedagogy (Kyveryalg, 1980). In particular, Fisher's test (F-test) was used to prove the reliability of the results. The table material with indicators of theoretical F-criterion is taken as a basis ( $F_{krit}$ ) (Kyveryalg, 1980, p. 278).

In order to compare the value of the critical F-criterion ( $F_{krit}$ ) with empirical, calculated according to the indicators of formation of each level of readiness for pedagogical activity in future masters of medicine of control and experimental groups ( $F_{emp-CG}$  i  $F_{emp-EG}$ ), the number of degrees of freedom, which for CG and EG is  $120 - 1 = 119$ . At the condition when the number of degrees of freedom will be from 60 to 120 (which is typical for the number of participants in the CG and EG), then in the standardized tables  $F_{krit}$  is outlined in the range of 1.7 - 1.3.

If calculated values  $F_{emp-CG}$  i  $F_{emp-EG}$  will be within the indicators 1,7 – 1,3, thus the reliability of the obtained research results will be confirmed.

Making out mathematical calculations in order to define numerical indicators of Fisher's test in control groups ( $F_{emp-CG}$ ) and experimental groups ( $F_{emp-EG}$ ) carried out according to formula 1, borrowed from the manual of A. Kiveryalg (Kyveryalg, 1980, p. 277):

$$F_{emp} = \frac{\sigma_1^2}{\sigma_2^2} \quad 1,$$

where  $\sigma_1^2$  – higher dispersion;  $\sigma_2^2$  – lower dispersion, the value of which were determined by calculation using the formula 2:

$$\sigma^2 = \frac{\sum f(x_i - \bar{x})^2}{N} \quad 2,$$

where  $f$  – the number of participants in CG and EG with the appropriate level of readiness for pedagogical activity;

$(x_i - \bar{x})$  – the difference between the numerical value of each level of readiness for pedagogical activity (5, 4, 3, 2) and average score (AvSc);

$N$  – the number of future masters in CG or EG, where the dispersion was calculated.

Calculation of the dispersion according to formula 2 gave the following results:

- in CG  $\sigma_1^2 = 0,5697$ , and  $\sigma_2^2 = 0,5094$ , therefore  $F_{emp-CG} = 1,12$ ;
- in EG  $\sigma_1^2 = 0,5875$ , and  $\sigma_2^2 = 0,4427$ , giving calculations  $F_{emp-EG} = 1,33$ .

Thus, checking the reliability of the results of the formation of the axiomatic component of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG on the basis of a comparison of Fisher's test allows us to generalize that  $F_{emp}$ -CG with a numerical value of 1.12 goes beyond the theoretical value  $F_{krit}$  (1,3 – 1,7), and calculated  $F_{emp}$ -EG with an index of 1.33 indicates about the reliability of the obtained results.

Systematization of statistical data on the formation of the infocognitive component of professional competence of future masters of medicine of CG and EG allowed to compile table 3.

Table 3

**The results of defining the formation of the infocognitive component of the readiness of future masters of medicine for pedagogical activity**

Group-NM	SR	Levels of formation of the infocognitive component of readiness								AvSc
		High		Sufficient		Satisfactory		Low		
		NM	%	NM	%	NM	%	NM	%	
CG-120	IC	18	15,0	49	40,83	46	38,33	7	5,84	3,65
	FC	22	18,33	53	44,17	44	36,67	1	0,83	3,8
EG-120	IC	17	14,17	48	40,0	50	41,67	5	4,16	3,63
	FC	33	27,5	65	54,17	22	18,33	0	0	4,09

The established numerical values of the indicators of the formation of the infocognitive component of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG, are reflected in the form of diagrams in Fig. 2.

