

MENDIVE



REVISTA DE EDUCACIÓN

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Original article

Methodology for the labor training of Medicine students

Metodología para la formación laboral de los estudiantes de Medicina

Metodologia para a formação profissional de estudantes de medicina

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ABSTRACT

This article responds to the need for the elaboration of a methodology for the job training of students of the Medicine career, which contributes to the improvement of their performances during the fulfillment of the functions of the General Practitioner aimed at solving a problem during their assistance functions, teaching and research. A pre-experimental quantitative research was carried out using theoretical methods such as analysis and synthesis and empirical methods such as the review of documents, observation, the pedagogical pre-experiment and as mathematical statistics, the chi-square statistician was taken into account, which allowed verifying the existence of favorable impacts on the job training of medical students in teaching, care and research as a result of its application in a sample of 165 3rd year students of the Medicine career at the University of Holguín Cuba. The result can be generalized at a national and international level according to the characteristics of the medical student's professional training process. The methodology contributes to improving work qualities as an expression of a more positive performance of the student, who is trained as a general practitioner in the face of teaching, care and research work.

Keywords: job training; student; Medicine.

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RESUMEN

El presente artículo responde a la necesidad de la elaboración de una metodología para la formación laboral de los estudiantes de la carrera de Medicina, que contribuya al mejoramiento de sus desempeños durante el cumplimiento de las funciones del Médico General, dirigido a resolver un problema durante sus funciones asistenciales, docentes e investigativas. Se realizó una investigación cuantitativa de tipo preexperimental, empleando métodos teóricos como análisis y síntesis, y empíricos como la revisión de documentos, la observación, el pre-experimento pedagógico; como estadísticos matemáticos se tuvo en cuenta el estadígrafo chi-cuadrado, que permitió constatar la existencia de impactos favorables sobre la formación laboral de los estudiantes de Medicina en lo docente, asistencial e investigativo como resultado de su aplicación en una muestra de 165 estudiantes de 3^{er} año de la carrera de Medicina de la Universidad de Holguín, Cuba. El resultado puede generalizarse a nivel nacional e internacional, acorde a las características del proceso de formación profesional del estudiante de Medicina. La metodología contribuye a mejorar las cualidades laborales como expresión de una actuación más positiva del estudiante que se forma como Médico General ante el trabajo docente, asistencial e investigativo.

Palabras clave: formación laboral; estudiante; Medicina.

RESUMO

Este artigo responde à necessidade do desenvolvimento de uma metodologia para a formação profissional dos alunos da carreira de Medicina, que contribua para a melhoria dos seus desempenhos durante o cumprimento das funções do Clínico Geral, visando a resolução de um problema durante o seu atendimento, funções de ensino e pesquisa. Realizou-se uma pesquisa quantitativa pré-experimental, utilizando métodos teóricos como análise e síntese, e métodos empíricos como revisão documental, observação, pré-experimento pedagógico; como estatística matemática, foi levado em consideração o estatístico qui-quadrado, que permitiu verificar a existência de impactos favoráveis na formação profissional de estudantes de medicina no ensino, assistência e pesquisa como resultado de sua aplicação em uma amostra de 165 alunos do 3^o ano da carreira de Medicina da Universidade de Holguín, Cuba. O resultado pode ser generalizado em nível nacional e internacional, de acordo com as características do processo de formação profissional do estudante de medicina. A metodologia contribui para a melhoria das qualidades de trabalho como expressão de um desempenho mais positivo do aluno que se forma como clínico geral antes do trabalho docente, assistencial e de pesquisa.

Palavras-chave: formação profissional; aluna; Medicamento.

INTRODUCTION

Cuban higher medical education after the revolutionary triumph has resulted, the progressive improvement of the different training plans for professionals in the sector, with the aim of achieving continuous improvement in the health level of the population and optimization of the services that with equity they are provided, as well as the elevation of the effectiveness in the labor training of the students.

