Date of Submission: December, 2024 **Date of Acceptance:** February, 2025 **Date of Publication:** March, 2025

PEDAGOGICAL CONDITIONS OF THE INNOVATIVE PROCESS OF PREPARING STUDENTS FOR RESEARCH ACTIVITIES IN HIGHER EDUCATION INSTITUTIONS

CONDICIONES PEDAGÓGICAS DEL PROCESO INNOVADOR DE PREPARACIÓN DE LOS ESTUDIANTES PARA LA ACTIVIDAD INVESTIGATIVA EN LAS INSTITUCIONES DE EDUCACIÓN SUPERIOR

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Suggested citation (APA, seventh ed.)

Koval D., Kravchenko, L., Matvisiv, Y., Berbets, T., Hrechanyk, N., & Yakymenko, S. (2025). Pedagogical conditions of the innovative process of preparing students for research activities in Higher Education institutions. ***Revista Conrado***, *21*(103), e4331.

ABSTRACT

The article considers the content and presents the classification of research activity. The main directions, levels, and types of students' research activities are identified. The research and experimental work consisted of integrating three interconnected stages, each of which was characterized by certain content, features, and defined goals. To diagnose the formation of students' readiness for research activity by implementing pedagogical conditions for the innovative process of preparing students for research activity in higher education institutions, adequate criteria and indicators were selected – value-based, cognitive-instrumental, and effective. The data obtained were differentiated according to four levels (low, medium, sufficient, high). The results of the ascertaining stage of the study indicated the need to introduce and conduct experimental testing of a system of measures that affects the process of innovative preparation of students for research activity, based on the appropriate pedagogical conditions. The difference in the levels of students' readiness for research activity through the implementation of the developed author's pedagogical conditions is statistically significant, which indicates its positive dynamics in the context of the implementation of research tasks during the experimental work. Thus, the positive dynamics in the experimental group confirm the effectiveness of the implementation of the students' readiness for research activity through the implementation of the developed author's pedagogical conditions in the process of the pedagogical experiment.

Keywords:

Research activity, Implementation of pedagogical conditions, Innovative training process, Higher education institutions, Students.

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RESUMEN

El artículo examina el contenido y presenta una clasificación de las actividades de investigación. Se destacan las principales áreas, niveles y tipos de actividades de investigación de los estudiantes. El trabajo de investigación y experimentación consistió en la integración de tres etapas interconectadas, cada una de las cuales se caracterizó por un determinado contenido, características y objetivos definidos. Para diagnosticar la formación de la preparación de los estudiantes para la actividad de investigación mediante la implementación de condiciones pedagógicas para el proceso innovador de preparación de los estudiantes para la actividad de investigación en instituciones de educación superior, se seleccionaron criterios e indicadores adecuados: valores, cognitivo-instrumentales y efectivos. Los datos obtenidos se diferenciaron según cuatro niveles (bajo, medio, suficiente, alto). Los resultados de la etapa de constatación del estudio indicaron la necesidad de implementar y realizar pruebas experimentales de un sistema de medidas que incida en el proceso de formación innovadora de los estudiantes para actividades de investigación, con base en condiciones pedagógicas adecuadas. La diferencia en los niveles de preparación de los estudiantes para las actividades de investigación a través de la implementación de las condiciones pedagógicas desarrolladas por el autor es estadísticamente significativa, lo que indica su dinámica positiva en el contexto de la implementación de tareas de investigación durante el trabajo experimental. Así, la dinámica positiva en el grupo experimental confirma la eficacia de la implementación de la formación de la preparación de los estudiantes para las actividades de investigación a través de la implementación de las condiciones pedagógicas desarrolladas por el autor en el proceso del experimento pedagógico.

Palabras clave:

Actividades de investigación, Implementación de condiciones pedagógicas, Proceso de formación innovador, Instituciones de educación superior, Estudiantes.

INTRODUCTION

A powerful tool for understanding the world is the scientific field, which serves as the engine of society's progress, expands the boundaries of human consciousness, and creates a foundation for solving global problems and innovations of humanity. High-quality education, which trains young qualified specialists, is the basis of such an approach. The key compass in the development of educational systems is pedagogical science, which improves and directs educational processes, forming, through the training of creative, competent, adaptive individuals, the future society (Chernenko, 2024).

Students' research work is one of the most important means of their effective preparation for professional innovation, as it provides a close relationship between scientific activity and educational professional disciplines, which leads to the identification of patterns, the discovery of new facts, the systematization and deepening of the acquired knowledge.

