

METHODOLOGY OF DEVELOPING VALEOLOGICAL COMPETENCE IN NON-MEDICAL STUDENTS THROUGH CLOUD TECHNOLOGY

© Shevchenko A.S.

Ukrainian Engineering Pedagogics Academy

Information about the author

Shevchenko Alexander S.: ORCID: 0000-0002-4291-3882, al.shevchenko1976@gmail.com, PhD student, Master of Medicine, Economics and Pedagogy; Ukrainian Engineering Pedagogics Academy; Universytetska str., 16, Kharkiv, 61003, Ukraine.

Health-saving is an important aspect of the work of many institutions and organizations of Ukraine, regulated by the Constitution of Ukraine, a number of laws, national and regional target programs and state educational standards. The educational environment is a convenient area for the systematic study of issues of a healthy lifestyle, safe behavior, formation of the necessary skills and abilities of providing emergency aid in critical situations. The outcome of valeological education should be the formation of valeological (health-saving) competence. The article discloses the method of forming this competence at the conceptual, technological, substantive and control-diagnostic levels. The methodology is based on the study of valeological disciplines "Fundamentals of Medical Knowledge and Health-Saving" and "Health Pedagogy" in non-medical higher education institutions for students of the "bachelor's" and "master's" educational levels. The forced distance learning in these disciplines since the start of the COVID-19 pandemic and full-scale war has made cloud technologies the main means of teaching. The article demonstrates the approaches, principles, methods and means of valeological competence formation in these conditions at a sufficient level. Didactic adaptation of medical information for teaching valeological disciplines to non-medical students takes place by simplifying it using methods of system analysis, expert evaluations, balancing, scaling and aggregation. In today's pandemic and wartime circumstances, instructing valeological subjects relies heavily on employing information-communication (cloud) technologies. Both educators and students need a certain proficiency level in using these technologies. Developing valeological competence among non-medical students entails teaching "Health Pedagogy." Initially led by instructors with medical and pedagogical backgrounds, there is potential for a transition to instructors solely equipped with pedagogical expertise, following a relay principle.

Keywords: health-saving, approaches, principles, methods, means.

Шевченко О.С. «Методика формування валеологічної компетентності немедичних студентів засобами хмарних технологій»

Здоров'язбереження є важливим аспектом роботи багатьох установ та організацій України, регламентованим Конституцією України, низкою законів, національних та регіональних цільових програм та державних освітніх стандартів. Освітнє середовище є зручною територією для системного вивчення питань здорового способу життя, безпечної поведінки, формування необхідних вмінь та навичок надання невідкладної допомоги при критичних станах. Результатом валеологічної освіти має бути сформована валеологічна (здоров'язбережувальна) компетентність. У статті розкрита методика формування цієї компетентності на концептуальному, технологічному, змістовному та контрольнo-діагностичному рівнях. Методика заснована на вивченні валеологічних дисциплін «Основи медичних знань та здоров'язбереження» та «Педагогіка здоров'я» у закладах немедичної вищої освіти студентами освітніх рівнів «бакалавр» та «магістр». Вимушене навчання студентів за цими дисциплінами у дистанційній формі від початку пандемії COVID-19 та повномасштабної війни зробило головними засобами викладання хмарні технології. Стаття демонструє підходи, принципи, методи та засоби формування валеологічної компетентності в цих умовах на достатньому рівні. Дидактична адаптація медичної інформації для викладання валеологічних дисциплін здобувачам вищої немедичної освіти відбувається шляхом її спрощення з використанням методів системного аналізу, експертних оцінок, балансування, масштабування та агрегації. Викладання валеологічних дисциплін у сучасних умовах пандемії та війни ґрунтується на використанні інформаційно-комунікативних (хмарних) технологій, вимагає певного рівня володіння ними як викладачами, так і студентами. Формування валеологічної компетентності у здобувачів вищої немедичної освіти передбачає викладання дисципліни «Педагогіка здоров'я» викладачами з медичної та педагогічної освітою, з можливістю переходу на викладання викладачами лише з педагогічною освітою, за принципом естафетності.

Ключові слова: здоров'язбереження, підходи, принципи, методи, засоби.