The job training of medical students must have a solid development of political values, from the foundations of the Ideology of the Cuban Revolution; endowed with a broad scientific, ethical, legal, humanistic, economic and environmental culture; committed and prepared to defend the socialist Homeland and the just causes of humanity with their own, competent arguments, for professional performance and the exercise of virtuous citizenship.

The Ministry of Public Health (MINSAP) establishes the methodological guidelines for the Study Plan E in the Medicine career, which is designed so that "job training prevails with a broad and active participation of the student, with a high burden of Education in Work and formation of values."

It conceives five functions that support the social mandate of the General Practitioner: "comprehensive medical care, educational teaching, administration, research and special".

The work performance of medical students through their training process contributes to comprehensiveness, recognizing the need to develop the academic, work, research and extension components that are conceived in the current training process of the Medicine career.

The initial exploratory study, carried out as a result of the institutional research project "Job training from the university-work world link", of the 3rd year students of the Medicine career of the University of Medical Sciences of Holguín, allowed to identify that these have the following shortcomings:

- Difficulties with entrepreneurship and leadership that must be exercised during care, medical teaching and research that they carry out.
- Limitations in compliance with medical responsibility and ethics.
- They do not always behave in an organized, committed and creative manner during the care, medical teaching and research that they carry out in the performance of their duties.

These difficulties manifested by the students of the Medicine career limit their performance during the fulfillment of their functions (comprehensive medical care, teaching, research, administration), which causes, from the social point of view, difficulties in their job training, which which contributes to generate the first elements of the contradiction that gave rise to the development of this investigation.

The results of the initial exploratory study carried out, made it pertinent to carry out an epistemological analysis related to the formation of the Medicine student from the theory of medical education and treatment to labor training as a process and result that mainstreams this training process.

Several authors have developed research in the field of Medical Education that support the training process of the Medicine student; In this sense, the works of: García, Corrales and Reyes (2015); Cruz and Alonso (2016); Salas and Salas (2017); Miranda, Prieto, Tosar, Sánchez, Ruisanchez, and Tamayo

(2019); Pupo, Verdecia and Ramón (2020); Cervantes, Cruz, Cintero and Escaris (2020); Milan, Garcia, Cabrera, Hernandez, Rodriguez, and Miralles (2020); Villegas, Hamui, and Vives (2020).

These investigations provide models, strategies, methodologies, dimensions and methodological orientations aimed at the training of Medicine students from various perspectives, in which, due to the objectives they have pursued, they are limited to the study of the Medicine student's performance, but without delving into the treatment of their job training, from the specific characteristics of their training process.

For its part, the study aimed at job training verified the work carried out by: Infante, Leyva and Mendoza (2014); Argueta and Jiménez (2017); Alonso, Martinez and Dominguez (2019).

The study of the works of the aforementioned authors demonstrated the existence of principles, conceptions, categories, models, methods, strategies, methodologies and projects for the job training of students in the national education system in Cuba, whose results have allowed us to verify the existence of improvements in their job training; however, the absence of studies aimed at establishing paths for job training for Medicine students is appreciated, as a way to improve their performance in correspondence with the functions of the General Practitioner.

The foregoing makes it pertinent the need to investigate the following problem: how to improve the performance of Medicine students, according to the functions established by the model of the professional to the General Practitioner once graduated.

As a way to solve the problem, the objective is: to develop a methodology for the job training of students of the Medicine career,

improving the performance of the students of the Medicine career, according to the functions established by the model of the professional at the General Practitioner

MATERIALS AND METHODS

The research raised the following hypothesis:

The application of a methodology for the labor training of the students of the Medicine career, improving the performance of the students of the Medicine career, according to the functions established by the model of the professional to the General Practitioner

As a dependent variable, the performance of the medical student during the performance of the functions of the General Practitioner was determined. The independent variable is the methodology for the job training of the Medicine student. Likewise, a pre - experimental quantitative research was carried out, according to Hernández, Fernández and Batista (2014), based on a cross-sectional study.