Research activity contributes to the generation of new knowledge, allows achieving higher motivation of students to assimilate and search for information, which is important for modern specialists; involves the search for evidence, the discovery of new facts, the identification of patterns, the systematization and deepening of the acquired knowledge, the substantiation of statements, the structuring of the studied material, etc.; contributes to the formation of a problem vision in any type of activity, since, engaged in research, the student sees the problem, independently chooses ways to solve it, and clearly presents the results of research activity.

All this contributes to the formation of such personal qualities as: imagination, creativity, intuition, associative thinking, divergent thinking, as well as such student character traits as endurance, thoughtfulness, purposefulness, attentiveness, activity, habit of systematic work, organization, independence, communication, responsibility, perseverance, discipline, etc. (Kozak, 2014).

That is why, to support the innovative orientation of technologies and the content of the educational process in higher education, to educate the personality and innovative management in higher education institutions, it is necessary to create an innovative infrastructure based on higher education and to develop an innovative research component of students' activities.

Literature Review

Scientists' research has always been aimed at encouraging a research approach to the educational process as an effective means of scientific training of students.

The author Bartosh (2024) emphasizes the growing role of research that students perform during the completion of their studies in higher education, which is a key way to achieve the results of the educational process according to the educational program, the development and formation of research skills and abilities; shows the connections between "research" and "learning and teaching" in the light of the formation of the skills of future specialists and their research skills; demonstrates the growing role of research in higher education and alternative opportunities for presenting the results of students' research activities.

The structure of formation and development of research skills and abilities was developed by Willison & O'Reagan (2007) for higher school students – from the moment of

entering the higher education institution to the completion of studies and preparation of their final research. Students must form research skills and practice general skills to achieve success in the preparation of research. The mandatory forms of research include visual and verbal presentation, report writing, critical thinking, creativity, and independent decision-making.

R. Griffiths (2004) proposed a typology of teaching and research relationships – three approaches: research-led – using the example of the results of teachers' scientific research – teaching the educational component; research-oriented – the formation of research thinking, evaluation and study of research methods; research-based – learning based on the problem-solving activities of the student and his own thematic research activities. The fourth approach is added by M. Healey (2005) – research-tutored – the participation of students in critical reviews of scientific literature and scientific discussions. Research-tutored is an integral part of teaching and learning and offers participation in research discussions. Students and teachers are given the main attention, encouraging them to critically discuss the research within the educational component.

Two groups of forms of research work of master's students are distinguished by Kozak (2014): those that are an integral part of the educational process and those that are performed in extracurricular time. The main stages of writing a master's thesis and its directions are named: performance of individual search and research tasks; performance during the period of pedagogical practice of atypical tasks of a research nature; implementation in the process of teaching professional and pedagogical disciplines of educational innovative technologies; training students in the technologies of preparing reports, articles, reports in the process of scientific and research innovatively directed practice; organization of students' participation in competitions of scientific student works, conferences.

The current problem of managing research group work of students in higher education is the subject of a study by O. Chernenko (2024). In general terms, the author characterizes the current state of scientific activity of students in higher education, determines the role of research in the training of future teachers; defines the functions and substantiates the scientific and theoretical principles of managing group research work of students; gives a classification of its forms, the advantages of students' research activity; shows the role of an innovative research environment for students' collective creativity, the formation of research groups, the development of students' skills of critical analysis, presentation of results and project management.

Summarizing the positions of scientists on the organization of research activities in higher education institutions, we note that the authors characterized the current state of research activities of higher education students, determined the role of research in the training of future specialists and its functions; provided a classification of forms of research activities in higher education institutions; emphasized the growing role of research that students perform during the completion of their studies, which is a key way to achieve the results of the educational process according to the educational program, the development and formation of research skills and abilities; developed a structure for the formation and development of research skills and abilities for students; proposed a typology of teaching and research relationships; showed the advantages of student research activities; proved the need for an innovative research environment for students' collective creativity, the formation of research groups, the development of students' skills of critical analysis, presentation of results, project management, etc.

Research purpose: formation of students' readiness for research activities by implementing the developed author's pedagogical conditions of the innovative process of training in higher education institutions.

MATERIALS AND METHODS

To achieve the research goal, a set of methods was used: theoretical – analysis of psychological and pedagogical literature with systematization and further generalization of the results – to compare different views on the problem and compare the research; analysis of modern practice – to clarify the features of students' professional training; empirical – questionnaires, surveys, pedagogical observation, conversation, knowledge testing, expert assessment of students regarding their readiness for research activities; pedagogical experiment – to verify the effectiveness of pedagogical conditions of the innovative process of training students for research activities in higher education institutions (declarative, formative, control stages); statistical – determination of standard deviation and arithmetic mean; calculation of Student's t-criterion to process experimental data, analyzing the obtained results and checking their reliability, clarifying the conclusions.

The research and experimental work took place during 2023–2024 and consisted of integrating three interconnected stages, each of which was characterized by certain content, features, and defined goals.

