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Empirical and computational innovative methods for the study of health in the educational process

Problem statement. The science of the physical body of man develops in the direction of deepening into matter-deepening into the cell, into DNA, molecules and the like. Huge results have been achieved, but although the pharmacological industry annually introduces dozens of new drugs into circulation, the incidence does not decrease, but grows [8].

According to Gerber, the fundamental reason for this problem is that: "...Traditional medicine suffers from extreme narrow-mindedness, as it is based on the Newtonian model, which considers a person as a complex biological machine.", "...The human being is more than flesh, blood, proteins, fats and nucleic acids. The unique form of fine energy has yet to be thoroughly studied by scientists" [4].

The relevance of the research. It follows from the above that the problems of modern methodology of scientific research and medicine

are that it is necessary to change the world following modern realities, to take into account new theories and discoveries, to approach a person as a complex multi-level material and energy information system.

Professor of Stanford University, William A. Tiller argues that only recently have scientists become aware of the importance of the interaction between the body and the electromagnetic fields, although there is no full understanding of the mechanisms by which electric and magnetic fields are involved in cellular metabolism.

Therefore, relevant are the studies that study human from the point of view of the modern worldview.

Urgent are the problems of training future teachers of the basics of health and the introduction of health-saving technologies in the educational process in Ukraine.

Analysis of recent research and publications. Recent studies have enriched with new evidence the theory that electromagnetic fields in biological systems play a regulatory and informational role [1-4, 9-11]. In the scientific literature has long been mentioned information that the human body emits electromagnetic fields around the microwave range. Later, a low-frequency electrophysiology field of a person, as well as acoustic and optical waves were registered.

As stated in the introduction to the book [6, p.4], from the standpoint of knowledge about the mechanisms of functioning of wave processes in nature and man, the human body is a multidimensional information and energy essence, in which a complex system of fields are in a state of continuous resonance interaction. In the matrix of these fields laid the "programs" that run, supervise and coordinate all functions of the body: hormonal, immune, electrophysiology the like. According to this, health is considered as a dynamic process of formation of the adaptive frequency-resonance matrix in the relationship of energy-wave processes of all morphological structures, carried out on the principle of frequency resonance bio-feedback.

It is proved by R. Bayevsky that the adaptive capacity of the organism is one of its fundamental properties. First of all, it should be determined that the adaptive capacity – a stock of functional reserves that are constantly spent on maintaining a balance between the body and the environment. The reserve of functional reserves is information, energy and metabolic resources, the expenditure of which is accompanied by constant replenishment [2]. Also in the work of G. Apanasenko it is stated that the energy potential of the biosystem characterizes its viability [1].

In our time, research is carried out, computer systems are created based on the achievements of science and technology to study the human body based on modern worldview [1-7, 10-11].

Modern pedagogy is spent much health of pupils. The urgent need of society and the main priority of the state policy in the field of education should be the creation of optimal conditions for the formation, preservation and strengthening of the physical, mental, social and spiritual health of students and young people. Require solutions to the problem of training future teachers of the basics of health, the introduction of the educational process of health-saving techniques [8].

The relevance of health of the younger generation and the formation of a healthy lifestyle in our time is due to the fact that during the school years significantly deteriorates the health of children. In this regard, there was an urgent need to develop methods for assessing the state of health, the choice of reasonable health strategies and methods of correction body's health. The famous Ukrainian surgeon M. Amosov argued that health should be measured. Seems to be considered a milestone in the development of the doctrine about health offer M. Amosov [1987] on the introduction of such a concept as "the amount of health", which can be determined by the reserve capacity of the organism. According to M. Amosov, health is the maximum performance of organs while maintaining the qualitative boundaries of their functions.

Nowadays, there are diagnostic methods for measuring health. Empirical research methods are used where it is impossible to find objective factors for instrument measurements, such as psychology. The development of science and technology, the change of worldview paradigms gave impetus to the development of new modern methods using the capabilities of computer technology.

Presentation of research material. A diagnostic system for determining the level of students and pupils health was developed at the Department of Valeology of the School of Philosophy, which is in V. N. Karazin Kharkiv National University. This system was created by taking into account the achievements of science and technology, modern world-view ideas about the human organism as a complex material and energy-information structure. The valeological approach implies that human health consists of a harmonious combination of physical, mental, emotional, intellectual, social, environmental and spiritual health.

Comprehensive valeological examination allows assessing the health status based on a wide range of indicators, which cover all essential aspects of human functioning. From one hand they are physiological and energy-informational levels, and from the other hand they are psychological and spiritual levels.

The system of hardware and software computer complexes allows you to determine the quantity and quality of health at the functioning level of the organism physiological systems, the status of the cardiovascular system regulatory apparatus. Also, it helps to evaluate the human potential at the cellular level, to determine the macro- and microelement composition of body tissues, to carry out the comprehensive assessment of adaptive systems indicators intensity in the human body, to determine energy-information component state of the health and person's emotional component. It is also possible to conduct a psychodiagnostic examination. Besides that, the ability to spiritual growth can be determined among students.