The research is quantitative, of a pre-experimental type, because a stimulus or treatment is administered to a group and then the measurement of a (dependent) variable is applied to observe the level of the group in these (Hernández, Fernández and Baptista, 2014). In this sense, in the present investigation it is observed how the work performances (which is the dependent variable) behave in the Medicine students before and after the proposed methodology is applied, in a time of six months, a reason that leads to recognize the performance of a cross-sectional study.

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The following methods were used:

- Analysis and synthesis to interpret the job training of medical students.
- The review of documents, for the establishment of the theoretical framework of the investigation.
- Observation, to diagnose the work performance of medical students.
- Pedagogical pre-experiment, to validate the methodology through its partial introduction and the chi-square test, to accept or reject the research hypothesis.

RESULTS

The main results were determined in the establishment of medical teaching, education at work and scientific research, which is directed from the theoretical by the instructive, educational and developer method.

Actions to develop labor qualities during medical teaching

Action 1. Diagnosis of the development of labor qualities of the student

To do this, the student, under the mediation of the teacher (depending on the subject taught) will carry out the following actions:

- Contextualize the features of the labor qualities contributed to the characteristics of the content of the subject of the study plan in question.
- Observe the performance of the medical student according to the academic year they are going through.

- Assess (the student), jointly with the teacher, the state of development of the manifestation features of their work qualities, expressed in their teaching-assistance and research performance, according to indicators provided in section 1.3 of the thesis.

Action 2. Design, together with the teacher, tasks to develop the work qualities of the General Practitioner through the medical teaching they receive.

For this, the students, under the mediation of the teacher, will carry out the following actions:

- Characterization of the contents of the subject of the study plan received.
- Characterization of the manifestation features of the labor qualities provided in the theoretical component of the methodology.
- Interrelation between the contents of the subject received with the traits of labor qualities with educational potential for their development.

Take into account, in the design of the tasks, the following didactic structure (contextualized from the proposal made by Alonso, Martínez and Domínguez (2019):

Professional teaching, healthcare and research problem to solve: the professional problem that the Medicine student will solve is identified (either from the lowest to the highest level of complexity).

Training objective: the goal, the aspiration, the end to be achieved to solve the professional problem posed is defined, in which the integration of the knowledge and skills that characterize the content of the subject they learn is expressed, with the quality or qualities to develop in their personality as General Practitioners.

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Labor qualities to be developed: according to the educational potentialities of the subject content, what will be the labor qualities to be developed in the Medicine student, according to the manifestation features with greater integration potentialities.

Integrative content: the teacher who is in charge of guiding the medical student determines what content is to be appropriated and applied to solve the professional problem, which may or may not require the help of the teacher or the rest of their fellow students.

This content is the expression of the integration of the content that the student learns in the subject with the manifestation features of the work qualities provided in the theoretical component of the methodology (some of them, not all, according to the educational potentialities of the content of the subject).

Problematic learning situations to be carried out: according to the training model of the Cuban doctor and the very conception of labor training, problematic situations of learning of the integrating content are conceived, in which the student, according to the degree of complexity of the problem and of the determined contents in teamwork, it specifies the activities that must be carried out, emphasizing the duration periods and taking into account the forms of organization of teaching; that is, for each class that the student receives, what tasks are they going to carry out to solve the problem that contributes to developing their work qualities.

Criteria to be considered for the evaluation: according to the indicators determined in action 1, they establish how the task carried out by the student will be evaluated for the treatment of their job training during the learning of the contents of each subject (this is done to each subject individually)

Action 3. Execute the tasks designed for the development of the labor qualities of the General Practitioner during the forms of organization of higher medical teaching.

Once the tasks have been designed, they are carried out from the diversity of forms of organization of higher medical teaching, which the student receives in the subjects of the study plan. For this, the following methodological indications are recommended.