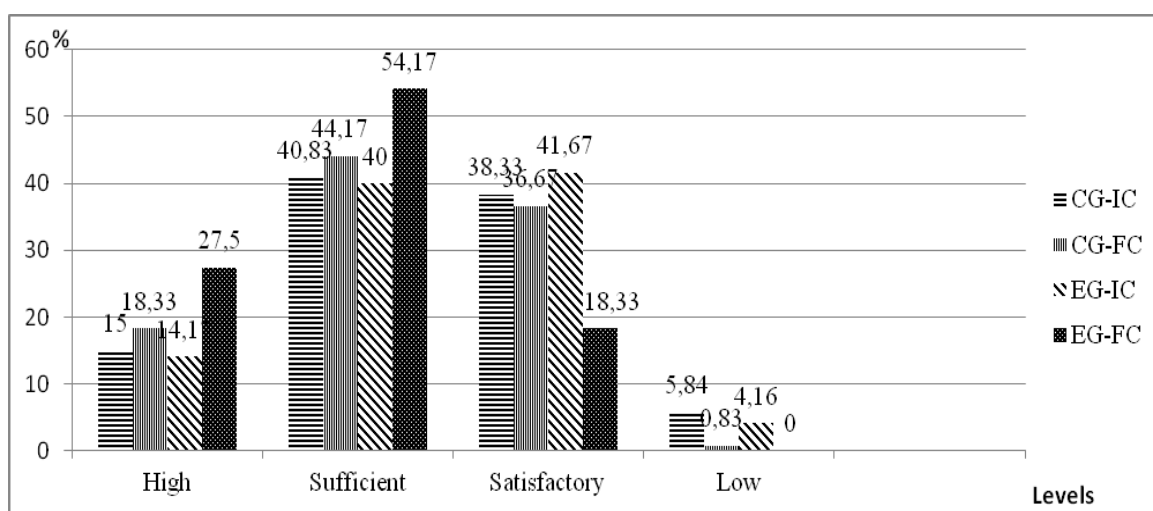


Fig. 2. Changes in the indicators of the formation of the infocognitive component of the readiness of future masters of medicine for pedagogical activity

Calculation of variance on the indicators of the formation of the infocognitive component of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG, gave the following results: in CG  $\sigma_1^2 = 0,6442$ , and  $\sigma_2^2 = 0,5433$ ;  $F_{emp-CG} = 1,19$ ; in EG  $\sigma_1^2 = 0,6156$ , and  $\sigma_2^2 = 0,4499$ ;  $F_{emp-EG} = 1,37$ .

Therefore, in CG  $F_{emp-CG}$  with numerical value 1,19 goes beyond standardized tables  $F_{krit}$ , and  $F_{emp-EG}$  with the calculated indicator 1,37 proves the reliability of the obtained results. The effectiveness of the formation of the communicative-activity component of the readiness of future masters of medicine for pedagogical activity is presented in table 4.

Table 4

**The results of defining the formation of the communicative-activity component of the readiness of future masters of medicine for pedagogical activity**

Group - NM	SR	Levels of formation of the communicative-activity component of readiness								AvSc
		High		Sufficient		Satisfactory		Low		
		NM	%	NM	%	NM	%	NM	%	
CG -120	IC	17	14,17	48	40,0	49	40,83	6	5,0	3,63
	FC	21	17,5	52	43,33	46	38,33	1	0,84	3,78
EG -120	IC	16	13,33	47	39,17	51	42,5	6	5,0	3,61
	FC	32	26,67	64	53,33	24	20,0	0	0	4,07

Diagrams in Fig. 3 make it possible to compare changes in the results of the formation of the communicative-activity component of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG.

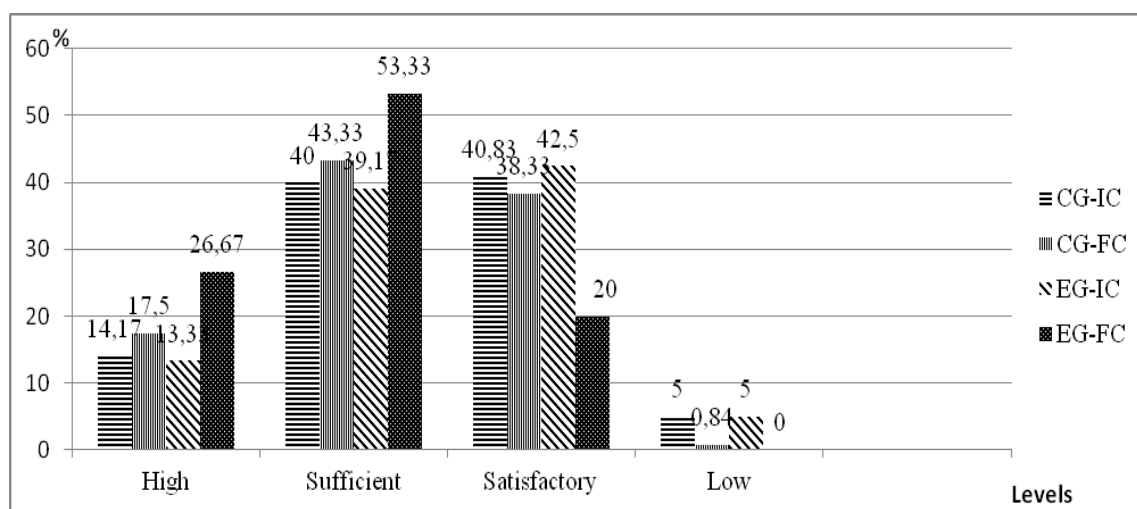


Fig. 3. Changes in the indicators of the formation of the communicative-activity component of the readiness of future masters of medicine for pedagogical activity

