Revista Românească pentru Educație Multidimensională
ISSN: 2066-7329 | e-ISSN: 2067-9270
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2020, Volume 12, Issue 1, pages: 265-290 | doi:10.18662/rrem/213

Organization of Research Work of Future Pedagogues in Higher Education Institutions: Experiential Learning Results

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Abstract: The article is devoted to the results of experimental training in forming the readiness of future pedagogues to successfully perform their professional tasks by means of research work. Also this article deals with the author's approach to the application of methodological tools for the formation of professional competence in higher education applicants at all stages of university education.
The article is focused on the need to build modern higher education based on the principles of organizing research activities with a practical and pragmatic orientation. The factors of systemic influence on the effective research activity of future pedagogues are identified and analyzed.
The experimental study was conducted in a parallel structure, thus, two homogeneous objects were identified – experimental and control groups. In experimental groups, the author's method of teaching future teachers was used; in the control groups, the educational process followed the traditional scheme of studying in HEIs. The comparison of both objects of the study was performed both before and after the experiment.
It is proved that successful implementation of the experimental programme will contribute to meet the needs of future educators in quality higher education, expand their professional competence, create the conditions for scientific research.
The results of comparisons and contrasts of initial and final characteristics of the formation of the future pedagogues' readiness to successful perform professional tasks by means of research are presented; the efficiency and effectiveness of the above-mentioned process are proved.

Keywords: *environmental culture; future teacher; indicators; criteria; model; professional training; pedagogical conditions.*

How to cite: Sushchenko, L., Gladysh, M., Zubtsova, Y., Sushchenko, R., Kniazian, M. (2020). Organization of Research Work of Future Pedagogues in Higher Education Institutions: Experiential Learning Results. *Revista Romaneasca pentru Educatie Multidimensionala, 12*(1), 265-290. doi:10.18662/rrem/213

1. Introduction

In the age of rapid globalization, high intellectualization and intensive growth of the volume of information, radical transformation in the field of education, the most pressing challenge of the national professional pedagogy is the strategic orientation of the professional training of pedagogical staff to rethink and take into account long-term goals, direct towards the model of continuous development, ensure the timely readiness to new conditions of education and upbringing, active influence on the advance harmonious development of environment and educational environment.

Accordingly, it is of the utmost importance to make significant changes to the existing system of professional training of future teachers, in particular, to provide the professional pedagogy of research character, its focus on the search for new alternatives and progressive ideas for the improvement and development of professional adaptation of pedagogical staff to perspective innovative concepts and technologies of successful involvement of higher education applicants in professionally-oriented research work. These significant changes have been required for future pedagogues with the purpose of discovering new pedagogical truths and understanding of existing contradictions, gaining experience of formulating hypotheses, independent conducting of new scientific observations, designing, successful realization of professionally oriented research activity.

In the context of studying the issue of research work organization of higher education applicants in domestic professional pedagogy, much has been accomplished in terms of defining scientific approaches to formulating key provisions of its influence on the overall development of the student's personality. But today the important and promising task is to make optimal use of the research work organization of future teachers in order to bring them closer to professionalism in the process of professional training.

In this perspective the scientific works, which contain the basic theoretical foundations on the organization of research work of higher education applicants, are particularly important:

- philosophical views on the problem of scientific research (Andrushchenko, 2015; Ziazun, 2008, Kremen', 2013; Slyusarevsky, 2011);
- genesis of preparing a future teacher for research pedagogical activity (Knyazian, 2012; Kushniruk, 2011; Lerner, 1981; Sisoeva, & Slastionin, 2013).

The current stage of social progress is characterized by increased interest in human intelligence and self-realization. Defining intelligence as a strategic resource for development, European civilization draws attention first of all to education and science. European education for many other peoples of the world is an example of the organization of the educational process, its content and technological support, although each of them has its own gains in the field of education.

Thus, Academician V. Andrushchenko (2018) proves that "the root of solving the problems of civilizational development of Ukraine lies in science, education and upbringing, which should ensure the return of people to the bosom of mind and creativity, high spirituality and morality, creating the need to do good for man and society ".

The scientists G. Tsvetkova and E. Panasenko (2019), who research problems of professional pedagogy, emphasize on the professional competence of future pedagogues, "characterized by their ability, readiness, ability to pedagogical activity, high level of specialist, which allows to predict, plan, design their self-determination and self-enrichment".

An indispensable condition for fulfilling the above-mentioned requirements is an increasingly active involvement of future teachers in research activities in higher education institutions (HEIs), and the inclusion of methodological knowledge in the cycle of psychological and pedagogical disciplines. In fact, there is an urgent need to engage future teachers in science. Despite declaring such ideas about the importance and necessity of training of a teacher-researcher, applicants for higher education often have complete or partial lack of research skills, lack of theoretical and methodological knowledge, and a system of relationships with research is not formed.

