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TÍTULO: Fundamentos metodológicos de la formación de elementos de pensamiento clínico en estudiantes de una universidad médica mientras se enseña física.

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RESUMEN: Actualmente las universidades de Europa, Estados Unidos y Rusia realizan el modelo de competencias como el conjunto de competencias en la formación de futuros médicos; sin embargo, la formación de este conjunto no garantiza que los graduados tengan éxito en sus actividades profesionales. Según médicos competentes, el pensamiento clínico es lo que garantiza su profesionalismo. Los autores del estudio tienen como objetivo desarrollar métodos para la enseñanza de la física a los estudiantes de universidades médicas que contribuyan a la formación del pensamiento clínico. El artículo describe el modelo de este método y sus particularidades, y da una breve descripción de los resultados de su introducción al proceso educativo en una universidad médica.

PALABRAS CLAVES: formación de futuros doctores, pensamiento clínico, enseñanza de la física.

TITLE: Methodological foundations of the formation of clinical thinking elements in students of a medical university while teaching physics.

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ABSTRACT: Nowadays medical universities in Europe, America and Russian Federation implement competence-based model of training a future doctor as a complex of competencies. However, formation of the given complex does not guarantee successful performance of professional activity by the graduates. According to the opinion of authoritative doctors, the key of professionalism lies in the presence of medical judgment. The authors of the given research set their goal as developing methods of teaching physics to medical university students that promote the formation of medical judgment. The article reveals the model of the given methods and their peculiarities; results of introducing these methods into the learning process of a medical university are briefly described.

KEY WORDS: teaching future doctors, medical judgment, teaching physics.

INTRODUCTION.

From the very origin of higher medical education, the system of training medical personnel has naturally been raising the following question: what should a medical university graduate be like? What knowledge, skills and qualities should he possess? The analysis of the condition of the given issue shows that according to the regulatory documentation of Europe, America and Russia, the model of a future specialist represents a complex of the competencies that a university graduate should possess.

The given set of competencies is the key to creating professionalism with a future doctor. However, researchers – professors as well as practicing doctors note the importance of forming the so-called medical judgment among future doctors during the university learning.

The medical practice must systematically combine in itself the ability of working according to the protocol and the ability to independently defend the solution of professional issues, based on the principles of evidence-based medicine. It is in these clinical situations that are outside the standard, that the doctor must employ medical judgment.

Speaking of training medical university students for professional activity, it is necessary to note that curriculum of medical universities include such a discipline as “Physics” or “Bases of medical biophysics”. In our opinion, it is extremely necessary for each discipline to contribute to forming competencies and forming medical judgment among future doctors. Generalizing the experience of educators [1, 2, 3 and others] and curriculum developers [4, 5, 6 and others], we found that nowadays there are no researches aimed at the development of methods of forming medical judgment while teaching physics to students of medical universities.

DEVELOPMENT.

The goal of the research.

The goal of our study was to develop a model of a methodology for teaching physics to future doctors and its implementation in the educational process.

Materials and research methods.

The first stage of our research was in forming the tentative definition of the notion “medical judgment”.

Analyzing information materials as well as academic works, we established that medical judgment is the thinking aimed at solving professional issues of a clinician (medical, treatment-and-prophylactic, academic research issues), their goal being the detection of signs of disease from the initial syncretic image of an illness and establishing their correlation in biosocial and spiritual context. All the above mentioned shows the individual disease pattern.

Based on the definition “medical judgment” make a conclusion of the main stages of judgment that can be characterized as medical judgment. Stage “forming the initial syncretic image of an illness” corresponds to the type of activity on comparison of the given data of the disease and the health image; “detection of signs” corresponds to differentiating, analysis and synthesis; “establishing correlation” means individualization of a disease as an object of the research. Thus, having obtained the full range of medical judgment stages, we can compose the activity algorithm that would correspond to these stages:

1) Analysis of the given literature.

2) Revealing lacking facts for working assumption.

3) Experimental finding of lacking factors.

4) Hypothesizing.

5) Testing the hypothesis.

6) Correction and individualization of a hypothesis.

7) Feasibility, argumentation and record of the conclusions.

Building on the experience of theoretical and clinical departments that we observed; on the next stage of our research, we revealed the possibility and the practicability of forming “medical judgment” while teaching physics to medical university students. Certainly, it is possible to fully form medical judgment only within clinical departments during the direct dialogue with a patient. During the first year, it is only possible to form elements of medical judgment that are manifested in the situations simulating medical practice which are based on analysis, synthesis and abstract thinking. Therefore, for the development of methods of teaching physics to medical university students aimed at forming the elements of medical judgment, the following initiatives have been undertaken:

1) The notion of “doctor's activity” from the position of mental operations was clarified.