The reliability of the obtained results from the formation of the communicative-activity component of the communicative-activity component of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG, is confirmed by the following calculations:

- in CG  $\sigma_1^2 = 0,6156$ , and  $\sigma_2^2 = 0,5410$ ;  $F_{emp}\text{-CG} = 1,14$ ;
- in EG  $\sigma_1^2 = 0,6049$ , and  $\sigma_2^2 = 0,4622$ ;  $F_{emp}\text{-EG} = 1,31$ .

So,  $F_{emp}\text{-CG}$  with an indicator 1,14 goes beyond the standardized indicators of the theoretical F-criterion (within borders 1,3 – 1,7), and  $F_{emp}\text{-EG}$  with a numerical value of 1.31 indicates the reliability of the obtained results.

The results of the formation of the personality-reflexive component of the readiness of future masters of medicine for pedagogical activity, who studied in CG and EG, are shown in table 5.

Table 5

**The results of the formation of the personality-reflexive component of the readiness of future masters of medicine for pedagogical activity**

Group - NM	SR	Levels of formation of the personal-reflexive component of readiness								AvSc
		High		Sufficient		Satisfactory		Low		
		NM	%	NM	%	NM	%	NM	%	
CG -120	IC	20	16,67	54	45,0	43	35,83	3	2,5	3,76
	FC	23	19,17	56	46,67	41	34,16	0	0	3,85
EG -120	IC	19	15,83	53	44,17	43	35,83	5	4,17	3,72
	FC	34	28,33	65	54,17	21	17,5	0	0	4,11

In Fig. 4 there is shown the dynamics of the formation of personality-reflexive component of the readiness of future masters of medicine for pedagogical activity in CG and EG.

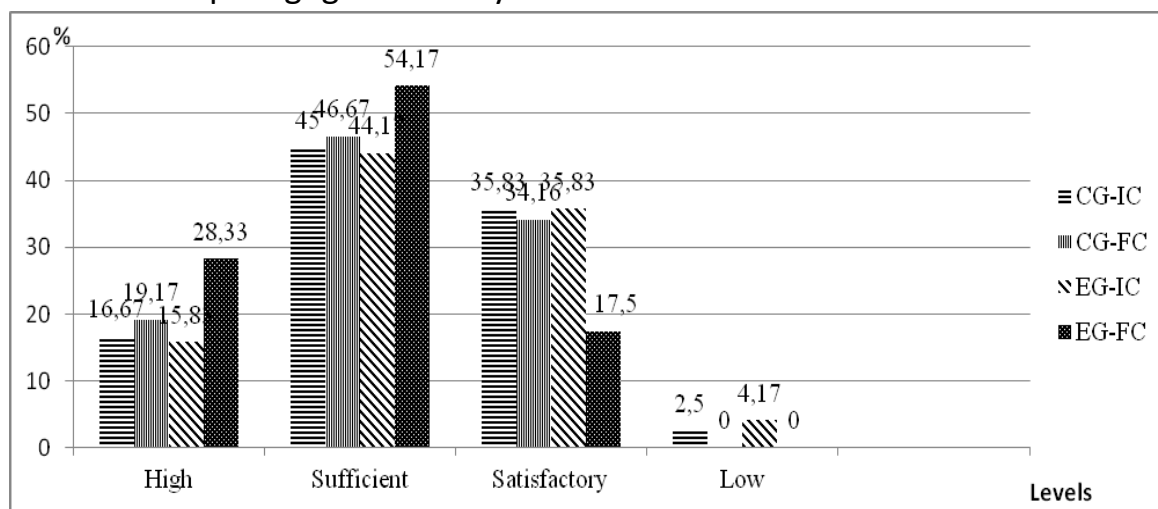


Fig. 4. Changes in the formation of the personality-reflexive component of the readiness of future masters of medicine for pedagogical activity

The reliability of the results of the formation of personality-reflexive component of the readiness of future masters of medicine for teaching by calculating and comparing the F-test (Fisher’s test) for CG and EG is confirmed by the following calculations:

- in CG  $\sigma_1^2 = 0,5666$ ;  $\sigma_2^2 = 0,5108$ ;  $F_{emp-CG} = 1,11$ ;
- in EG  $\sigma_1^2 = 0,6031$ ;  $\sigma_2^2 = 0,4466$ ;  $F_{emp-EG} = 1,35$ .