2. Methodology

The experimental work was carried out in order to test the effectiveness of the preparation of future pedagogues for the successful tackle of pedagogical tasks by means of research at such higher education institutions: the National Pedagogical University named after M.P. Dragomanov, Cherkasy National University named after Bogdan Khmelnytsky, Central Pedagogical State Pedagogical University named after Volodymyr Vynnychenko, Poltava National Pedagogical University named after V.G. Korolenko, Melitopol State Pedagogical University named after Bogdan Khmelnitsky, in particular, specialties "Philology. Ukrainian

Language and Literature", "History and Ukrainian Studies", "Chemistry", "Biology", "Geography".

The experimental study was conducted in a parallel structure, thus, two homogeneous objects were identified – *experimental and control groups* (the number of higher education applicants 164 and 156 respectively). In experimental groups, the author's method of teaching future teachers was used; in the control groups, the educational process followed the traditional scheme of studying in HEIs. The comparison of both objects of the study was performed both before and after the experiment. This enabled to compare the initial and final characteristics of the formation of the final level of readiness for successful solution of professional tasks by means of research work and, thus, to prove the efficiency and effectiveness of the introduction of scientific and methodological support for the research work organization of future teachers in the process of professional training.

The evaluation of the effectiveness of scientific and methodological support for the research work organization of future pedagogues by *motivational-valued component* was carried out on the basis of the analysis of the results of modified diagnostics of the motivation of investigative and research activities of higher education applicants (A. Rean's methods "Motivation of success and fear of failures", applied), the questionnaire by N. Kabardova, "Pedagogical self-assessment of personality's ability to innovate" by V. Slastionin). It is worth noting that in the experimental groups there was a change by leaps in the motivation of investigative activity and research-oriented thinking, which demonstrates through a steady interest in mastering the methods of research activity; an active and positive attitude to the research work, based on a strong sense its value and necessity; the persistence in overcoming difficulties in solving research problems, and more.

The results of the levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the motivational-valued component at the beginning and end of the experiment are shown in Table 1–3.

Table 1. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the motivational-valued component at the beginning of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp. group	Control group	Exp. group	Control group	Exp. group
1	Motivation for success	11,53	16,45	45,43	47,09	43,04	36,46
2	Personal demands in professional activity	23,59	22,07	45,80	42,12	30,61	35,81
3	Interest in pedagogical activity	18,21	20,74	32,28	29,71	49,51	49,55
4	Personal significance of research activities	17,09	14,49	48,23	47,56	34,68	37,95
5	Focus on the development of research abilities	11,35	12,25	32,68	39,78	56,05	47,97

The results of the analysis show that quantitative indicators at all levels are relatively stable in the control group (CG) at the beginning and at the end of the forming phase of the experiment, while significant changes are observed in the experimental group (EG) after the forming experiment. Thus, the percentage of future teachers characterized by a basic level of achievement motivation (first indicator) decreased from 36.46% to 18.63%. Instead, the results reflecting the combined and creative levels of this quality indicator increased by 4.83% and 3% respectively.

Table 2. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the motivational-valued component at the end of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp. group	Control group		Control group	Exp. group
1	Motivation for success	11,84	26,45	48,93	54,92	39,23	18,63
2	Personal demands in professional activity	18,75	27,88	49,03	53,98	32,22	18,14
3	Interest in pedagogical activity	19,82	34,08	30,91	49,56	49,27	16,36

4	Personal significance of research activities	18,37	32,85	43,56	57,98	38,07	9,17
5	Focus on the development of research abilities	17,45	32,61	42,90	52,97	39,65	14,42

The positive changes in the experimental group are also observed in the second indicator (personal demands in professional activity). The change of motives led to improvement of work on own "I-concept", introduction of corrections and additions to the diary of own scientific achievements, which was reflected in the recording of results.

The analysis of the results of future teachers' experimental groups as for the interest in pedagogical activity (the third indicator), the personal significance of the research activity (the fourth indicator) and the focus on the development of research abilities (the fifth indicator) shows that all the results reflecting all levels of these indicators have undergone significant changes. Thus, the number of future teachers with a basic level of interest in pedagogical activity decreased by 33.19%, at the combined level – increased by 19.85%, at the creative level – increased by 13.34%. If at the beginning of the forming experiment the basic level of personal significance of the research activity of the higher education applicants was 37.95%; combined – 47,56%; creative – 14.49%, at the end of the pedagogical experiment, these data changed as follows: basic – 9.17%; combined – 57,98%; creative – 32.85%. The quantitative indicators of the focus on the development of research abilities of future teachers of the basic level decreased from 47,97% to 14,42, combined level - increased from 39,78% to 52,97%, creative level – increased from 12,25% to 32,61 %.

The formative impact on the indicators of the motivational-valued component of the readiness of future pedagogues to successfully perform professional tasks by means of research work in the conditions of experimental training, was made by learning the directions and actions of the future pedagogue-researcher; the fulfilment of individual motivation and personally attractive goal with emphasis on the dominant motivation; the intensification of theoretical considerations in the sphere of professional and pedagogical activity, investigative activity as the main driving force of personal and professional development and self-development; performing problematic, educational and professional tasks.