At the first stage, the scientific, pedagogical, and methodological literature was studied, the state of the development of the problem was clarified, the research apparatus was

specified and defined, and conceptual positions in clarifying the problem under study were clarified.

At the second stage, the ascertaining stage of the experiment was carried out, the research methodology was developed, and the pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions were identified.

At the third stage, an experiment was conducted, during which an experimental verification of the effectiveness of the developed pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions was carried out, the results were systematized and the analysis of the pedagogical experiment was carried out, and conclusions were formulated. The main task of the pedagogical experiment was to observe the studied pedagogical phenomenon in the created pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions, to identify the correlation and dependence between the developed learning conditions and the result.

At the ascertaining stage of the experiment, the following research methods were used: observation, survey, conversation, questionnaire, interview, and testing.

To diagnose the formation of students' readiness for research activities through the implementation of the developed pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions, adequate criteria and indicators were selected – value-based, cognitive-instrumental, and effective.

The data obtained were differentiated according to four levels (low, medium, sufficient, high).

The general level of readiness of students for research activities of each of the criteria was determined as the arithmetic mean of the quantitative values of each indicator of a certain criterion.

The results of the ascertaining stage of the study indicate the need to implement and carry out an experimental verification of the system of measures that affects the process of innovative training of students for research activities, the basis of which is the development of appropriate pedagogical conditions.

At the formative stage of the experiment in the EG, the implementation of pedagogical conditions for the innovative process of training students for research activities in higher education institutions was carried out. The research author's program of the formative stage of the experiment provided for the phased implementation of pedagogical conditions for the innovative process of training students for research activities in higher education institutions in the EG. CG students studied according to the standard educational methodology of a higher school.

A total of 69 respondents with a bachelor's degree participated in the research and experimental work.

An experimental study was conducted in a parallel structure – experimental (EG) and control (CG) groups were selected.

Both before and after the experiment, a comparison of both objects of the study was carried out. This made it possible to compare the final and initial characteristics of the formation of the final level of students' readiness for research activity through the implementation of pedagogical conditions of the innovative training process in higher education institutions.

As evidenced by the analysis of the experimental results of our study in the CG at all levels at the end and beginning of the experiment, quantitative indicators are relatively stable, and in the EG, positive significant changes are observed.

Comparison of data, according to all the specified criteria and indicators, obtained at the initial stage of the experiment and after its completion confirms the qualitative growth of EG indicators in the process of implementing the proposed pedagogical conditions.

Using one of the methods for testing statistical hypotheses – Student's t-test we conducted a statistical analysis of the data to verify the reliability of the results obtained during the experiment to determine the absence or presence of a difference in the results of the control group and the experimental group.

We compare the obtained coefficient t=3.12 with the (tabular) theoretical value of the Student's t-distribution.

We take into account the degree of freedom (significance level = 0.05, which corresponds to 95% reliability), which is calculated by the formula df=N1+N2–2=118 at p=5%, and the theoretical value of the Student's t-distribution is t=1.98. The obtained coefficient t=3.12 significantly exceeds the tabular value, i.e., the proposed pedagogical conditions for the innovative process of preparing students for research activities in higher education institutions are effective.

Therefore, the difference in the levels of students' readiness for research activity through the implementation of the developed author's pedagogical conditions is statistically significant, which indicates its positive dynamics in the context of the implementation of research tasks during

the experimental work. Thus, the positive dynamics in the experimental group confirm the effectiveness of the implementation of the students' readiness for research activity through the implementation of the developed author's pedagogical conditions in the process of the pedagogical experiment.

RESULTS AND DISCUSSION

Content and classification of research activities.

An important component of the educational process of higher education is the research work of students of higher education institutions, which contributes to the activation of students' cognitive activity, suggests the use of new technologies and methods, changes the meaning of academic disciplines, contributes to the development of creative abilities in higher education applicants, improves the quality of their professional training, broadens the student's horizons, and ensures the practical effective use of skills and knowledge acquired in the educational process (Alioshkina & Novak, 2021).

Research activities of students of higher education institutions are one of the areas of high-quality professional training of future specialists for their further professional activities, which is a deepening of the educational process, a natural continuation, by overcoming problems and studying specific topics through the use of pedagogical research, a system of research methods, which contributes to students' self-development, the development of professional, scientific thinking, the need for intellectual formation, and self-education of the personality (Sydorchuk, 2002). Therefore, the research activity of students is a scientific search activity, and as a result of which the subjective knowledge of reality acquires practical significance and novelty of an objective specific theoretical problem (Ponomariova, 2010).

The main goal of students' research activities is to use and obtain new scientific knowledge to ensure high-quality training of specialists, create socially useful scientific results, solve complex problems in the field of technological development and scientific, use and implementation of scientific, practical and scientific results on the world market (Verba, 2023).