Therefore,  $F_{emp-CG}$  with a numerical value of 1.11 is not within limits of the theoretical F-criterion (1,3 – 1,7), and  $F_{emp-EG}$  with value 1.35 proves the reliability of the obtained results.

The generalized results of formation of readiness of future masters of medicine for pedagogical activity are presented in table 6.

Table 6

**Результати підготовки майбутніх магістрів медицини до педагогічної діяльності**

Group - NM	SR	Levels of readiness								AvSc
		High		Sufficient		Satisfactory		Low		
		KC	%	KC	%	KC	%	KC	%	
CG -120	IC	19	15,83	51	42,5	45	37,5	5	4,17	3,7
	FC	22	18,33	54	45,0	43	35,83	1	0,84	3,81
EG -120	IC	18	15,0	50	41,67	47	36,17	5	4,16	3,68
	FC	33	27,5	65	54,17	22	18,33	0	0	4,09

Visualization of the results of training of future masters of medicine for pedagogical activity, obtained in CG and EG is shown in Fig. 5.

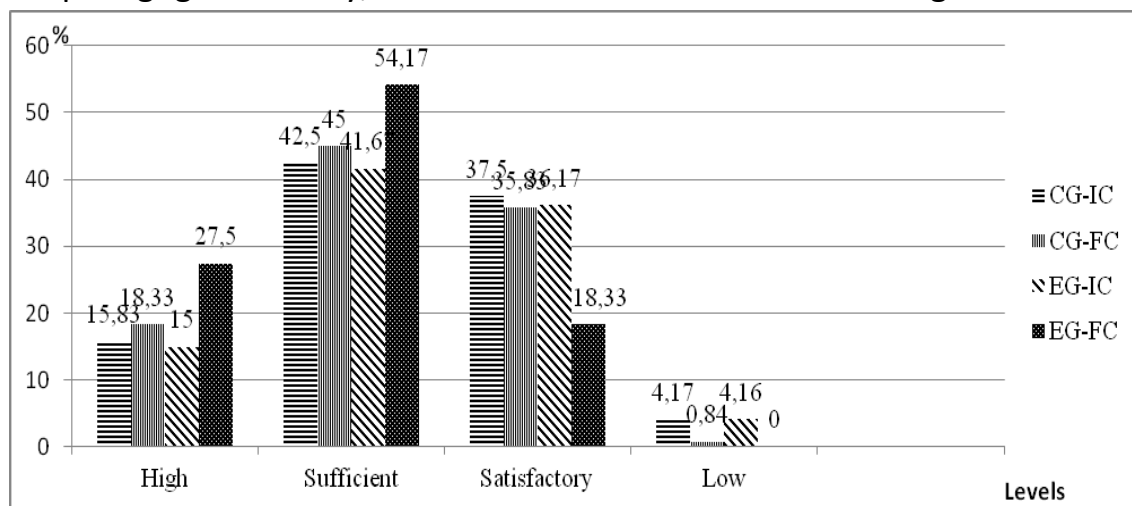


Fig. 5. Changes in statistical indicators of readiness of future masters of medicine for pedagogical activity

Verification of the reliability of the results of the training of future masters of medicine for pedagogical activity is confirmed by the following statistic data:

- in CG  $\sigma_1^2 = 0,6100$ ;  $\sigma_2^2 = 0,5383$ ;  $F_{emp-CG} = 1,13$ ;
- in EG  $\sigma_1^2 = 0,6027$ ;  $\sigma_2^2 = 0,4499$ ;  $F_{emp-EG} = 1,34$ .

Therefore,  $F_{emp}$ -CG with a value of 1.13 goes beyond 1.3-1.7, which is a standardized indicator of the theoretical F-criterion, a  $F_{emp}$ -EG with a calculated value of 1.34 confirms the reliability of the results.