Thus, the calculation of the total value of indicators of a certain level at the beginning and at the end of the forming experiment with the derivation of their arithmetic mean made it possible to reflect (Table 3) the

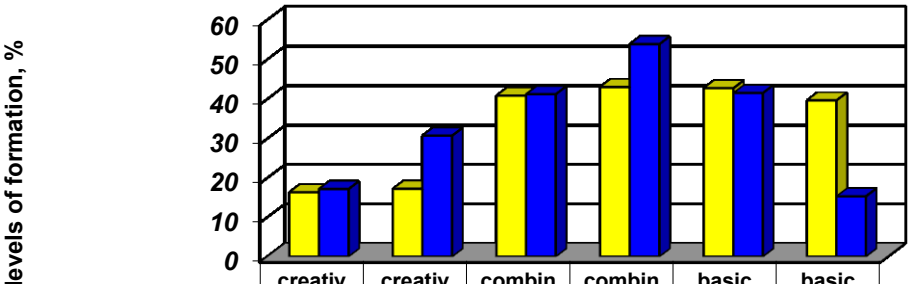
dynamics of the levels of formed readiness of future teachers to successfully perform their professional tasks by means of the scientific research work on the relevant indicators of the motivational-valued component.

In contrast to CG, the creative level of the motivational-valued component of the studied readiness in the EG increased significantly: from 17.2% to 30.78%, whereas this indicator in the CG at the beginning of the forming experiment was 16.35%, and after – 17, 2%. At the same time, the basic level of motivation-valued component of the readiness of future teachers in EG at the beginning and at the end of the pedagogical experiment decreased significantly from 41.55% to 15.34%. However, changes in the quantitative indicators of the indicated level of future pedagogues from CG at the beginning and at the end of the experiment are insignificant.

Table 3. The dynamics of formed readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the motivationally-value component, %

Levels	**the beginning of the experiment**		**the end of the experiment**	
	Control group	**Experimental group**	**Control group**	**Experimental group**
	556	564	556	564
Creative	16,35	17,20	17,25	30,78
Combined	40,88	41,25	43,06	53,88
Basic	42,77	41,55	39,69	15,34

This is clearly illustrated by the diagram of the distribution of future teachers by the formation of the indicated readiness on the relevant indicators of the motivationally-value component (Figure 1).



	creative (at the beginning)	creative (at the end)	combined (at the beginning)	combined (at the end)	basic (at the beginning)	basic (at the end)
Control group	16,35	17,25	40,88	43,06	42,77	39,69
Experimental group	17,2	30,78	41,25	53,88	41,55	15,34

Figure 1. The distribution of future pedagogues by the formed readiness to successfully perform their professional tasks by means of the research work on the relevant indicators of the motivationally-value component

The above confirms the effectiveness of the implementation of ways of scientific and methodological support for the organization of research work of future teachers in higher education institutions.

With the aim of identifying changes in indicators of *the cognitive component* of the examined readiness, we used the unfinished sentence method, tests, diagnostic control works, tasks and questionnaires.

It was necessary to determine at what level the system of psychological and pedagogical knowledge of higher education applicants was formed, which indicated changes in the quality of other knowledge, namely: skills to compare, analyze, synthesize, abstract, summarize material; to observe facts, events, phenomena, to process observational data, to classify, to identify essential issues, to apply analogy; to carry out a bibliographic search; analytical comparisons of data from different literary sources in order to highlight the problem and options for addressing it; express their thoughts and more.

The qualitative analysis has shown that future pedagogues are proficient in terminology, a system of knowledge about the essence of research, scientific knowledge and search. They are able to structure and systematize facts, phenomena, concepts, views; critically analyze information and assess it; understand the essence of the logic of scientific research; rules

for searching scientific information; perform analytical and predictive actions in the process of activity, while algorithmic actions when performing research tasks in a specific sequence. The summary experimental results of the research are presented in Tables 4 and 5.

Table 4. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the cognitive component at the beginning of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp group	Control group	Exp group	Control group	Exp group
1	Complex of psychological and pedagogical knowledge about methodological bases of scientific research and ways of their implementation in different types of pedagogical researches	9,74	10,05	36,78	33,49	53,48	56,46
2	Complex of research skills of future teachers	8,26	9,73	38,08	46,23	53,66	44,04
3	Peculiarities of implementation of scientific researches into pedagogical practice	13,29	16,04	46,21	57,14	40,50	26,82
4	Application of techniques of self-organization, introspection, self-control in the process of research	19,93	21,72	39,64	43,86	40,43	34,42

In the control group, these levels have significantly lower results. Thus, the monitoring of the results gave possibilities to ascertain the differences between the control and experimental groups in terms of such indicators: a complex of psychological and pedagogical knowledge about the methodological bases of scientific research and ways of their implementation in different types of pedagogical research; peculiarities of implementation of scientific researches into pedagogical practice; a complex of research skills of

future teachers, as well as application of techniques of self-organization, introspection, self-control in the process of research.

The results indicate that future teachers of the experimental group at the stages of implementation of the ways of scientific and methodological support for the research work organization of future teachers in the HEIs have significantly higher levels of cognitive knowledge than students of the control group.