In the conferences, the medicine students, together with the teachers, must carry out the problem learning situations, conceived in the designed tasks, that allow them to search, analyze and understand the integrating contents and their link with the branch of the knowledge of the subject in question, which allow him to understand and explain and interpret, from the Medical Sciences, the professional problem identified in the task that is oriented in its design stage and why it is necessary to develop the work qualities of the Physician General.

On the other hand, in the seminars they must carry out learning problem situations aimed at deepening of the integrating contents determined in the previous action, through its link with the branch of knowledge of the subject in question, which allow it to offer new interpretations from medicine as a science that bases the contents that it studies in each subject and the meaning of the incorporation of the labor qualities of the General Practitioner, as well as the professional problem identified in the task in its design stage.

In the practical classes they must carry out problem situations aimed at the consolidation of the integrating contents of the task and its link with the branch of knowledge of the subject in question, which allow to achieve greater solidity in the interpretations from medicine as a science

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that bases the knowledge that it studies in each subject, and the meaning of its application in the solution of the professional problem identified through the demonstration of the manifestation traits of the labor qualities that characterize the integral performance of the General Practitioner.

in the workshops, students must carry out the problem situations aimed at the methodological systematization of the theoretical and scientific foundations related to the integrating content of the task and its link with the branch of knowledge of the subject in question; This will allow the generation of innovative solution alternatives to the professional problem and improve their performance by incorporating the work qualities that characterize the General Practitioner.

Medicine students, as part of the labor tasks that they develop from each form of organization of medical teaching, must apply the integrative contents (expression of the interrelation of knowledge and skills in the area of medical knowledge with the manifestation features of the labor qualities) that he learns in each subject of the study plan, through the realization of learning situations.

In each of the tasks carried out by medical students, the generation of questions and problem situations should be stimulated.

In this sense, the student is recommended to apply the clinical and epidemiological method according to the nature of the content of the subject they are learning, through the problem and investigative methods directed by the teacher (according to their personal style) from each form of organization of higher medical education.

The students, together with the teachers, will use the following problem methods:

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The *professional heuristic conversation*, for the development of problem situations during the conferences and seminars that he carries out for the treatment of his job training.

The *professional search*, for the development of the problematic situations conceived during the practical classes and the workshops that they carry out aimed at the treatment of their job training.

The *use of Information Technology and Communications (ICT)*, which promotes the interactive nature of the appropriation of integrating content for the student's job training, through the use of discussion forums, virtual learning environments, videoconferences, chats, among others.

Action 4. Evaluation of the results of the development of the student's work qualities during higher medical teaching.

We proceed to evaluate the state of the appropriation of the contents learned by the student in the subject, as well as the integration and application of the same, to the features of manifestation of the labor qualities of the General Practitioner provided in the theoretical component of the methodology and its demonstration during the tasks carried out through their teaching, assistance and research performances.

In this action, the students, through a workshop as a form of organization of teaching and under the mediation of the teacher, will carry out the following:

- **Self-assessment:** each student, individually, will carry out a self-assessment of the state of development of the work qualities that characterize the work training that the Cuban doctor is reaching, according to their manifestation features demonstrated in the performance of the task.

- Co-evaluate: each student will assess in other students the state of his work training as a Cuban doctor, based on the behavior demonstrated in the manifestation traits of the work qualities developed through the task.

- Receptivity: listening to the evaluative criteria issued by the teacher regarding the state of development of the labor qualities demonstrated during the performance of the task.

- Socialization: teachers will issue the evaluative criteria that allow them to get feedback regarding the diagnosis of their job training as general practitioners.

To carry out the actions conceived in this first procedure of the method to develop labor qualities, teachers must carry out the following actions:

- Guide the professional problem.
- Design tasks that guide the student to the active search for the new integrating content of the subject they teach with the use of ICT, according to the didactic structure suggested in action 3.
- Guide the tasks promoting the development of the student's work qualities during the application of clinical and epidemiological methods, depending on the nature of the content that he learns.
- Promote debates and exchanges of experiences through socialization with their students, according to the solution paths offered by the students.
- Evaluate their results through self-assessment and co-assessment about the state of the development of labor qualities that the student is reaching.