Furthermore, the organism's adaptive capability assessment is involved in health system monitoring. adaptive capability of the organism is one of its fundamental properties. First of all, it should be noted that adaptive capabilities it is a stock of functional reserves which are constantly spent to maintain organism-environment balance. The stock of functional reserves is information, energy and metabolic resources, and their spending is accompanied by constant filling [2].

The methodology manual [5], which was written by experts at the Department of Valeology, contains modern valeological methods that allow studying the dynamics of health. The manual can be useful for school teachers and lecturers who teach "Health Fundamentals", "Valeology", "Healthy lifestyle

Fundamentals", and also "Computer technologies in Valeology". At the Department of Valeology, during the training of future specialists, who are taught the most up-to-date methods for assessing the level of health. All the methods are non-invasive and can be used in educational institutions to monitor the health of pupils and students during the learning process.

Comprehensive valeological examination includes the following methods:

1. Assessment of the organism's physiological systems development level with the help of the health index, which is determined using 5 indexes to assess adaptive abilities of the respiratory and cardiovascular

systems and to determine of the “weaknesses” of the organism. As well as adaptive potential by R. M. Baevsky [2], which allows evaluating the functional capabilities of the organism as a whole.

2. The system of express assessment of the health level at the cellular level and biological age of a person [14] is a non-traumatic method for determining the physiological state of the human organism at the cellular level by examining the electrokinetic activity of buccal epithelium nuclei in cells with the help of an optoelectronic complex and computer equipment.

3. Determination of the macro and microelement composition (K, Na, Ca, Mg, Cu, Al, Pb, Fe, Zn) in saliva can reveal insufficiency or excessive composition of these elements in human organism. Analysis of water and soil samples by atomic absorption spectrophotometry allows identifying anthropogenic pollution of the environment.

4. The psychodiagnostic examination is an assessment of mental health state with the help of commonly accepted tests. It helps to assess the state of the emotional-volitional and cognitive spheres of the organism, its adaptability to micro-social relations, behavioral self-management [12].

5. The hardware and software complex for electropuncture diagnostics “INTA-com-Voll-F” is functional systems diagnostics of an organism, its individual organs and systems by measuring the indices of biologically active points, localized on the hands, feet and head.

6. Screening energy-information adaptometry of the human holographic matrix [3, 13]. It is a method of using electropuncture testing of biologically active points and a computer program that allows you to assess the state of the bioenergy field and the adaptive capabilities of the human organism, determine the core pathology and propensity of the organism to certain health disorders. Also, this method allows determining all trends in changes in the energy resources under the influence of certain factors.

8. The digital analyzer of the human organism functional state APK“OMEGA – M”. The computer hardware and software complex allows the diagnostics of the human organism functional state-based on heart rate variability, analyzing human biorhythms, as well as the correction through biofeedback.

9. KME is a medical expert complex for computer diagnostics and correction of health, determining the functional state of the human organism main systems, psychological factors and some disease development risk prediction [6];

10. The “KSD” device is a spectral-dynamic complex that records the radiation spectrum of the organism and allows assessing of health status by comparing the spectrum with the reference signals recorded in the KSD database [7]. The method can obtain information about the state of the brain, all body systems, hormones, presence of pathologies or calculate risks of disease prediction information. Also, the equipment can identify the external environment and food for the content of microbes, viruses and harmful substances. With the help of the “KSD” device it is also possible to carry out the correction of the functional and psychological state of the human body.

The diagnostic system, which was implemented at the Department of Valeology of V. N. Karazin Kharkiv National University, covers all (currently known) spheres of the human existence. Diagnostic methods include empirical studies, such as assessing the state of mental health using commonly accepted tests, Luscher test; the “Self-feeling-activity-mood” test (SFAMS); the “Situational anxiety” test, a tests system for assessing the spiritual health state.

Monitoring, with the help of instrument-software systems, was developed according to the latest science and technology achievements, which are based on modern ideas about the complex material and energy-informational structure of a person. It allows you to assess the health level at the cellular level, the level of systems and organs, to the state of energy-informational psycho-physiological and adaptive properties of the organism. Studies were conducted simultaneously using several methods that allow us to determine the features of the various levels of human organism functioning and the tendency to respond to various factors.

The diagnostic system is non-invasive and can be used in educational institutions to monitor the health of pupils and students during the learning process. Using our health monitoring system, a large amount of research was carried out, so the health state of the adult and child population in Ukraine was conducted. Besides, a huge amount of work was carried out to determine the level of health and correction of the post-traumatic syndrome state.

Valeology Students, future teachers of Health Fundamentals are taught valeological aspects of monitoring the health status, diagnostic methods [5], etc. To correct the health status of pupils and students, a group of valeologists has developed a system of health improvement, which includes complexes of health improvement exercises, fitocorrectors

made from plants that grow in Ukraine, self-regulation and self-perfection techniques, a system of valeological nutrition, etc.

Such a wide range of knowledge and opportunities for research helps valeology students, future teachers of Health Fundamentals, to form a holistic worldview, motivation for a healthy lifestyle, civic attitude and high spirituality to carry this knowledge for health care of the nation.