After conducting a formative experiment in the experimental group, the number of future pedagogues with the combined and creative levels of the cognitive component of the studied readiness prevails.

Table 5. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the cognitive component at the end of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp group	Control group	Exp group	Control group	Exp group
1	Complex of psychological and pedagogical knowledge about methodological bases of scientific research and ways of their implementation in different types of pedagogical researches	10,91	29,81	35,94	58,70	53,15	11,49
2	Complex of research skills of future teachers	9,93	31,19	36,77	59,28	53,30	9,53
3	Peculiarities of implementation of scientific researches into pedagogical practice	14,74	24,12	45,69	63,08	39,57	12,8
4	Application of techniques of self-organization, introspection, self-control in the process of research	20,14	26,88	47,15	66,31	32,71	6,81

Thus, the calculation of the total values of the indicators of each of the levels at the beginning and end of the forming stage of the experiment

with the derivation of their arithmetic mean gave us the opportunity to reflect in Table 6 the dynamics of levels of formed readiness for the cognitive component.

The analysis of the control tests regarding the formation of the investigated readiness for the cognitive component indicators of future teachers of CG and EG demonstrates that changes in the results of their testing in EG are more significant.

Table 6. The dynamics of formed readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the cognitive component, %

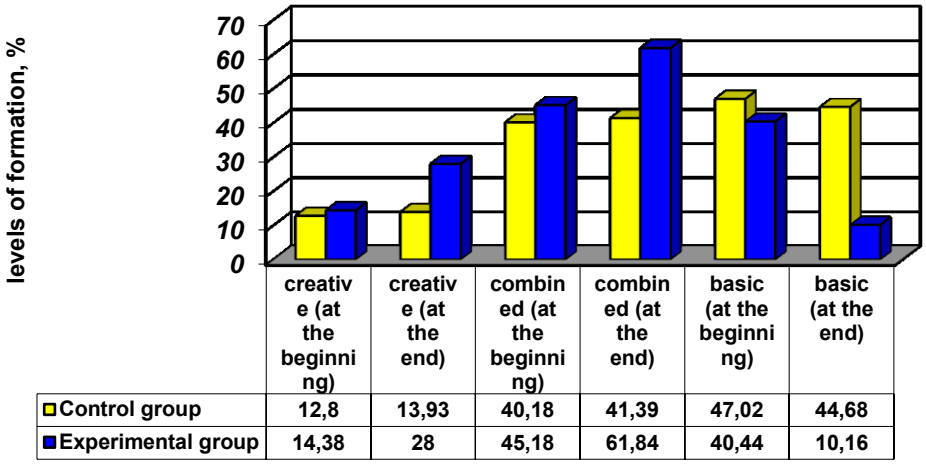
Levels	**the beginning of the experiment**		**the end of the experiment**	
	Control group	**Experimental group**	**Control group**	**Experimental group**
	556	564	556	564
Creative	12,80	14,38	13,93	28,0
Combined	40,18	45,18	41,39	61,84
Basic	47,02	40,44	44,68	10,16

Thus, at the beginning of the experiment, at the basic level of the first indicator was 53.48% of higher education applicants from CG and 56.46% of higher education applicants from EG, and at the end – 53.15% and 11.49%, respectively; at the combined level, at the beginning of the experiment, 26.78% of CG students and 33.49% of EG students, and at the end of the forming experiment, 35.94% of CG students and 58.7% of EG students; at the creative level, the quantitative indicators of testing future pedagogues from CG remained almost unchanged, while in EG they increased from 10.05% to 29.81%.

That effectiveness of the experimental research organization is demonstrated by the results on the formed readiness of future teachers of the second indicator of the cognitive component. Thus, at the basic level at the beginning of the forming experiment there were 53.66% of higher education applicants from CG and 44.04% of higher education applicants from EG, and at the end there were 53.30% and 9.53% respectively, at the combined level at the beginning – 38.08% in CG and 46.23% in EC, and at the end – 36.77 in CG and 59.28% in EC; at the creative level at the

beginning – 8.26% in the CG and 9.73% in the EG, at the end of the experiment – 9.93% (almost unchanged) in CG and 31.19% in EG.

This is illustrated by the diagram of the distribution of future pedagogues on their formed readiness to successfully perform professional tasks by means of research work on the relevant indicators of the cognitive component (Figure 2).



	creative (at the beginning)	creative (at the end)	combined (at the beginning)	combined (at the end)	basic (at the beginning)	basic (at the end)
Control group	12,8	13,93	40,18	41,39	47,02	44,68
Experimental group	14,38	28	45,18	61,84	40,44	10,16

Figure 2. The distribution of future pedagogues by the formed readiness to successfully perform their professional tasks by means of the research work on the relevant indicators of the cognitive component

These indicators are the result of handling some special courses by students: "Introduction to the speciality" (1st year), "Technology of scientific search" (3rd year), "Scientific organization of student work" (5th year). As well as work on the author programme of theoretical and practical training for university professors about the organization of professionally oriented scientific research work of future teachers on the basis of "School of pedagogical skills of teachers" in order to improve their professionalism impacted on the indicators.