Students' research activities, implemented in a complex, provide solutions to the following tasks: mastering the methods and methodology of scientific research, forming a scientific worldview, providing students with assistance in achieving high professionalism and accelerated mastery of the specialty, developing students' individual abilities and creative thinking in solving practical problems, instilling in students the skills of independent research activity; the ability to apply theoretical knowledge in their practical work, developing initiative, involving capable students in solving scientific problems, the need for constant improvement and updating of their knowledge; expanding the scientific erudition of the future specialist and theoretical horizons, developing and creating creative teams, scientific schools, educating a reserve of researchers and scientists in a higher educational institution (Chornovol-Tkachenko, 2009). The small number of academic hours offered in higher education in educational programs for students' research activities does not fully contribute to the active development of students' creative and analytical abilities. Due to the insufficient attention paid by society to the problems of managing group and individual research activities of students, we have, as a result, a certain loss of the scientific field and a low percentage of innovations implemented in research activities (Mytnyk et al., 2024).

The relevance of managing students' research activities is due to the rapid development of the information society and the growing need for specialists who can work effectively in a team, specialists of a new level, specialists who can generate innovative solutions. In the conditions of interdisciplinarity of modern science and its globalization, research activities become an important tool for the professional development of the individual (Kuchai et al., 2017). Effective management of the research process prepares students for the realities of the modern labor market, favors innovation and collaboration, and promotes the development of students' critical thinking, research, and communication skills. It should be noted that the organization of research creates a platform for science, pedagogical practice, the integration of education, its compliance with the needs of society, and the improvement of the quality of higher education (Chernenko, 2024).

Depending on the level of problems that are solved in education through research activities, research activities are classified into the following types: theoretical (fundamental), applied (theoretical-experimental), and experimental search (theoretical-applied) (Suprun, 2014).

Main directions, levels, and types of research activities of students.

During the professional training of future specialists in higher education, the following main directions of research activities of students are distinguished:

1. in the structure of the educational process;
2. in extracurricular activities, which complement the educational process in higher education and provide for independent research (outside the curriculum) work of students;
3. outside the university but carried out in parallel with the educational process (Knysh et al., 2024).

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The most effective in higher education institutions is research-based learning, which is based on research activities, where students form their own inquiries when studying existing knowledge and creating new knowledge. This approach is considered "real research", which allows students to "make discoveries" and contributes to the gradual acquisition of research skills and abilities by students from entering higher education to completing their studies (Bartosh, 2024).

Let us name the main levels of student participation in research activities.

Level 1 – students receive research tasks, clarify the essence and purpose of the research. Following the established research methods, students perform research tasks;

Level 2 – students receive further information about the research and consultations. Higher education applicants join an existing research project, publish articles, and work as part of research groups. Students can contribute to the dissemination of research results and influence the implementation of the research project, but the research is clearly directed (Shuliak et al., 2022).

Level 3 – students receive broad opportunities and a role in reformatting, determining directions of action, making decisions on the development of methods, and responsibility for the dissemination of the content of the research and the results of research activities.

Level 4 – students make all decisions independently without consulting in research activities with teachers.

Level 5 – students initiate research, formulate their own request, and conduct research, where all work is done in consultation with teachers, which allows students to receive constant feedback on the work done (Walkington, 2015).

Let us highlight the main types of research activities of students: systematization of materials, processing of used sources, selection of scientific literature, analysis of scientific literature, compilation of bibliographies on specific topics; preparation of abstracts and scientific reports, theses, scientific reports, articles; methodological developments on topical issues of professional activity; design developments of devices, instruments, scientific reports on the implementation of research elements during practice, coursework, qualification works, research computer programs, etc. (Chernenko, 2024).

Research activities have an informative multi-vector character; therefore, active learning methods are optimal because they involve interaction, business cooperation, understanding the essence of the phenomena under study, deeper assimilation of the material, exchange of information, and as a result, obtaining relevant skills and knowledge. (Pryhodii, 2016).

It is worth considering in higher education the problem of combining the following types of activity: research and educational. Such a combination is a systemic complex process aimed at implementing and organizing the educational process through research, the ability to apply knowledge from various fields in solving a specific research problem, when the educational process is based on the scientific research of teachers and students (Puhach et al., 2021). Such an approach to education requires the formation of students' ability to independently conduct innovative creative research, promotes the development of students' desire to actively express themselves (as a person and a specialist) in scientific creativity, etc. (Volkova, 2014).

Stages and course of the experimental study.

The research and experimental work took place during 2023–2024 and consisted of integrating three interconnected stages, each of which was characterized by certain content, features, and defined goals.