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Abstracts

HONCZARENKO M., BOHOMAZ T. **Empiryczne i komputerowe innowacyjne metody badania stanu zdrowia w procesie pedagogicznym.** Przy określaniu stanu zdrowia człowieka używane są metody empirycznego badania i współczesne technologie komputerowe. W dzisiejszych czasach rozwija się nauka "waleologia", która traktuje zdrowie człowieka jako harmonijne połączenie zdrowia fizycznego, psychicznego, emocjonalnego, intelektualnego, społecznego, ekologicznego i duchowego. Na Uniwersytecie Narodowym imienia W. N. Karazina w katedrze waleologii opracowano system diagnostyki stanu zdrowia, który pozwala na prowadzenie monitorowania stanu organizmu od poziomu komórkowego, poziomu systemów i organów, do poziomu komponentu energoinformatycznego, a także określić cechy psychofizjologiczne i adaptacyjne organizmu. Monitorowanie odbywa się za pomocą

urządzeniowo-komputerowych systemów programowych, opracowanych na podstawie ostatnich osiągnięć nauki i techniki, które opierają się na współczesnej wizji człowieka jako złożonej struktury materialnej i energoinformatycznej. System diagnostyki jest nieinwazyjny, co daje możliwość jej stosowania w zespołach dziecięcych i studenckich w procesie pedagogicznym, a także w celu określenia poziomu zdrowia i korekcji stanu zaburzenia stresowego pourazowego.

Słowa kluczowe: zdrowie, monitorowanie, adaptacja, energoinformatyczny komponent organizmu.

ГОНЧАРЕНКО М.С., БОГОМАЗ Т.О. **Емпіричні і комп'ютерні інноваційні методи дослідження стану здоров'я у педагогічному процесі.** При визначенні стану здоров'я людини застосовуються методи емпіричного дослідження і сучасні комп'ютерні технології. У наш час розвивається наука «валеологія», де здоров'я людини розглядається як гармонійне поєднання фізичного, психічного, емоційного, інтелектуального, соціального, екологічного і духовного здоров'я. На кафедрі валеології ХНУ імені В. Н. Каразіна розроблена система діагностики стану здоров'я, яка дозволяє проводити моніторинг стану організму від клітинного рівня, рівня систем та органів, до рівня енергоінформаційної складової, а також визначати психофізіологічні й адаптаційні характеристики організму. Моніторинг здійснюється за допомогою приладо-комп'ютерних програмних систем, розроблених на основі найновітніших досягнень науки і техніки, які ґрунтуються на сучасних уявленнях про людину як складну матеріальну і енергоінформаційну структуру. Система діагностики неінвазивна, що дає можливість її застосування у дитячих та студентських колективах у педагогічному процесі, а також для визначення рівня здоров'я і корекції стану посттравматичного синдрому.

Ключові слова: здоров'я, моніторинг, адаптація, енергоінформаційна складова організму.

ГОНЧАРЕНКО М.С., БОГОМАЗ Т.О. **Эмпирические и компьютерные инновационные методы исследования состояния здоровья в педагогическом процессе.** При определении состояния здоровья человека применяются методы эмпирического исследования и современные компьютерные технологии. В наше время развивается наука «валеология», где здоровье человека рассматривается как гармоничное сочетание физического, психического,

эмоционального, интеллектуального, социального, экологического и духовного здоровья. На кафедре валеологии ХНУ имени В.Н. Каразина разработана система диагностики состояния здоровья, которая позволяет проводить мониторинг состояния организма от клеточного уровня, уровня систем и органов, до уровня энергоинформационной составляющей, а также определять психофизиологические и адаптационные характеристики организма. Мониторинг осуществляется с помощью приборно - компьютерных программных систем, разработанных на основе новейших достижений науки и техники, основанных на современных представлениях о человеке как о сложной материальной и энергоинформационной структуре. Система диагностики неинвазивная, что дает возможность ее применения в детских и студенческих коллективах в педагогическом процессе, а также для определения уровня здоровья и коррекции состояния посттравматического синдрома.

Ключевые слова: здоровье, мониторинг, адаптация, энергоинформационная составляющая организма.

GONCHARENKO M., BOGOMAZ T. Empirical and computational innovative methods for the study of health in the educational process. *In determining the state of human health, methods of empirical research and modern computer technologies are used. Nowadays, the science of valeology is developing, where human health is considered as a harmonious combination of physical, mental, emotional, intellectual, social, environmental and spiritual health. The Department of valeology in V.N. Karazin Kharkiv National University developed a system of diagnosis of health, which allows you to monitor the state of the body from the cellular level, the level of systems and organs, to the level of energy component, as well as to determine the psycho-physiological and adaptive characteristics of the body. Monitoring is carried out with the help of instrument - computer software systems, developed on the basis of the latest achievements of science and technology, based on modern ideas about man as a complex material and energy-information structure. The diagnosis system is non-invasive, which makes it possible to use it in children's and student groups in the pedagogical process, as well as to determine the level of health and correction of post-traumatic syndrome.*

Keywords: health, investigation, adaptation, energy-informational component of organism.