The accumulation of qualitative changes is the effective organization of search work with future pedagogues, where the very process of professional training at all stages and organizational levels is the basis of the

dynamics of the final level of readiness to successfully perform professional tasks by means of research work.

With the aim of identifying changes in indicators of *the operating activity-oriented component* of the readiness being investigated, we applied: a direct and indirect observation; the method of rating; the peer review method; the results of which are shown in Tables 7 and 8.

Table 7. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the operating activity-oriented component at the beginning of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp group	Control group	Control group	Exp group	Control group
1	A regular search activity of future pedagogues in the process of performing research tasks	15,13	13,48	50,08	53,06	34,79	33,46
2	Ability to define research tasks by setting out the requirements for the results of their performing	21,33	17,16	32,65	37,74	46,02	45,10
3	A set of skills required for the application of basic research methods: observation, questioning, experiment, statistical testing of hypotheses, correlation analysis	21,51	21,19	26,35	25,19	52,14	53,62
4	Ability to analyze, predict, regulate, correlate their own research work, evaluate its results and their impact on the learning and upbringing of students	30,96	32,29	36,4	41,8	32,64	25,91

Significant positive changes in the formation of this readiness of future teachers of experimental group were achieved through a thorough study of the complex of disciplines, the introduction of unconventional methods and forms of the research activity organization of future teachers.

This stage was characterized by the study of: the features of creative work in the research activity; basics of scientific organization of work; methodology of scientific research and methods of its implementation in different types of pedagogical research; modern technologies of research training; the essence of the logic of scientific research; analytical and prognostic actions in the course of pedagogical activity; approaches to the choice of research methods; techniques of the organization in the research activity and their planning; research actions algorithm and so on.

At the same time, the formation of the readiness of future teachers to successfully solve their professional tasks by means of research was carried out continuously: first, disciplines aimed mainly at the development of the basic level and to some extent the development of the professional level were studied; then, based on the basic level formed, students proceeded to study the disciplines aimed at the development of the creative level, which is the basis of the dynamics of formation of the final level of the above readiness.

Table 8. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the operating activity-oriented component at the end of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp group	Control group	Control group	Exp group	Control group
1	A regular search activity of future pedagogues in the process of performing research tasks	15,3	22,29	52,06	60,95	32,64	16,76
2	Ability to define research tasks by setting out the requirements for the results of their performing	20,97	23,36	33,12	49,82	45,91	26,82

3	A set of skills required for the application of basic research methods: observation, questioning, experiment, statistical testing of hypotheses, correlation analysis	19,07	27,15	29,85	45,79	51,08	27,06
4	Ability to analyze, predict, regulate, correlate their own research work, evaluate its results and their impact on the learning and upbringing of students	31,18	37,45	40,1	49,67	28,72	12,88

The analysis of the experimental data on the formed readiness in accordance with the indicators of the operating activity-oriented component showed that with slight changes in the quantitative indicators of the control group at the beginning and at the end, the quantitative indicators of the experimental group at the basic level decreased from 53.62% to 27.06% (relative to third indicator), from 25.91% to 12.88% (relative to the fourth indicator).

If at the beginning of the forming experiment the combined level (the third indicator) of the experimental group was 25.19%; creative – 14.49%, then at the end of the pedagogical experiment these data changed as follows: combined level – 57.98%; creative – 45.79%. The quantitative indicators of the ability to analyze, predict, regulate, adjust their own research work, to assess its results and their impact on the learning and upbringing of pupils (combined level) – increased from 41.8% to 49.67%, creative level – increased from 32.29% to 37.45%.

Qualitative analysis of the control test check showed a significantly better dynamics of growth in the results of the combined and, especially, creative levels of formation at the control stage of the pedagogical experiment of readiness to successfully perform professional tasks by means of scientific research work in the experimental group compared to the control group.

The dynamics of the formation levels of future teachers' readiness for successful performing of professional tasks by means of research work towards relevant indicators of the operating activity-oriented component are shown in Table 9.

Table 9. The dynamics of formed readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the operating activity-oriented component, %

Levels	the beginning of the experiment		the end of the experiment	
	Control group	Experimental group	Control group	Experimental group
	556	564	556	564
Creative	22,23	21,03	21,63	27,56
Combined	36,37	39,45	38,78	51,56
Basic	41,40	39,52	39,59	20,88

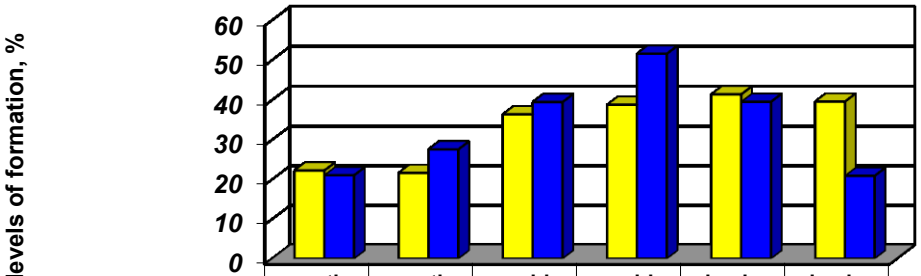
The combined level of development of this readiness in accordance with the indicators of the operating and activity-oriented component increased in EG from 39.45% to 51.56%, and in CG – from 36.37% to 38.78%.