Problem Statement. Health-saving is an important task of the state, its health care, social care and education systems. Teaching students to lead a healthy lifestyle is required by most state standards of higher education [1]. However, their analysis shows a lack of clear instructions on the content of health-saving competence and methods of its formation [2]. In some of higher education standards, health-saving (or *valeological*) competence is proposed to be formed with an emphasis on ecological issues, in others – at the expense of "various types and forms of motor activity", and only some of the standards emphasize the need to "preserve life, physical and of mental health, provision of pre-medical care" and offer to "organize an educational space in compliance with the life safety principles, sanitation and hygiene, psychological comfort". The *valeological* higher education standard is not included in the list, although some universities of Ukraine train *valeological* specialists [3]. In the National Qualification Framework, the Laws of Ukraine "On Education" and "On Higher Education", there are also no definitions of *valeological* competence and requirements for its formation level among graduates. That is, today the definition, content of *valeological* competence, approaches, principles, methods, means of its formation, requirements for levels of formation are at the stage of scientific development and cannot be transformed into legislative directives.

Analysis of research and publications. Brekhman I., Bekh I., Amosov M., Vernadskyi V., Bekhterev V., Apanasenko H., Vakulenko O., Vyhotskyi L., Holoborodko H., Venedyktov D. et al. began the formation of *valeological* approaches to a healthy lifestyle on humanistic grounds in 1980s. Today the issue of health-saving at the theoretical level is much more discussed by Ukrainian scientists in comparison with European and American scientists, who concentrate their attention on the prevention of diseases and individual risk factors. Ukrainian pedagogues understand the main thing in health care in different ways. For example, Shapovalova T.G. believes that *valeological* competence consists in the ability to take care of one's own health and the health of other people. Shumyhai S., Voznosymenko D. and Bondarenko O. say that *valeological* competence allows you to preserve and strengthen your health and that of your fosterlings, to improve their health. Osadchenko T., Bondarenko T., Shtefan L. [4] believes that this competence lies in the readiness and ability of the future teacher to create a health-saving environment.

Some researchers combine *valeological* competence with others, that is, consider it as part of a complex of competences. So, for example, Kosheleva M.E. offers to consider psychological and *valeological* competence. Zemska N. considers the ability to lead a healthy lifestyle as part of students' personal competence, Vasyliuk V.M. – as part of the teacher's professional competence. Since the 1980s Sukhomlynskyi O., Makarenko A., Leshaft P., Boichuk Yu. [5], Mikheienko O., Kuksa N. investigate the formation of health culture and consider *valeological* competence as a part of it. Shostak I. believes that the culture of health consists in the ability to lead a healthy lifestyle, correlates with the level of health, should be used in sanitary and educational work as an integral part of professional skill and is formed mainly outside the classroom.

Some researchers focus their attention on aspects of safe behavior. Tekliuk R.V. & Serheta I.V. consider the refusal of the use of psychoactive substances, which is widespread, to be the main part of health-saving. Heera H.S. et al. emphasize the measurability of *valeological* indicators of health, rehabilitation and adaptive potential depending on age, genetics and the predominant type of nervous system (vagotony or sympathotony) [6]. Amosov M., Yelnykova H. also talk about the measurability of health indicators. Yelnykova H. suggests using qualimetry for this purpose [7; 8]. She also emphasizes the importance of adaptability for health-saving. Orzhekhovska V. talks about adaptability in its biological sense (the ability to adapt to changes in the surrounding environment and reactive changes in homeostasis indicators) in her works.

Such a diversity of views on the content of *valeological* competence, its main components, on the one hand, allows each teacher to choose a definition that is more in line with his own beliefs, but on the other hand, it does not allow to transfer the definition of competence to the level of normative acts and establish the readings of the requirements for the health-saving competence levels formation for bachelor's, master's and PhD students, to determine methodological approaches to the formation of this competence in classroom, distance and mixed learning conditions.

The purpose of the study is to develop a methodology for *valeological* (health-saving) competence formation among students of non-medical higher education institutions using cloud technologies, with the determination of the approaches, principles, methods and means.