At the first stage, the scientific, pedagogical, and methodological literature was studied, the state of the problem was clarified, the research apparatus was specified and defined, and conceptual positions in clarifying the problem under study were clarified.

At the second stage, the ascertaining stage of the experiment was carried out, the research methodology was developed, and the pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions were identified.

At the third stage, an experiment was conducted, during which an experimental verification of the effectiveness of the developed pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions was carried out, the results were systematized and analyzed, and conclusions were formulated. The main task of the pedagogical experiment was to observe the studied pedagogical phenomenon in the created pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions, to identify the correlation and dependence between the developed learning conditions and the result.

At the ascertaining stage of the experiment, we consider it timely and necessary to investigate the orientation of the organization of students' research activities in higher education to fulfill the function of a researcher in professional activity. This stage of the study included: clarifying

students' attitudes towards future professional research-oriented activities; determining students' ideas about the content, essence, stages, structure, and mechanisms of research activities, methods of scientific cognition, students' awareness of the need to achieve ways of continuous replenishment of scientific personal potential by mechanisms of research activities; diagnosing difficulties that arise in the implementation of research-oriented activities.

At the ascertaining stage of the experiment, the following research methods were used: observation, survey, conversation, questionnaire, interview, and testing.

To diagnose the formation of students' readiness for research activity by implementing pedagogical conditions of the innovative process of preparing students for research activity in higher education institutions, adequate criteria and indicators were selected – value, cognitive-instrumental, effective.

Diagnostics of the value criterion of the study required the following indicators: interest in mastering scientific methods; formation of principles, norms, reference models, rules of professional activity of a student-researcher; dominance of the research component in the value system; orientation towards achieving a productive result; attitudes towards research-oriented subject-subject interaction with colleagues. The value of the above criterion was calculated based on the results of the arithmetic mean of all indicators.

According to the cognitive-instrumental criterion, the degree of formation of students' readiness for research activity was studied based on the following indicators: depth of knowledge, stages of research activity, norms; ability to determine the structure of research activities and the manifestation of initiative and independence in organizing and planning research; rational self-organization of research work; ability to apply research methods; prevalence of research activities in practice, in classroom and extracurricular work.

Diagnostics of the effective criterion required the study of the following indicators: the ability to assess the characteristics of one's own personality through correlation with others as a subject of pedagogical activity at the initial stage in comparison with one's own level of development; ability to self-regulate, self-correct behavior based on assessment activities; readiness to compete in the market of educational services; non-standard actions in working on oneself.

The data obtained were differentiated according to four levels (low, medium, sufficient, high).

The general level of formation of students' readiness for research activity of each of the criteria was determined as the arithmetic mean of the quantitative values of each indicator of a certain criterion.

We will provide a characteristic for each of the four levels.

A high level of formation of students' readiness for research activity is expressed by: students' interest and need for the chosen professional activity in general and, in particular, for research activity; a positive, active attitude to search work; perseverance and a stable need for means of research work and in finding effective ways to solve problems; for carrying out research activity – the presence of a system of professional qualities; the ability to direct one's own activity towards oneself; determining ways of promising one's own development as a researcher; building self-development strategies; predicting the results of research.

A sufficient level of formation of students' readiness for research activity is expressed by the fact that students observe a lack of unity in the development of all elements of the educational structure. Characterized by a sufficient level of coherence with the research activity of personal goals, but they are vague; the student uses only known approaches but understands the essence of scientific search; the possibility of reproduction and systematic formation of knowledge, stages, norms, research activity is characterized by insufficient depth; periodically manifests a desire for professional development, situationally observed research activity; assessment of the features of one's own personality is not always clearly carried out as an assessment of the subject of professional activity, the student's self-assessment may be inadequate.

The average level of formation of students' readiness for research activity is characterized by: situational fragmentation, instability of its manifestation; a certain limitation in the meaning of orientation towards professional research-oriented activity, towards the implementation of scientific competence and understanding of the role in one's own life; lack of orientation towards productive achievement of the result; lack of established research position; imitation prevails in the student when compiling the algorithm of search actions; the student conducts and analyzes an assessment of the problem of research from different points of view, but he is not ready for self-correction of his own activity; the student does not show activity in professional self-development or it is low.

The low level of formation of students' readiness for research activity is indicated by: lack of interest in the profession; desire for stereotypes; lack of formation of values of self-realization; weak information awareness regarding the features of search activity, understanding of its essence, inability to reproduce research activity in the profession; students do not show interest in mastering pedagogical research methods, as well as in participating in

research projects, seminars, conferences; such students systematically need external control of their activities from other participants in pedagogical interaction; students have certain difficulties in expressing their own thoughts, cannot defend their positions; do not show independence and initiative in solving tasks and professional situations; students of this group are not ready for critical analysis of the results of their own activities, self-correction and self-regulation; have difficulties in professional communication; the level of students' desire for self-improvement is underestimated. Many of the test questions were left unanswered by the respondents of this group.