At the beginning of the forming experiment, the creative level of the investigated readiness (operational and activity-oriented component) was recorded in 22.23% of future CG educators and 21.03% of EG respondents.

However, at the end of the forming experiment, this indicator in the CG was 21.63%, and in the EG reached 27.56%.

This is illustrated by the diagram of the distribution of future pedagogues on their formed readiness to successfully perform professional tasks by means of research work on the relevant indicators of the operating activity-oriented component (Figure 3).

The significant difference in the results is explained by the effectiveness of the research work. In the process of this work the future teachers were oriented to forming a readiness to introduction in practice the positive results and values of their research activities; enriched future educators with the necessary knowledge of research work; provided its focus on compliance with the requirements of modern society to a person with higher education, to the "model" of human quality, "model of quality of the teacher". In this regard, the quality of knowledge of higher education applicants has increased.



	creative (at the beginning)	creative (at the end)	combined (at the beginning)	combined (at the end)	basic (at the beginning)	basic (at the end)
Control group	22,23	21,63	36,37	38,78	41,4	39,59
Experimental group	21,03	27,56	39,45	51,56	39,52	20,88

Figure 3. The distribution of future pedagogues by the formed readiness to successfully perform their professional tasks by means of the research work on the relevant indicators of the operating activity-oriented component

In order to identify the nature of changes in the formation of the readiness of future teachers to successfully perform professional tasks by means of research on the relevant indicators of the reflexive-analytical component, we applied the following methods: "Self-assessment of self-activity and achievements" and "Self-actualization of personality". The fourth appraisal of the quality of knowledge was conducted as well.

Data on changes of the levels of formation of the above readiness at the beginning and at the end of the experiment on the respective indicators of the reflexive and analytical component are included in Tables 10 and 11.

Table 10. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the reflexive and analytical component at the beginning of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp group	Control group		Control group	Exp group
1	Ability to accumulate and	12,09	12,78	40,73	39,85	47,18	47,37

	systematize information on the results of their own scientific achievements						
2	Self-analysis of achievements in research activities	9,74	11,34	39,18	40,09	51,08	48,57
3	Formation of the reflective position of the future teacher	10,81	9,8	29,38	33,07	59,81	57,13
4	The conscious need for professional self-improvement	12,73	13,06	38,48	36,94	48,79	50,0

The analysis of the data tables, as well as the results of observations, conversations, self-assessments and materials of the appraisal give grounds to state that monitoring the results of the forming experiment provided the opportunity to observe the differences between the control and experimental groups regarding the formation of the readiness according to the indicators of reflexive and analytical component.

Table 11. The levels of the formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the reflexive and analytical component at the end of the experiment, %

№	Indicators	Creative level		Combined level		Basic level	
		Control group	Exp group	Control group		Control group	Exp group
1	Ability to accumulate and systematize information on the results of their own scientific achievements	12,79	37,04	40,85	50,18	46,36	12,78
2	Self-analysis of achievements in research activities	9,83	25,93	38,60	53,76	51,57	20,31
3	Formation of the reflective position of the future teacher	12,81	18,75	28,32	48,69	58,87	32,56
4	The conscious need for professional self-improvement	11,54	28,08	39,43	50,12	49,03	21,80

Thus, the analysis of the experimental results of the research shows that quantitative indicators at all levels are relatively stable at the beginning and at the end of the forming phase of the experiment in the control group, while significant changes are observed in the experimental one. The percentage of future teachers characterized by a basic level (first indicator) decreased from 47.37% to 12.78%. Instead, the results reflecting the combined and creative levels of this qualitative indicator increased by 10.33% and 24.26% accordingly.

Tables 10 and 11 demonstrate the positive dynamics in reaching the allocated levels of the future teachers of the experimental group, especially at the end of the last stage of the experiment.

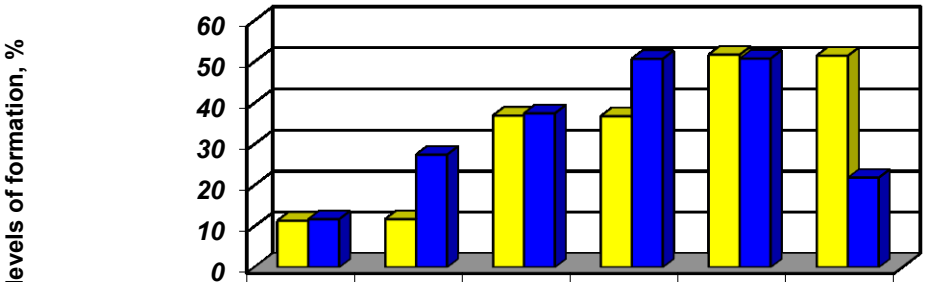
The dynamics of the formation levels of future teachers' readiness for successful performing of professional tasks by means of research work towards relevant indicators of the reflexive and analytical component are shown in Table 12.