Presenting main material. Ukrainian researchers demonstrate models of competence

formation are represented by sequential and interconnected information blocks: target, theoretical-methodological, content-technological, and diagnostic-resultative. **The target block** indicates the context of competence formation (for example, the social order of the training of specialists, the requirements of the law, etc.), determines the purpose of the research (for example, the development of a model or methodology of competence formation, – the latter is a broader concept [9]) and tasks (if the purpose needs to be detailed). The conceptual-target block of the methodology for the formation of valeological competence is presented on Fig. 1. The context of competence formation includes the requirement of the majority of higher education

standards approved by the Ministry of Education and Science of Ukraine to form health-saving competence among graduates of higher education institutions (HEI), articles of the Constitution, laws "On Education" and "On Higher Education", a number of national and regional programs on public health, the high demand of Ukrainian society to preserve and strengthen the health of the nation. The development of the methodology of valeological competence formation is carried out within the framework of the dissertation on the specialty 011 (educational, pedagogical sciences), which involves the justification, development and experimental verification of the methodology of valeological competence formation in non-medical HEI students by means of cloud technologies.

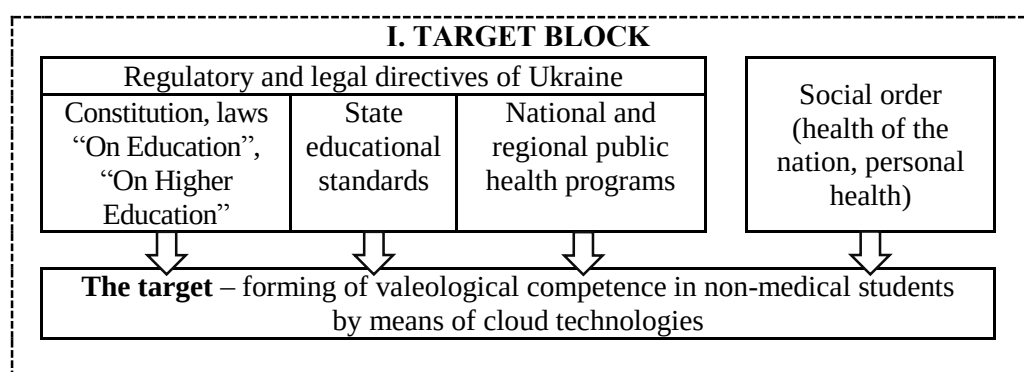


Fig. 1.

target block of methodology of valeological (health-saving) competence formation in non-medical students by means of cloud technologies

The

The theoretical-methodological block defines approaches and principles of competence formation (Fig. 2). When forming valeological competence among students, we used the following approaches: *competent* (the study of valeological disciplines contributes to the formation of valeological, ecological, digital, English-speaking and other competencies), *systematic* (describes the interrelationships of approaches, principles, methods and means of competence formation), *adaptive* (the curriculum of the valeological discipline is adapted for study in classroom, distance and mixed forms, for studying by students of the bachelor's and master's educational levels, in Ukrainian and German, for studying in full-time, part-time and correspondence forms; adaptability is one of the key concepts in understanding health and health-saving), *axiological* (health is considered as a personal and social value); *multilingual* (the terminology of the discipline is presented in Ukrainian, German, English, Greek and Latin languages), *interdisciplinary* (valeological competence can be formed by studying one valeological discipline or related disciplines (basics of ecology, labor protection, physical education, etc.); to study

valeological disciplines, an initial level of knowledge in physics, chemistry, and computer science (the basics of using a personal computer and cloud technologies), human biology (anatomy and physiology), hygiene, basics of life safety is necessary). There are *generally didactic* and *specific* principles when forming valeological competence among non-medical students were used (Fig. 2). *Generally didactic principles* include: *the principle of scientificity* (in particular, the study of valeological disciplines requires compliance with the principles of evidence-based medicine), *systematicity and consistency* (the sequence of subject topics is clearly defined; the following topics are based on the learned provisions of the previous topics), *visibility* (presentations for all lectures and practical classes have been developed for teaching the valeological discipline; for independent classes, students are recommended to watch thematic videos on YouTube, TED Talks), *connection between theory and practice* (the study of valeological disciplines should change behavior patterns to safer ones, teach a healthy lifestyle, promote the refusal of the use of psychoactive substances). *Specific principles* of valeological (health-saving)

competence formation include: *individualization* of requirements (the possibility of building an individual educational trajectory for students who need it from the point of view of giftedness or inclusiveness of education [10]), *confidentiality* (to study the motivational, value and personal components of valeological competence formation in students, they are asked questions of a personal nature, the answers to which must be kept confidential [11]), *relays* (teachers of valeological disciplines with a medical education teach them in

such a way that the baton of teaching can be accepted by teachers without a medical education), *continuity* (the valeological competence is formed during the study of the valeological discipline at HEI, but it is improved throughout life (lifelong learning paradigm); if the teaching of the valeological discipline begins with undergraduate students, and continues during the continuation of their studies in the master's degree, then the formation of valeological competence does not stop during a break in education).