Teachers of General Psychology should get feedback on the evaluative criteria that students are reaching in the remaining subjects of the disciplinary diversity of the career; that is, during the execution of work tasks, in which they demonstrate the state in which their work training as General Practitioners is up and running.

Actions to develop work qualities during education at work

This procedure of the developing method of labor qualities for Medicine students, is aimed at their labor training from the educational potentialities of education at work, according to their organizational forms: investigations, medical guard, visit pass and consultation.

Next, the actions to be carried out by the students under the mediation of the teacher and the tutors.

Action 1. Conduct research in the assigned community.

In this sense, students will develop the manifestation traits of the labor qualities proposed for the General Practitioner in the theoretical component of the methodology, through the application of the following clinical and epidemiological methods:

- Stratify, in a responsible, committed, organized, independent and teamwork manner, each area to be investigated, with a fixed universe, delimiting the responsibility of each duo (route grid), the support of formal and informal community leaders, in a way that allows them to control the daily results of the same, as well as the analysis and identification of confirmed cases in places where it was reported during the investigation that there were no people with suspected manifestations of COVID-19, dengue or another type of epidemiological disease.

- Identify the efficiency in the detection of cases by carrying out daily analyzes of the quality of the investigation, which allows them to determine whether most of the suspects were detected early, the causes and conditions, so that a positive case was not detected in the investigation (violation of established epidemiological procedures), in an honest, responsible, committed, laborious and persevering manner.

- Prevent COVID-19 or other types of epidemiological diseases through the development of educational talks with the family and members of the community where they carry out the investigations in a committed, responsible, persevering and creative manner.

- Diagnose the family nucleus about the existence of symptoms associated with COVID-19, dengue or other types of epidemiological diseases with high responsibility, degree of commitment, perseverance and honesty.

- Identify individual health status in population groups independently, laboriously and flexibly.

- Determine existing risk factors associated with COVID-19 or another type of infectious disease with commitment and creativity.

- Discover early the hidden morbidity associated with some symptom of COVID-19 or another type of infectious disease, through the use of investigative methods that encourage the development of creativity and sensitivity.

- Make reports of successes and failures obtained in the research, in accordance with the teacher who attends the research and the family doctor with responsibility, honesty and industriousness.

- Stimulate the independence and research of the student in the search for solutions to the problem associated with the prevention of COVID-19, dengue or other types of infectious disease that are creative and innovative.

- Promote a prospective self-assessment of the experiences (positive and negative) acquired, and the student's capacity for critical analysis.

Action 2. Design tasks for solving professional problems during medical shifts, visits and consultations.

The Medicine student, through teamwork and under the mediation of the teacher, the work practice tutor and the resident doctor, will design work tasks to develop the work qualities of the General Practitioner during medical shifts, visiting passes and queries.

To do this, they must establish linking relationships between the actions carried out by the student during the medical shift, the visit pass and the consultations with the manifestation features of the General Physician's work qualities, provided in the cognitive theoretical component of the methodology.

These labor tasks have a higher level of generalization and professional and investigative meaning for the student, since they will allow him to develop the labor qualities of the General Practitioner, through the application of the scientific clinical and epidemiological method in the solution of professional problems during the participation in medical shifts, consultations and visits passes (depending on the year of study through which they are transiting).

For the design of the tasks, the same structure conceived in the teaching component will be taken into account, but with the difference in the integrating content,

which will be the expression of the integration of the actions carried out by the student in the medical guard, pass from visit and consultation with the manifestation features of the labor qualities of the General Practitioner, provided in the investigation.

Action 3. Apply the tasks designed to solve professional problems during medical shifts, visits and consultations.

In this sense, the student will carry out the following actions.