Table 12. The dynamics of formed readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work on the relevant indicators of the reflexive and analytical component, %

Levels	the beginning of the experiment		the end of the experiment	
	Control group	Experimental group	Control group	Experimental group
	556	564	556	564
Creative	11,34	11,74	11,74	27,45
Combined	36,94	37,49	36,80	50,69
Basic	51,72	50,77	51,46	21,86

We have analyzed the work done to form future teachers' readiness for successful performing of professional tasks by means of research work towards relevant indicators of the reflexive and analytical component. It was found that the most effective means of its development are special trainings of self-control in the process of searching and building a system of pedagogical introspection, concerning the personal and active characteristics of future professional activity.

This is illustrated by the diagram of the distribution of future pedagogues on their formed readiness to successfully perform professional tasks by means of research work on the relevant indicators of the reflexive and analytical component (Figure 4).



	creative (at the beginning)	creative (at the end)	combined (at the beginning)	combined (at the end)	basic (at the beginning)	basic (at the end)
Control group	11,34	11,74	36,94	36,8	51,72	51,46
Experimental group	11,74	27,45	37,49	50,69	50,77	21,86

Figure 4. The distribution of future pedagogues by the formed readiness to successfully perform their professional tasks by means of the research work on the relevant indicators of the reflexive and analytical component

The experimental methodology proposed and implemented by us in the educational process contained: future teachers' reflection of situations of success in their professional activity; application of goal setting at each stage of the organization of research work; formation of projective and reflexive skills; determination of optimal means of performing the identified tasks; forecasting the short-term and long-term results of their implementation; awareness of the desire for self-knowledge, self-improvement, creative self-realization and dynamic self-correction; achievement of one's own search activity as the main driving force of personal and professional development and self-development.

The conducted pedagogical experiment included a number of content, organizational and other influences, which in turn influence the orientation of future educators on guidelines. The latter allow maintaining stability of activity in constantly changing situations, to determine the means, methods of satisfaction of the motivational and required sphere through behaviour and research activity. Moreover, the focus of value orientations and behaviour of the individual depend on the specific content of these levels, and effectiveness and constancy are demonstrated in actions of the individual.

Therefore, on the basis of diagnostic checks, the level of formation of the readiness of future teachers to successfully perform professional tasks by means of research work in control and experimental groups before and after the forming experiment was determined. The summarized results of the development of these components as a result of the forming stage of the experiment are presented in Table 13.

As a result of the experimental forming influence there were positive changes in the level of readiness of future teachers to successfully perform their professional tasks by means of research work by all components in the experimental group. The results of the study, shown in Table 13, indicate that during the control phase of the pedagogical experiment, the levels of readiness formation of the higher education applicants of the experimental group underwent significant changes, unlike the higher education students of the control group, where they were insignificant.

Table 13. The results of formed readiness of future pedagogues to successfully perform their professional tasks by means of the research work, %

Components	Groups	Levels					
		creative		combined		basic	
		at the beginning	at the end	at the beginning	at the end	at the beginning	at the end
Motivationally-value	CG	16,35	17,25	40,88	43,06	42,77	39,69
	EG	17,20	30,78	41,25	53,88	41,55	15,34
Cognitive	CG	12,80	13,93	40,18	41,39	47,02	44,68
	EG	14,38	28,0	45,18	61,84	40,44	10,16
Operating activity-oriented	CG	22,23	21,63	36,37	38,78	41,40	39,59
	EG	21,03	27,56	39,45	51,56	39,52	20,88
Reflexive and analytical	CG	11,34	11,74	36,94	36,80	51,72	51,46
	EG	11,74	27,45	37,49	50,69	50,77	21,86

The dynamics of readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work is presented in Table 14 and Fig. 5 (at the ascertaining and control stages of the pedagogical experiment).

Table 14. The dynamics of formed readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work, %

Levels	Ascertaining stage of the experiment		Control stage of the experiment	
	Control group	Experimental group	Control group	Experimental group
	556	564	556	564
Creative	15,68	16,09	16,14	28,45
Combined	38,59	40,84	40,0	54,49
Basic	45,73	43,07	43,86	17,06