2) Doctor's activity was compared to the student’s cognitive activity.

3) Training model that allows maximizing stages of medical practice during the classes of physics, was created (fig.1).

4) Elements of the formation of physical knowledge corresponding to the doctor's activity were selected.

5) Forms of implementation of such methods were selected, training model was created.

6) Didactic tools corresponding to the stages of the model were developed.

Particularly, we note the peculiarities of the developed model of methods of teaching physics to medical university students:

I. The fundamental theoretical basis of these methods is primarily the doctor's activity, namely its structural components. Thus, a doctor while interacting with a patient finds himself in choice situation, open situation [7]. The following algorithm [8, 9] may be considered the generalized scheme of solving the given problem:

1. Awareness of the problem.

a) Appearance of the problem.

b) Understanding the available facts.

c) Formulation of the question.

2. Problem solution.

a) Formulation of hypothesis.

b) Developing the solution.

c) Revealing the principle.

d) Developing the decision making judgment.

3. Verification of the solution.

Doctor's activity is a defining characteristic for forming the content of education, educator and students' activity as well as the bases for developing requirements to didactic tools for teaching physics to future doctors.

II. Theoretical basis include the well-known in pedagogics situational approach and case-study technology. As shown by a review of literature, the given teaching technologies are rarely used in the education of medical university students. However, their application for teaching clinical disciplines proves its efficiency. Thus, we selected the situational approach and the case – study technology as a theoretical basis of the model of methods of teaching physics to future doctors.

III. For the organization of each stage of these methods special didactic means of teaching physics were developed. With the help of these means various types of activities are organized. Like that, a "Workbook" and specially designed testing tasks promote the actualization of physics knowledge that was obtained during school education.

The set of situational tasks modeling a doctor's professional activity that can be solved with the help of physical knowledge, allows creating motivation among students for studying a unit of physics course. Laboratory practice allows imitating a doctor's activity while solving professional issues.