The results of the ascertaining stage of the study indicate the need to implement and conduct an experimental verification of the system of measures that affects the process of innovative training of students for research activities, the basis of which is the appropriate pedagogical conditions.

Therefore, at the formative stage of the experiment in the EG, the implementation of pedagogical conditions for the innovative process of training students for research activities in higher education institutions was carried out. The research author's program of the formative stage of the experiment provided for the phased implementation of pedagogical conditions for the innovative process of training students for research activities in higher education institutions in the EG. The CG students studied according to the standard educational methodology of the higher school.

To prepare students for innovative professional activities and to form their research competencies at the formative stage of the experiment, we introduced the following forms of organizing research work for EG students: problem lectures; seminars, performing independent tasks with elements of problem search; preparing abstract materials with elements of scientific research and their presentation; annotating professional literature; writing theses, scientific articles and essays; compiling and solving creative problems; solving and developing test tasks; studying the experience of the best workers in the chosen field, etc.

An effective means of the innovative process of preparing EG students for research activities in higher education institutions and forming the research competence of future specialists was the holding of scientific conferences, symposia, round tables, and trainings, which stimulated students to publicly present the results of their scientific research.

As a system of basic initial provisions, attitudes, and requirements for the process of organizing students' research work, we consider in the EG the principles we have identified (general didactic: individualization, scientificity, consciousness, independence, and activity; specific: intersubjectivity, humanistic orientation; praxeological, compensatory).

At the formative stage of the experiment in the EG, the pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions were implemented. Let us consider them in more detail.

1. Strengthening the orientation of students' professional training towards their successful mastery of research methods in the educational space of higher education, which, based on scientific and technical achievements, ensures students' access to valuable knowledge, instilling skills for scientific work, mastering methods and foundations of research, and skills for their application in practice, which allows students to be competitive and mobile in the labor market.

By conducting role-playing and business games of a research nature, EG students were trained in diagnostic research tasks of a search nature, round tables with the participation of leading specialists, discussions, and modeling of professional situations. The research orientation of the educational environment of higher education provided: through the implementation of tasks of a research nature, professional situations – diversification of the content of educational complexes of professional disciplines aimed at building a research-oriented educational paradigm; successful acquisition of experience in direct research behavior; mastering the techniques of scientific methods of cognition, a complex of methodological knowledge, the interaction of professional training and the content of scientific and research work; which ensures an innovative transition of students to mastering the profession. Within the framework of non-traditional seminar classes, research tasks were solved (research seminar, discussion seminar, conference seminar, mutual learning seminar, business game seminar, etc.).

2. Formation of value attitudes in students towards the dominant research professionally-oriented activity in a comprehensive manner in the process of organizing research work, through cross-cutting personal and professional values through a system of research tasks based on the requirements for the future profession. A promising approach is one based on the expansion and deepening of the reflection of research reality, the conscious intellectual work of the student. The lecture material was aimed at testing in higher education multivariate approaches to solving the presented problem: based on problem-based learning, formulation and explanation of new concepts; application of information and computer learning tools; based on creating a problem situation, determination of the logic of scientific research; use of experience and theoretical knowledge in practice. We used elements of the technology of educational interaction based on orientation on the internal personal potential of each

student, on understanding, openness, positive mutual respect, openness to knowledge, creating conditions for the growth of each student.

3. Creation of a professionally oriented educational environment aimed at forming students' readiness for research activities about each of the components of readiness identified. Scientific and technological progress of society is accompanied by a healthy favorable climate in the collective, an appropriate culture of humanity in relationships, factors of activity and personality formation, stimulation of its creative and spiritual self-realization, satisfaction from work, creative atmosphere, cohesion, productivity, stability, mutual understanding between people, positive mood, self-regulation and self-organization. An educational environment of a research-search nature is a value platform that contributes to the involvement of the individual in the value-oriented world of science, the preservation of its self-realization. The technology of imitation-game learning was used in experimental work, which involved the use of didactic, role-playing, business games, and a system of training aimed at innovative development of scientific search methods.

Analysis of the results of research-experimental work

A total of 69 respondents with a bachelor's degree participated in the research and experimental work.

An experimental study was conducted in a parallel structure – experimental (EG) and control (CG) groups were selected.

At the formative stage of the experiment, the EG implemented the pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions. Thus, the research author's program of the formative stage of the experiment provided for the implementation of the EG in a phased implementation of the pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions. CG students studied according to the standard educational methodology of higher education.