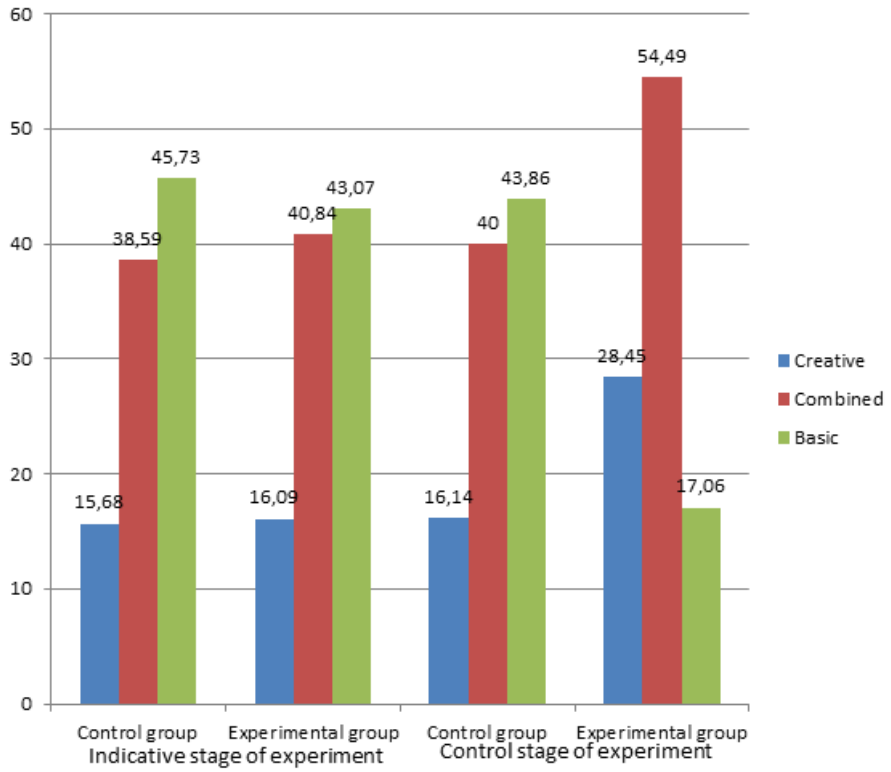


Figure 5. The dynamics of readiness levels of future pedagogues to successfully perform their professional tasks by means of the research work

The summarized results of diagnostic checks reflect the non-randomness and significance of changes in the readiness of future pedagogues to successfully perform professional tasks by means of research

work, which were found in increasing the levels of formation of this phenomenon.

4. Results and Discussion

The comparative analysis of diagnostic checks recorded the positive dynamics of future pedagogues' readiness to successfully perform professional tasks by means of research work, which emerged in the increase of the formation levels by motivationally-value, cognitive, operating activity-oriented and reflexive and analytical components. Thus, the number of higher education applicants with a creative level of readiness to successfully perform professional tasks by means of research work increased by 12.36% (from 16.09% to 28.45%). The number of future pedagogues with the combined level of formation of the studied readiness has increased from 40.84% to 54.49%. At the same time, the proportion of students with the basic level of its formation decreased from 43.07% to 17.06%, i.e. it decreased by 26.01%.

According to the results of the research, it is proved that the successful organization of professionally directed research work of future pedagogues, the organization of meaningful acmeological events contributes to the purposeful scientific and methodological support of the following three stages:

• Orientationally-research stage (1^{st}-2^{nd} year): creation of innovative-psychological environment in order to create the demand of future pedagogues in researching; formation and consolidation of knowledge about pedagogical science; awareness of the importance of solving research tasks in the professional work of the teacher;

• Organizationally-research stage (3^{rd}-4^{th} years): formation of stable internal motivation of the individual based on the dominance of future pedagogues; engaging them in self-observation; formation of readiness to implement positive values and results of own search activity into educational practice; nurturing persistence in overcoming difficulties in performing research tasks; mastering the skills to work on the Internet in search of the necessary scientific information, to analyze and synthesize literature sources, to find problematic aspects in the pedagogical field, which require the use of appropriate diagnostic research methods;

• Investigative-research stage (5th year): transforming the need for realization a research-based approach to professional activity into professional value; increasing the level of creativity; interiorization of intellectual and scientific values; increasing of scientific experience;

achievement of psychological freedom in carrying out research work; mastering at this stage the ability to independently carry out scientific research, process and describe the results of their research work, make announcements and reports at meetings of the research student's association and scientific conferences of various levels, to be able to answer the questions; creative approach to solving scientific and professional problems and so on.

The methodology of a step-by-step professional organization of research work of future pedagogues can be effective provided that the purposeful approach of future pedagogues to professionalism, the gradual transformation of the desire to engage in research activity into the highest stage - professional value; providing opportunities for successful professional self-realization, accelerating the development of creative potential of future educators, which opens the way to professional self-improvement.

5. Conclusions

Thus, the results of contrast and comparing the initial and final characteristics of the readiness of future pedagogues to successfully perform their professional tasks by means of research work are submitted in the article, and the efficiency and effectiveness of the above process are proved. The purpose of the forming phase of the experiment was the approbation of the effective direction of the science expansion vector into professional activity of both the pedagogue and the higher education applicants; rethinking all the factors that influence this process; organic combination of all kinds of research work with ensuring the most prestigious aspects of professional life (self-sufficiency, prestige, professional excellence, spiritual enrichment).

It was found that uninterrupted methodological support of self-optimization and self-improvement of the future pedagogue successfully occurs in the most enabling environment, which takes into account his/her individual identity in the implementation of professional tasks, professional and creative opportunities in the learning process, in extra-curricular work . The peculiarity of successful methodological support of the research work organization of professionally oriented future pedagogues is that it requires obligatory special in-university psychological and pedagogical training for its realization of the academic staff.

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