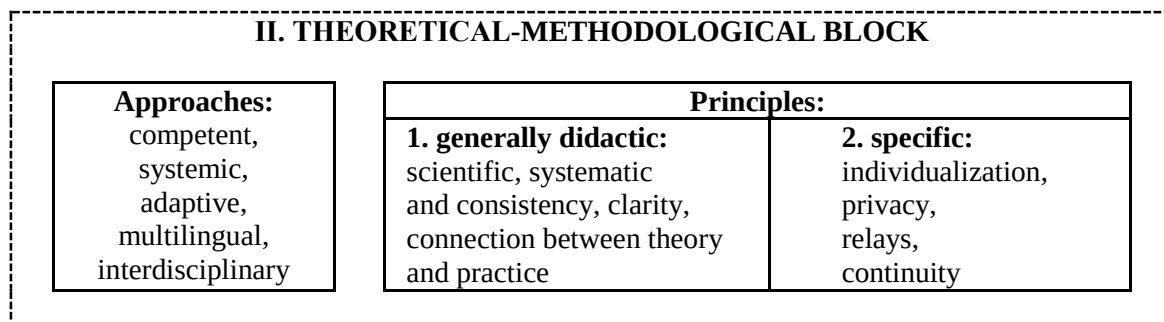


Fig. 2. Theoretical-methodological block of methodology of valeological (health-saving) competence formation in non-medical students by means of cloud technologies

The content-technological block (Fig. 3) contains a list of components of competence, stages of its formation, information about valeological disciplines for its formation, about curriculum indicating the number of topics and the structure of the material, about methods of teaching and adapting medical information for non-medical students, didactical-methodical tools (methods, forms and means). According to the conclusions of Holovan M.C. [12] and Shevchenko Yu.M. [13], researchers differently define the competences components, the formation of which is studied. At the same time, these components do not correspond to those defined in the National Framework of Qualifications in terms of "communication" and "responsibility and autonomy". For the purpose of my own research, the following components of valeological competence were determined: cognitive (corresponds to the "knowledge" of the qualifications of the National Qualification Framework), activity (corresponds to "ability/skills"), motivational-value and personal. At the *preparatory stage of competence formation*, students are familiarized with the discipline, comparison of expectations from the discipline with the content and forms of learning proposed by the teachers, determination of opportunities to improve one's health, and together with this determination of the personal value of the discipline. At the *procedural stage of*

competence formation, there is a direct study of the discipline and the formation of competence. At the *diagnostic-corrective stage* – analysis of formation and, if necessary, adjustment of the methodology based on the principle of feedback.

The list of diseases studied by the discipline includes those that: 1) cause the largest number of deaths in Ukraine in the world (are the most socially significant); 2) are the most resonant if they are treated incorrectly or are not treated/not properly prevented; 3) have controllable and modifiable risk factors and therefore can be prevented through healthy lifestyles, safe behaviors and emergency care. In non-medical HEI of Kharkiv (Ukrainian Engineering Pedagogics Academy, V.N. Karazin Kharkiv National University, National University of Civil Protection of Ukraine, National Technical University "Kharkiv Polytechnic Institute", etc.) in 1998–2019, specialists of the Medical Youth Organization of Kharkiv and the Kharkiv Regional Institute of Public Health Services taught the valeological discipline "Fundamentals of medical knowledge and health care" [14; 15], the curriculum of which included 14 topics:

1. Health saving in education;
2. Rational nutrition;
3. Physical culture and sports, mode of work and rest;
4. Safe use of medicines;
5. Trauma. Domestic violence. Bullying;

6. Poisoning, radiation, occupational diseases;
7. Emergencies;
8. Blood and organ donation;
9. Cardiovascular and pulmonary diseases;
10. Infectious and parasitic diseases;
11. Inclusive education;
12. Mental and psychological health. Professional burnout;
13. Sex education and family planning;
14. Chemical dependencies.