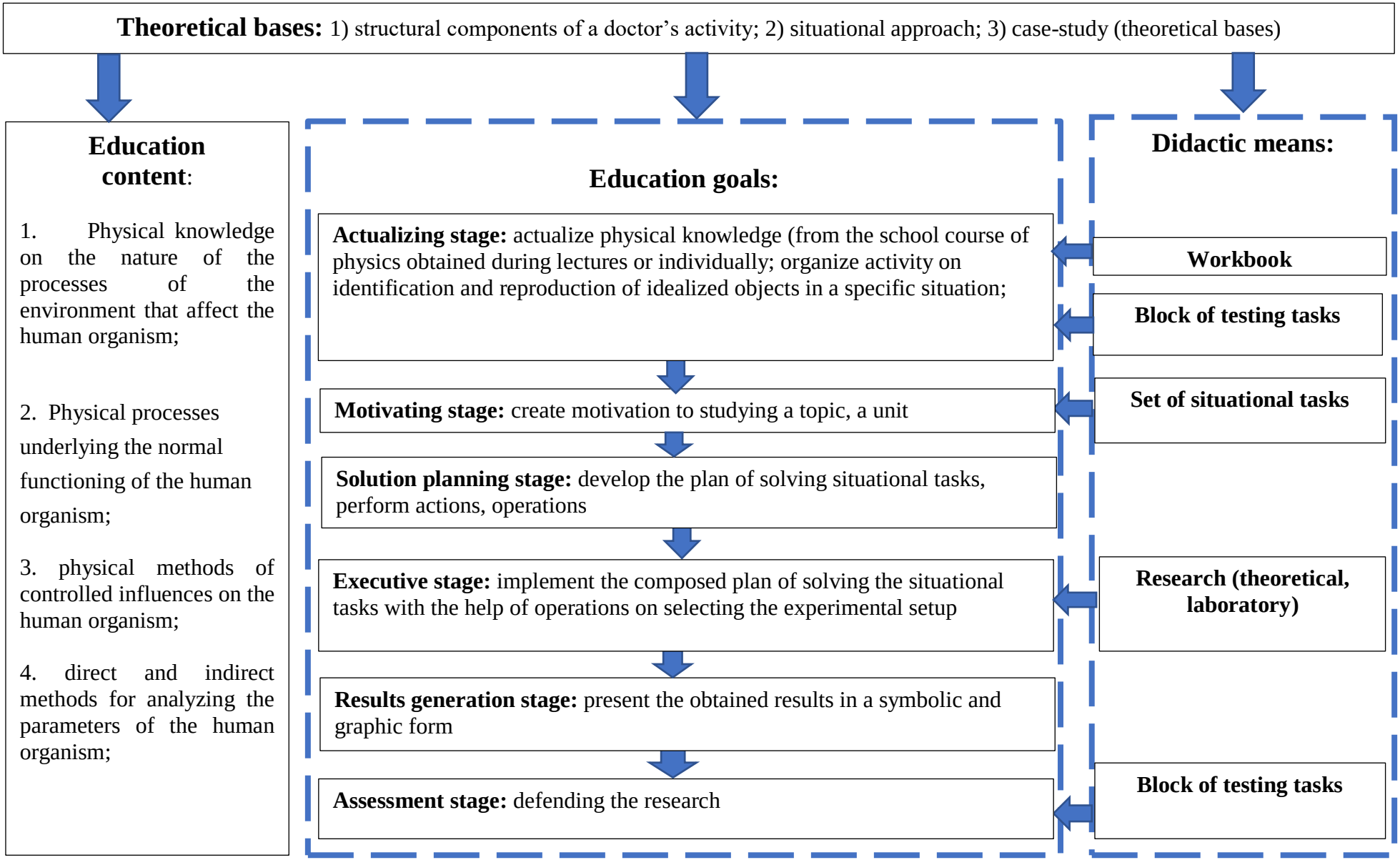

Fig. 1. Model of methods of teaching physics to future doctors.

IV. While developing the model we relied on:

a) Necessity of forming the knowledge on objects and processes of a living organism among students.

b) Importance of including students into the elements of medical practice with the help of situational tasks.

c) Focusing on the formation of the elements of medical judgment (abstract thinking and its constituents).

d) Necessity of organizing actions on object identification as an activity on identifying the characteristics of illness.

e) Necessity of involving students into practical accomplishment of laboratory research tasks (observing the course of physical processes and recording changes in the system, knowledge of physical characteristics and operating principles of medical equipment, mastering skills on working with medical equipment).

f) Necessity of forming skills to formulate conclusions on the obtained results of physical observations.

CONCLUSIONS.

Introduction of the developed model of the methods of teaching physics to medical university students was implemented on the basis of Astrakhan state medical academy.

Generalization of the study results allowed formulating the following conclusions:

1) Implementation of the methods allowed increasing the number of students who correctly and reasonably fulfilled tasks on analysis, synthesis and abstract thinking as elements of medical judgment (fig.2)

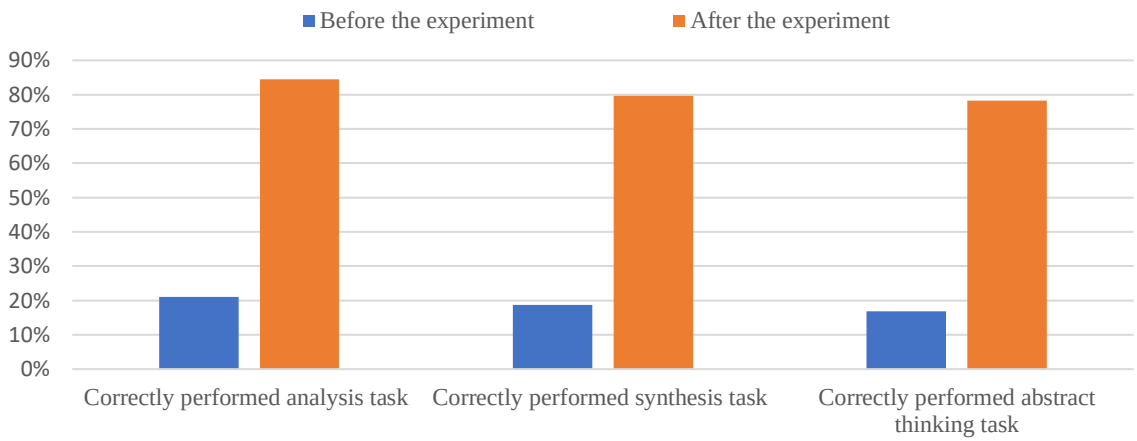

Fig. 2. The results of the pedagogical experiment

2) Increase of interest towards physics course was noted among future doctors (from 23% to 78% of all the respondent students participating in the experiment). Thus, the application of the developed methods of teaching physics to medical university students promotes the formation of medical judgment.

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