Both objects of research were compared before and after the experiment. This made it possible to compare the final and initial characteristics of the formation of the final level of students' readiness for research activities by implementing the pedagogical conditions of the innovative process of training in higher education institutions.

In the process of determining the levels of students' readiness for research activity through the implementation of pedagogical conditions of the innovative training process in higher education institutions at the control stage of the experiment (high, sufficient, average, low), we clarified the quality of the content of each of the criteria we identified – value, cognitive-instrumental, effective.

The results of the levels of students' readiness for research activity through the implementation of pedagogical conditions of the innovative training process in higher education institutions by the value criterion at the beginning and end of the experiment are presented in Table 1.

Table 1. Changes in the levels of preparation of students for research activity through the implementation of pedagogical conditions

Stages / Groups	Statutory stage		Control stage	
Levels	CG	EG	CG	EG
High	18	18	19	30
Sufficient	20	21	25	40
Average	32	42	31	21
Low	30	19	25	9

Fuente: Elaboración de autores

Comparison of the initial and final results of the study by the levels of readiness (high, sufficient, average, low) of students for research activities by implementing pedagogical conditions of the innovative training process in higher education institutions according to the indicators of the value criterion in the CG and EG made it possible to show their significant positive dynamics:

In the EG: – high level 18% and 30%; 21% and 40% – sufficient level; 42% and 21% – average level; low level – 19% and 9%.

In the CG, 18% and 19% – high level; 20% and 25% – sufficient level; 32% and 31% – average level; low level – 30% and 25%. We see only minor level shifts in the CG.

The formative influence on the indicators of the value criterion of the formation of students' readiness for research activity through the implementation of the developed author's pedagogical conditions was achieved through experimental training due to the awareness of the significance of research activity by students and the formation of cognitive interest in such activity; positive and active attitude of students to research activity; perseverance and a persistent need to find innovative ways to solve professional tasks using research activity in higher education; stimulation of research activity; self-development.

Measuring the indicators of the cognitive-instrumental criterion. The purpose of the next stage was to establish the levels of formation of students' readiness for research activity through the implementation of the developed author's pedagogical conditions of the innovative process of preparing students for research activity in higher education institutions according to the indicators of the cognitive-instrumental criterion listed above.

The generalized experimental results of the study are presented in Table 2.

Table 2. Changes in the levels of students' readiness for research activities through the implementation of the developed author's pedagogical conditions according to the cognitive-instrumental criterion

Stages / Groups	Statutory stage		Control stage	
Levels	CG	EG	CG	EG
High	17	18	17	35
Sufficient	20	19	23	39
Average	29	35	35	20
Low	34	28	25	6

Fuente: Elaboración de autores

Comparison of results by cognitive-instrumental criterion – initial and final results – by levels of students' readiness for research activity through implementation of developed author's pedagogical conditions of innovative process of preparing students for research activity in higher education institutions in CG and EG participants allows us to talk about their positive dynamics.

In EG – 18% and 35% – high level; 19% and 39% – sufficient level; 35% and 20% – average level; 28% and 6% – low level;

In CG, 17% and 17% – high level; 20% and 23% – sufficient level; 29% and 35% – average level; 34% and 25% – low level. We see only minor level shifts in CG.

In the EG, unlike the CG, at the end of the formative stage of the experiment, the formation of the corresponding active research behavior of students is observed, the manifestation of their scientific competence based on self-knowledge.

Qualitative analysis showed that the EG students know the requirements for research programs and projects; possess sufficient terminology and a system of knowledge about the content, essence, stages and features of research activity; when planning and organizing scientific research, they show initiative and independence, demonstrate skills in determining the structure of research activities, etc. The results are significantly lower for students in the control group. Thus, the results obtained indicate that the students of the experimental group at the stage of implementing the pedagogical conditions of their preparation for research activity according to the cognitive-instrumental criterion have higher indicators of the formation of the phenomenon under study than the students of the control group.

To identify changes in the indicators of the effective criterion of the formation of students' readiness for research activity by implementing the developed author's pedagogical conditions of the innovative process of preparing students for research activity in higher education institutions, a diagnostic process was carried out at the next stage of the study.

The effectiveness is demonstrated in Table 3.

Table 3. Changes in the levels of formation of students' readiness for research activity by implementing the developed author's pedagogical conditions by the effective criterion

Stages / Groups	Statutory stage		Control stage	
Levels	CG	EG	CG	EG
High	21	20	22	36
Sufficient	25	22	25	37
Average	30	37	34	19
Low	24	21	19	8

Fuente: Elaboración de autores

Analysis of the data presented in Table 3, as well as the results of observations, examination materials, students' self-assessments, and conversations indicate that monitoring the results of the formative stage of the experiment showed differences in the experimental and control groups of students regarding the formation of students' readiness for research activities through the implementation of the developed author's pedagogical conditions by the indicators of the effective criterion.