Teaching took place in classroom form for full-time students, bachelors and masters, and students whose educational level corresponded to the modern educational levels of bachelors and masters (3–4 and 5 courses). The choice of courses determined the internal standard of organizations to work with adult students: part of the students of the 1st and 2nd courses were minors. The discipline "Fundamentals of medical knowledge and health-saving" was intended for the formation of a healthy lifestyle and safe behavior patterns of students, contained *content* (lecture materials, practical classes, trainings, etc.) and *control* (control questions, tests and questionnaires) *components*. Since the beginning of the COVID-19 pandemic, declared by the World Health Organization in March 2020, the discipline has been taught in distance (synchronous) and mixed (distance-auditory) forms, for ordinary, gifted and inclusive students. For the purposes of the research, we have chosen the criteria of giftedness: 1) a gifted student consistently performs standard exercises and tasks without errors and faster than ordinary students; 2) a gifted student has an average (for his group and educational level) initial level of valeological competence and raises it to the maximum faster than ordinary students. In the Ukrainian Engineering Pedagogics Academy since 2019, students have been taught a similar valeological discipline "Health Pedagogy" [16; 17]. The "Health Pedagogy" curriculum also contains same 14 topics, expanded at the expense of *didactic* (explains what, how and why it is taught) and *psychological-pedagogical* (explains how information is perceived and how to make the formation of valeological competence more effective) *components*. The teaching of "Health Pedagogy" was carried out as a normative discipline and a discipline of choice, for students of full-time and correspondence forms of education (teaching for part-time students is a prospect for further research), Ukrainian and foreign students, bachelors and masters, in distance (synchronous) and mixed (distance-auditory) forms of education. To adapt medical information for non-medical students,

the following methods were used: *system analysis*, *expert evaluations* (determination of the list of questions for teaching, weighting coefficients of correct answers to control questions, etc.), *balancing*, *scaling* (to simplify information), *aggregation* (to combine blocks of information) [18].

Didactical-methodological tools included methods, forms and means of competence formation. Oral, written, and technologically mediated techniques were equally presented, including:: the teacher's narrative (lectures, part of the time of practical classes and trainings, when students were given new information), oral survey (questions related to homework and new information), writing essays (small works consisting of an introduction, the main part and conclusions, and must demonstrate the student's own attitude to the problem), watching videos (for most topics of the discipline, students were offered appropriate films or shows, mainly on the YouTube and TED Talks platforms), solving tasks with step-by-step instructions, hints (solving cases was often accompanied by gradual detailing of the circumstances and correction of the algorithm), practical exercises (included cases, discussion of the sequence of actions during the provision of emergency care or practice in the classroom, including on simulators), visiting museums (of anatomy and pathological anatomy of the Kharkiv National Medical University). Thus, the *forms* of valeological competence formation (Fig. 3) were: lectures, practical and independent classes, trainings, visits to museums, classes in the framework of informal education (courses, internships). The methods were classified as *interactive* (with the use of a personal computer and cloud technologies), *search* (related to the search for the necessary information according to the specified parameters to perform tasks in the discipline, to improve the lifestyle), *research* (determining the parameters of one's own health at self-examination and self-analysis, the health of students' family members, the health of other students, identification of household, educational environment, external ecological and social environment hazards) and *problematic* (identification of the main factors of possible health deterioration, strategies and tactics for their leveling).

The means of valeological competence formation were divided into *traditional* (textbooks, manuals, lecture notes, tests, questionnaires, simulators for practicing emergency care techniques, tools for self-examination), *innovative* (intelligence maps, cases, training materials) and *informational-communicative* (electronic libraries, search systems, videos, etc.). During distance learning,

the traditional note-taking of lectures was replaced by the compilation of *mind maps*, handwritten and created by special online services (for example, *XMind*, *Canva*, etc.). Students were recommended textbooks, encyclopedias, lecture notes and other methodical materials specially developed for the discipline. Solving the tests and answering the questionnaires, in addition to the control, also performed an educational function (contributed to the repetition and systematization of the material, indicated possible and typical logical errors). First aid procedures were practiced with the special

equipment (simulator for cardiopulmonary resuscitation, flexible and pneumatic tires for transport immobilization of victims, etc.). As tasks, students were offered to compile dictionaries of terms in Ukrainian and English, as well as with associative visual images. For in-depth study of the most interesting topics, students were offered courses on non-formal education platforms (for example, an emergency aid course on the platform *Prometheus*). Additional points were awarded to students for receiving certificates of successful study on similar courses.