On the visit pass:

- Participate in the organization of the visit pass developing the features of quality, be organized.
- Assess, in a responsible, sensitive and confidential manner, the data (patient's clinical history) according to the room in which the visit will take place.
- Analyzing, through direct observation, the presentation of the patient by the medical team that carries out this activity, expressing responsibility, teamwork and commitment to this task that they will carry out as a future General Practitioner.
- Intervene in the proposal of medical assistance treatment schemes according to the clinical case conceived, where creativity, perseverance, love of medicine, sensitivity, humanism, leadership and medical ethics are manifested, according to their manifestation traits.
- Use ICT as a means of teaching, a work tool and a means of learning responsibly, diligently and independently.
- Use the existing supplies in the room where the visit is made, with responsibility, commitment and a sense of belonging.

- Apply, responsibly, sensitively and with medical ethics, health promotion and prevention actions with the patient and family.

- Participate in the application of the therapeutic scheme for the patient, responsibly, creatively and through teamwork.

In the external consultation:

- Participate in the diagnostic processes of the patient's health-disease status, in a responsible, persevering manner, with love for the profession and industriousness.
- Intervene in the forecasts of the state of improvement of the patient's health in a creative, committed, ethical, sensitive way and through teamwork.
- Develop, under the guidance of the teacher, the resident doctor and the tutor, recommendations to promote, prevent or cure the patient from the application of the clinical and epidemiological method in an independent, flexible and laborious manner.
- Use ICT as a means of teaching and a working tool for consultations, with responsibility and a sense of belonging.
- Use the existing inputs in the consultation in an efficient and rational manner and with a sustainable approach.
- Participate in the exchange, orally and in writing, of the information associated with the patient who receives medical consultation with medical ethics.
- Promote and prevent the state of health of the patient and the family, where he demonstrates responsibility, sensitivity, perseverance, love for the work he does.

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- Intervene in the reevaluation processes of the patient's evolution from the application of clinical and epidemiological methods with responsibility, perseverance, medical ethics, confidentiality and creativity.

In the medical guard:

- Assess the symptoms, signs or other clinical data present in the patient, via their participation in the interrogation and physical examination applied by the specialist doctor on duty and their residents, where a high sense of medical ethics, responsibility, industriousness, teamwork and love of medicine are demonstrated.

- Interpret results of complementary tests with independence and flexibility.

- Intervene in the processes of execution of conducts, indications and treatment in the restoration of the patient's health status in a responsible, laborious, ethical and persevering manner.

- Use ICT as a means of teaching and a work tool during the medical shift, with responsibility and a sense of belonging.

- Responsibly use the existing supplies in the area where the medical guard performs, that guarantees its optimal use, as well as the care and conservation of the environment.

- Assess the integration relationships between the diversity of medical specialties, according to the assigned duty service that contributes to reinforcing interest in the profession (love of medicine).

- Intervene during the exchange of information associated with the patient that you receive during the medical shift in which you demonstrate medical ethics, commitment, independence and flexibility of ideas.

- Develop health promotion and prevention actions, with a high sense of responsibility, perseverance and medical ethics.

- Participate in the reevaluation processes of the patient's evolution from the application of clinical and epidemiological methods with responsibility, teamwork, industriousness, independence and love for the Medicine career.

Action 4. Prepare diaries for the systematization of healthcare experiences.

Finally, the students of the Medicine career will record, during their work practices and the research activities in the community that they carry out, the care and educational experiences that they achieve during the application of clinical and epidemiological methods in the tasks carried out, in which values the role and meaning of developing the work qualities of the General Practitioner to achieve their job training in this branch of Medicine. In these records, they will self-evaluate how their work qualities are going, according to the achievements made and the difficulties they are presenting. On the other hand, they will make proposals to the teachers and tutors of the labor practices on how to improve their difficulties.

Actions to develop work qualities during scientific research

Parallel to these actions that they carry out during the labor component, the Medicine students will carry out the actions conceived in the investigative component.

To do this, the following actions are suggested:

Action 1. Design scientific-research activities during the forms of organization of teaching and education at work.