Thus, as evidenced by the analysis of the experimental results of our study in the CG at all levels at the end and beginning of the experiment, quantitative indicators are relatively stable, and in the EG, positive significant changes are observed.

The percentage of students who were at the low and average level decreased from 21% to 8% and 36% to 19%, and the results showing the levels of qualitative indicators – sufficient and high – increased by 15% and 15%, respectively.

Summarizing. Comparison of data, according to all the specified criteria and indicators, obtained at the initial stage of the experiment and after its completion confirms the qualitative growth of EG indicators in the process of implementing the proposed pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions.

We, using one of the methods of testing statistical hypotheses – Student's t-test, conducted a statistical analysis of the data to verify the reliability of the results obtained during the experiment to clarify the absence or presence of a difference in the results of the control group and the experimental group.

We compare the obtained coefficient t=3.12 with the (tabular) theoretical value of Student's t-distribution.

We take into account the degree of freedom (significance level =0.05, which corresponds to 95% reliability), which is calculated by the formula df=N1+N2–2=118 at p=5%, and the theoretical value of Student's t-distribution is t=1.98.

The obtained coefficient t=3.12 significantly exceeds the tabular value; that is, the proposed pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions are effective.

Therefore, the difference in the levels of formation of students' readiness for research activities through the implementation of the developed author's pedagogical conditions is statistically significant, which indicates its positive dynamics in the context of the implementation of research tasks during experimental work. Thus, the positive dynamics in the experimental group confirm the effectiveness of the implementation of the formation of students' readiness for research activities through the implementation of the developed author's pedagogical conditions in the process of pedagogical experiment.

Recommendations for the formation of students' readiness for research activities.

Here are some recommendations for forming students' readiness for research activities to improve the educational process of higher education and the process of managing students' research work in higher education institutions:

- to ensure the continuity of the scientific process of research activities, use cyber-safe online platforms for coordination and communication of research groups;
- develop in students media literacy and skills of critical analysis of information, creativity of imagination, intuition, associative thinking, divergence of thinking, as well as such student character traits as endurance, thoughtfulness, purposefulness, attentiveness, activity, habit of systematic work, organization, independence, sociability, responsibility, perseverance, discipline, etc.;

- focus on a safe educational environment, psychological and pedagogical support for students, distance learning;
- encourage interdisciplinary research;
- store basic data by creating backup copies, ensure digital security of all research materials on cloud services;
- to establish mutually beneficial long-term cooperation with stakeholders and international partners to exchange experience and expand the resource base;
- to promote the development of scientific projects;
- to concentrate the efforts of the scientific project team on research;
- to create a system that allows for quick adjustment of methods and research directions.

CONCLUSIONS

At the ascertaining stage of the experiment, the following research methods were used: observation, survey, conversation, questionnaire, interview, and testing.

To diagnose the formation of students' readiness for research activity by implementing pedagogical conditions of the innovative process of preparing students for research activity in higher education institutions, adequate criteria and indicators were selected – value-based, cognitive-instrumental, effective.

The results of the ascertaining stage of the study indicated the need to implement and conduct an experimental verification of the system of measures that affects the process of innovative preparation of students for research activity, which is based on the appropriate pedagogical conditions.

The author's research program of the formative stage of the experiment provided for the gradual implementation of pedagogical conditions of the innovative process of preparing students for research activities in higher education institutions in the EG. Students of the CG studied according to the standard educational methodology of higher education.

Both before and after the experiment, a comparison of both objects of research was carried out. This made it possible to compare the final and initial characteristics of the formation of the final level of students' readiness for research activities through the implementation of pedagogical conditions of the innovative process of training in higher education institutions.

As the analysis of the experimental results of our study shows, in the CG at all levels at the end and beginning of the experiment, the quantitative indicators are relatively stable, and in the EG, significant positive changes are observed.

Se puede afirmar que las condiciones pedagógicas propuestas para el proceso innovador de preparación de los estudiantes para las actividades de investigación en las instituciones de educación superior son efectivas.

Thus, the difference in the levels of students' readiness for research activities through the implementation of the developed author's pedagogical conditions is statistically significant, which indicates its positive dynamics in the context of the implementation of research tasks during the experimental work. En the experimental group It is confirmed the effectiveness of the implementation of the students' readiness for research activities through the implementation of the developed author's pedagogical conditions in the process of the pedagogical experiment.

Further research requires clarification of ways to involve capable students in solving scientific problems, the need for constant improvement and updating of their knowledge; expanding the scientific erudition of the future specialist and theoretical horizons, the development and creation of creative teams, scientific schools, and the education of a reserve of researchers and scientists in a higher educational institution.

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