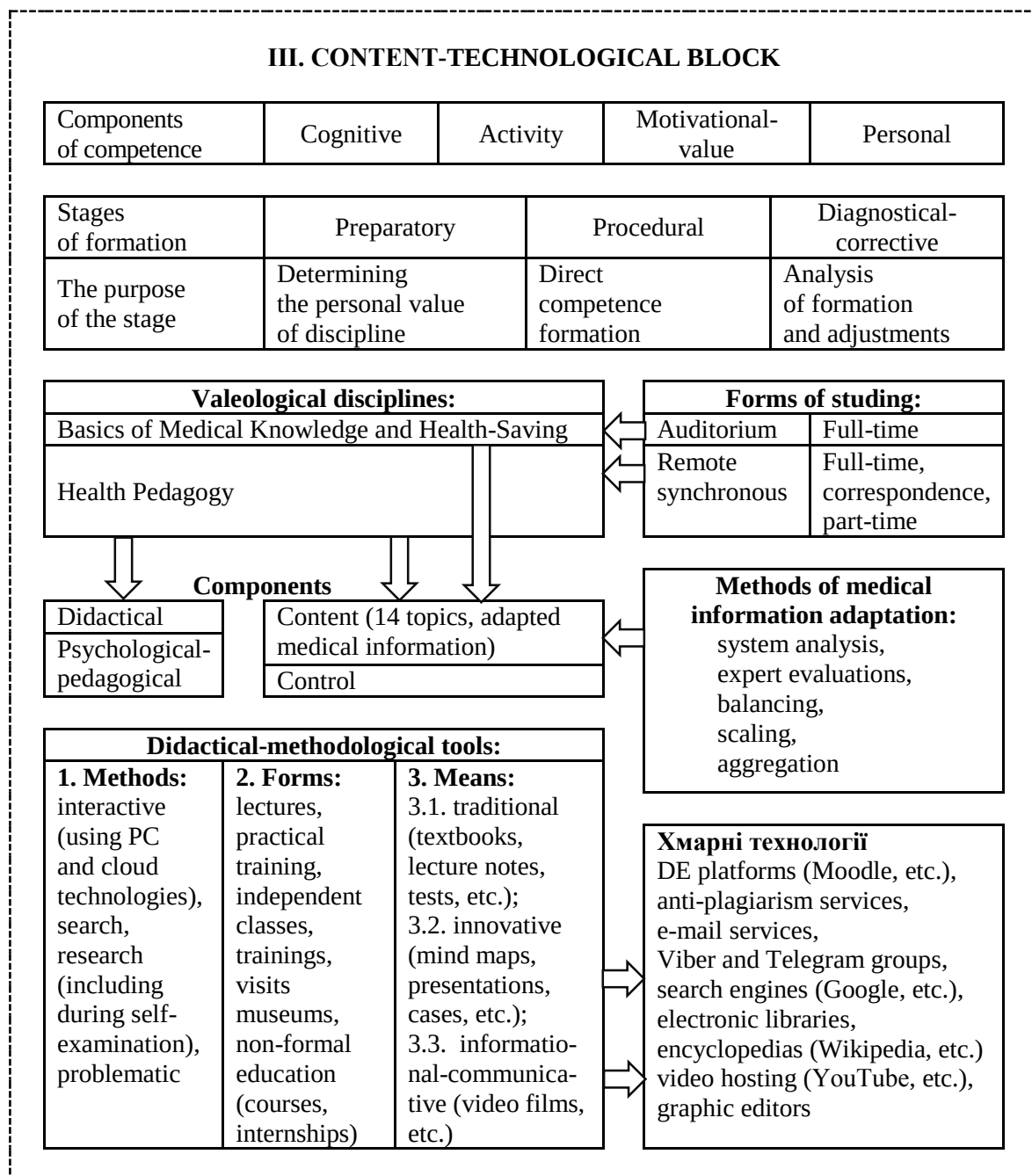


Fig. 3. Content-technological block of methodology of valeological (health-saving) competence formation in non-medical students by means of cloud technologies