**Conclusions and prospects for further scientific research.** Statistical processing of the results of research and experimental work on the preparation of future masters of medicine for teaching was carried out using the method of establishing and comparing numerical indicators of the Fisher test criterion. Comparative analysis of statistical materials indicates on the reliability of the obtained results of the study. This makes it possible to recommend the use of the author's pedagogical system in institutions of higher medical education in order to form the readiness of future masters of medicine for pedagogical activities in the field of health care.

**Prospects for further scientific research** we see in the expansion of areas of training of future masters of medicine for pedagogical activity in various medical institutions (colleges, institutes, academies, universities) with the use of innovative pedagogical technologies, modern information support, digitalization of education and the medical field in order to form highly qualified and competent professionals.

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#### АНОТАЦІЯ

**Василь Гуменюк.** Аналіз результатів підготовки майбутніх магістрів медицини до педагогічної діяльності.

*Мета статті полягає в доведенні достовірності результатів проведеної дослідно-експериментальної роботи з формування готовності майбутніх магістрів медицини до педагогічної діяльності як результату їхньої підготовки у медичних закладах вищої освіти. У науковому пошуку використовувалися методи теоретичного аналізу наукової літератури, методи математичної статистики, порівняння, ранжування, обчислення показників критерію Фішера, узагальнення. Порівняльний аналіз статистичних матеріалів свідчить про*

*достовірність результатів дослідження. Це дає змогу рекомендувати використання авторської педагогічної системи в медичних закладах вищої освіти з метою формування готовності майбутніх магістрів медицини до педагогічної діяльності у сфері охорони здоров'я, що підкреслює практичне значення дослідження.*

**Ключові слова:** магістри медицини, підготовка, педагогічна діяльність, методи, критерій Фішера, заклади освіти, готовність, освіта.

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**Наталія Коваленко**

Сумський державний педагогічний університет імені А.С.Макаренка

ORCID ID 0000-0003-2854-2461

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## **КАТЕГОРІАЛЬНО-ТЕРМІНОЛОГІЧНИЙ ТА МОРФОЛОГІЧНИЙ АНАЛІЗ ПСИХОЛОГО-ПЕДАГОГІЧНИХ УМОВИ ФОРМУВАННЯ РАННЬОЇ ПРОФЕСІЙНОЇ ІДЕНТИЧНОСТІ МАЙБУТНІХ УЧИТЕЛІВ ТА У СИСТЕМІ ПРОФЕСІЙНО-ПЕДАГОГІЧНОЇ ПІДГОТОВКИ ЗАКЛАДІВ ВИЩОЇ ОСВІТИ**

*У статті подано результати категоріально-термінологічного та морфологічного аналізу психолого-педагогічних умов формування ранньої професійної ідентичності майбутніх учителів засобами проектно-тренінгових технологій у системі професійно-педагогічної підготовки закладів вищої освіти. Визначено сутність поняття «психолого-педагогічні умови» та чотири психолого-педагогічні умови, які забезпечили взаємопов'язану сукупність методологічних підходів, принципів формування ранньої професійної ідентичності майбутніх учителів, стали підґрунтям педагогічної системи формування ранньої професійної ідентичності майбутніх учителів засобами проектно-тренінгових технологій у системі професійно-педагогічної підготовки закладів вищої освіти.*

**Ключові слова:** психолого-педагогічні умови, рання професійна ідентичність майбутніх учителів, формування ранньої професійної ідентичності майбутніх учителів, професійно-педагогічна підготовка, педагогічна система формування ранньої професійної ідентичності майбутніх учителів.

**Постановка проблеми.** Педагогічна система формування ранньої професійної ідентичності майбутніх учителів створена як складова (підсистема) системи професійно-педагогічної підготовки ЗВО. Реалізуючи завдання системи професійно-педагогічної підготовки, розроблена педагогічна система спрямована на досягнення конкретного результату – сформованості РПІМУ (Kovalenko, 2021). З метою спрямування й оптимізації освітнього процесу досліджуваної педагогічної системи було сформульовано психолого-педагогічні умови формування РПІМУ засобами проектно-тренінгових технологій, що визначені на основі аналізу наукового доробку й отриманих нами під час констатувального етапу педагогічного експерименту даних.

**Аналіз актуальних досліджень.** Методологію педагогічної науки, а також учення про неї розробляли В. Андрущенко, В. Биков,