To the extent that the students assimilate the contents on scientific research in Medicine, from its integration with the features of manifestation of the labor qualities to be developed in the General Practitioner, they will design under the mediation of the research teacher and the tutors of work practice:

- Investigative situations during the teaching that he receives in the subjects of the study plan in which he will develop the labor qualities: creative, sensitive and medical ethics.

- Research projects in which the development of their work qualities is enhanced.

Hence, it is proposed that the student design investigative situations in which he investigates, interprets and assesses the proposals for alternative solutions to the problems associated with the contents he learns in the rest of the subjects of the study plan, which are not from the area of research and subsequently design research projects according to the educational level through which they pass.

For the design of investigative situations, students should take into account the following recommendations:

- Characterize the contents on scientific research.

- Characterize the contents of the subjects of the study plan that he learns.

- Evaluate the educational potential of the contents to develop the labor qualities of the General Physician, according to their manifestation features.

Apply the following structure for the design of research projects:

- *Project theme*

- *Research problem to be solved:* those professional problems that occur during the application of the clinical and epidemiological method that, for their solution, require the use of investigative methods are declared.

- *General and specific objectives of the project:* the alternative solution to the detected problem is established, which constitutes the product that emanates from the realization of the research project.

- *Labor qualities to be developed as medical researchers:* those labor qualities whose manifestation features have the potential to be developed during the use of the scientific method are specified and selected.

- *Labor tasks, materials and methods with an investigative sense to be carried out by the students:* they will have a period of time and require research methods, as well as material and human resources to carry them out where they carry out their work practices and research.

- *Expected investigative results:* the main contributions expected in the realization of the project are specified, which provide solutions to problems of medical care.

In the design of the projects, the work qualities will be developed: creativity, industriousness, responsibility, medical ethics, expertise, confidentiality, teamwork and perseverance in the student, according to the integration of their manifestation features with the theme of the project.

Action 2. Develop research projects.

During the execution of the research projects, the students will develop the work qualities: creativity, industriousness, responsibility, medical ethics, expertise,

confidentiality, teamwork and perseverance through the following actions:

- Identify, through inquiry, the existence of problems during the medical shift, the visit pass, the investigations and the consultations in which they participate during the education at work.

- Theoretically base the referential theoretical framework in the field of medical sciences.

- Generate, in a creative way, innovative alternative solutions to the problems that arise during the medical shift, the visit pass, the investigations and the consultations through the use of the scientific method.

- Introduce innovative alternative solutions to problems, through the systematization of their medical-assistance practice, the publication of articles and participation in scientific events.

- Assess the achievements and difficulties encountered during the introduction of innovative alternatives to the identified problems.

- Generalize innovative alternative solutions to problems, in a persevering, responsible and committed manner.

Action 3. Evaluate the results obtained in the development of research projects.

In this action, the students will proceed to evaluate the impact of the alternative solutions proposed to the problems, as a result of their introduction and generalization.

During the evaluation, the impacts achieved (positive or negative) as a result of the application of the alternative solutions

proposed as scientific results of the research projects will be taken into account.

To do this, students will develop labor qualities: industriousness, flexibility, organization, independence and perseverance, through the following actions:

- Evaluate the context where the research experiences carried out are developed.

- Identify the authors involved and their specific weight in the results.

- Study the inter-institutional and social articulation.

- Offer cost-benefit-risk perception studies.

- Feedback the experience, preconceive it, expand it, perfect it, generalize it.

- Relationship between social needs (economically, environmentally and to improve the patient's health) and the development of the research process.

- Changes that it has caused from the scientific, economic, care and health point of view of the population (whether positive or negative).

This concludes the proposal of the actions to be carried out for the job training of medical students.

The methodology was applied through a pedagogical pre-experiment carried out on a sample of 165 3rd year Medicine students from the University of Medical Sciences of Holguín, Cuba, whose most significant results are shown below.