As it was mentioned earlier, since the beginning of the COVID-19 pandemic, the teaching of the discipline "Health Pedagogy" has been carried out in a remote synchronous form. Since the beginning of power cuts in connection with the full-scale war in Ukraine, an asynchronous form of learning has also begun to be used, in the framework of which students completed most of the tasks independently, at a time chosen by them. Our studies comparing the formation of valeological competence using classroom and distance learning showed the advantage of the former over the latter [19]. The transition from synchronous distance learning to asynchronous distance learning allowed us to conclude that

asynchronous distance learning is not suitable for teaching at all due to the critical decrease in motivation and lack of self-discipline in students [20]. Therefore, during the last three years, education has been taking place mainly in a distance form, and cloud technologies are both a tool and an environment of education at the same time. Means of distance education are such cloud technologies as e-mail, search engines (*Google*, etc.), anti-plagiarism services, distance education platforms (*Moodle*, etc.), Viber and Telegram groups, electronic libraries and encyclopedias (*Wikipedia*, etc.), video hosting (*YouTube*, etc.), graphic editors.

IV. DIAGNOSTICAL-RESULTATIVE BLOCK					
Components of competence	Cognitive	Activity		Motivational-value	Personal
Means of assessment of formation	Test			Questionnaire	
Evaluation of ECTS	Objective (knowledge, ability, skills)			Subjective (progress assessment, self-assessment)	
The level of competence formation					
Assessment by B. Bloom	Remember and replay	Understand	Apply	Analyze and interpret	Create
Quartile scale	Minimum	Low	Average	High	
	0–25%	25–50%	50–75%	75–100%	
by V. Bepalko	Low			Average	High
Factor-criterion qualitative model (by H. Yelnykova)					
Assessment of competence formation is consistent, threefold					
EXPECTED RESULT – formed valeological competence in non-medical students					

Fig. 4. Diagnostic-resultative of methodology of valeological (health-saving) competence formation in non-medical students by means of cloud technologies

The diagnostical-resultative block (Fig. 4) contains a description of the methods and appropriateness of the scales for assessing the formation of valeological competence in students of higher non-medical education. Assessment of academic success of students in the study of valeological disciplines is carried out in parallel with the assessment of the levels of valeological competence formation, by the methods of B. Bloom, V. Bespalko, G. Yelnykova and the quartile

(point-interval) scale are used [7; 8; 12; 21]. Tests were used to assess the formation of the cognitive and activity components of competence, and questionnaires were used to assess the motivational-value and personal components of competence. For convenience, questionnaires and tests are combined for each of the 14 topics of valeological disciplines. For the valeological competence formation, a consistent method was used, according to which the results of competence

formation are compared not with the control group, but with the results of the same students at the previous stages of competence formation. A test-questionnaire for each of the 14 topics is given to the student to fill out three times: before studying the topic, immediately after studying it, and at the end of studying all topics of the valeological discipline. The second test-questionnaire allows to determine the progress of knowledge and skills after studying the topic, as well as to find out the truthfulness of the answers to the questionnaire questions. The third test-questionnaire allows you to determine the formation of all components of competence by topic, calculate the qualitative weight of the result, determine the survival of knowledge and change in behavior patterns.

Conclusions. As a result of the use of competence, system, adaptive, multilingual and interdisciplinary approaches, general didactic principles of scientificity, systematicity and consistency, clarity, connection of theory and practice, specific principles of standard-

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orientation, individuality of requirements, confidentiality, relaying, continuity, methods of adaptation of medical information (system analysis, expert evaluations, balancing, scaling and aggregation), traditional and innovative methods and tools, cloud technologies during the teaching of valeological disciplines "Fundamentals of Medical Knowledge and Health-Saving" and "Health Pedagogy", with evaluation of results according to ECTS, the methods of B. Bloom, V. Bepalko, H. Yelnykova (based on the factor-criterion qualitative model) and on the quartile (point-interval) scale, it is possible to form valeological competence in students of higher non-medical education at a level sufficient for bachelors and masters, and all components (cognitive, activity, motivational-value and personal). The formation of valeological competence means the ability to lead a healthy lifestyle, practice safe behavior patterns and provide emergency pre-hospital care in critical situations.

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