The following graph establishes the comparative data on the state of the medical students' job training, before and after the procedure was applied.

The following graph shows the comparison made:

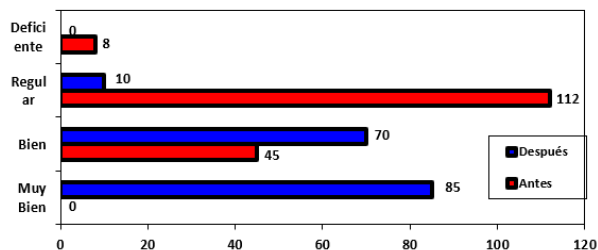


Fig. 1- Job training of medical students before and after applying the methodology

To assess whether the differences in the data shown in the graph of figure 1 were significant, the Chi-square statistical test (χ^2) was applied.

A 95.0% confidence level was used, recommended for educational sciences, assuming a degree of reliability of $\alpha = 0.05$. The following working hypotheses were outlined:

- Nullity hypothesis (H_0): the job training of medical students, before and after applying the methodology, is not significant.
- Alternative hypothesis (H_1): the job training of medical students, after applying the methodology, achieves significant differences with respect to its initial state (before being applied).

When applying the statistical test with the use of Excel, a probabilistic value of $p(\chi^2) = 0.003145$ was obtained, which is below the degree of reliability assumed, which is 0.05; that is: $p(\chi^2) = 0.003145 < 0.05$; so, H_1 is accepted and H_0 is rejected.

This result shows that the differences in the data obtained in the graph of figure 1 are significant; that is, it is inferred that with the application of the methodology, a 95.0%

reliability is achieved, demonstrated from the results achieved in the job training of medical students, an aspect that allows recognizing its validity and testing the hypothesis raised in the research.

DISCUSSION

The main results achieved during the training of medical students were taken into account as fundamental aspects: teaching, care and research, which showed improvements expressed in the following aspects.

In the teaching-educational function, they developed work qualities that allowed them to carry out training activities with community leaders, to develop health promotion and disease prevention actions, with an emphasis on COVID-19.

In the research function, they developed work qualities that allowed them to improve the application of the scientific method, through the clinical and epidemiological methods, with a social approach in the identification and solution of health problems in people, families, groups and the assigned community for its attention.

In the care function, they developed work qualities that allowed them to provide comprehensive and continuous medical care to the people, families, groups and groups assigned to them, through actions of health promotion, prevention of diseases and other damage to health, diagnosis and timely and rehabilitative treatment.

If this study is compared with the works of Salas y Salas (2017), the incorporation of work qualities from the educational potentialities of the academic, labor and research component is recognized, an aspect

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not taken into account in the study carried out.

On the other hand, the study carried out by Champin and Risco (2013); Vidal and Castillo (2019); as well as by Mora, Santiesteban and Gamboa (2020), although they address job training, they do not delve into how to develop job qualities from their teaching, care and research performances, aspects that were not taken into account in their studies.

The work carried out made it possible to determine that the job training of the Medicine career student is based on the Cuban doctor's training model and on the conception of job training that ponders the development of job qualities, based on the appropriation of the content during the teaching, assistance and research from the systematization of the instructive, deductive and developer method.

There is a lack, in the consulted theory, of the path, form and path to follow for the medical student's job training, by linking medical teaching with on-the-job education, research and university extension work.

The methodology that is provided in the research allows developing the job training of medical students, based on the instructive, educational and developer method and from the use of the educational potential of the content that they learn from medical teaching, education at work and research.

The applied pedagogical pre-experiment allowed us to verify, through the Chi-square test (X^2) that, with the application of the methodology, the job training of Medicine students is significantly improved, in accordance with the functions established by the model of the professional, being proven, with a 95.0% reliability, the research hypothesis.

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Conflict of interests

The authors declare no conflict of interest.

Authors contribution

All authors managed the information, reviewed the writing of the manuscript and approved the version finally submitted.



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