

Methodological aspects of revealing the metacognitive potential of a teacher in the context of the development of his health-preserving competence

Vasyl M. Fedorets^{1,*}, Oksana V. Klochko^{2,**}, Vitalii I. Klochko³, Tamila I. Berezhna⁴, and Halyna A. Ivanytsia⁵

¹Department of Psychological and Pedagogical Education and Social Sciences, Public higher educational establishment “Vinnytsia academy of continuing education”, 13 Hrushevskoho Str., Vinnytsia, 21000, Ukraine

²Department of Mathematics and Informatics, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, 32 Ostrozshkoho Str., Vinnytsia, 21001, Ukraine

³Department of Higher Mathematics, Natural and Mathematical Sciences, Vinnytsia National Technical University, Vinnytsia, 21021, Ukraine

⁴Institute of education content modernization, 36 Metropolitan Vasyl Lypkivsky Str., Kyiv, 03035, Ukraine

⁵Department of Psychology, Public higher educational establishment “Vinnytsia academy of continuing education”, 13 Hrushevskoho Str., Vinnytsia, 21000, Ukraine

Abstract. The article presents the results of a study aimed at improving the methodology and techniques for developing metacognitive strategies in postgraduate education as important aspects of health competence of physical education teachers. The concept of “Logos of health-preserving competence of a physical education teacher” has been developed. The logo of health-preserving competence of a physical education teacher is presented as a developed and professionally oriented metacognitive sphere of a teacher for the effective implementation of student health. An important component of the logo is the development of reflexive, self-reflexive, prognostic, goal-setting intellectual skills and stereotypes. The Logos of Physical Education Teacher’s Competence Logos includes the Logos-Narrative constitutive competence. The “Logos Narrative” reveals the main ideas, values, algorithms, interpretations, visions, the purpose of the strategy of professional health care. To study “Methods of integrative use of metacognitive and archetypal phenomena to improve the health competence of physical education teachers”, two questionnaires were used to study the meta-cognitive strategies of physical education teachers. All issues had an axiological dimension and are doctrinal and institutional. The issues highlight the role of humanism and charity as determinants of the relevant modern Ukrainian Eurocentric trends in education reform. Wilcoxon’s T-test was used to process the test results. The positive dynamics of learning outcomes aimed at updating the goals of cognitive strategies is determined.

1 Introduction

Health-preserving competence of physical education teachers is important both for the preservation of life and health and for a broad and humanistic understanding of the phenomenon of the child as a psychological, physical, spiritual being; imbued with joy and the spirit of freedom, which are manifested primarily in motor activity. As a tool of professional activity, this competence is aimed at considering both relatively simple typical issues and a positive solution to complex and atypical situations, threats and problems, primarily related to maintaining not only the health but also the lives of children in physical load conditions [1].

Accordingly, it is important to prevent pathology, which under the influence of physical activity can form as acute (i.e. occur quickly and without preconditions) and requires rapid, correct and intellectualized actions to prevent or minimize risks to life and health. To solve the above problems, which have a systemic, multidimen-

sional, anthropological, psychological, motor nature in the field of health competence is insufficient to develop problem-based and prevention-oriented algorithms, strategies and knowledge about a person and the human body in the normal situation and in the context of certain disorders prevention. This primarily includes the formation of healthy thinking of a physical education teacher based on a deep knowledge of human nature in the conditions of physical activity. Accordingly, health-preserving thinking as a specific cognitive professional phenomenon determines the structure and effectiveness of strategies and ways to save the lives and health of children. Integrative and reflexive cognitive abilities of the teacher and “cognitive prerequisites” aimed at self-organization, reflection, assessment of one’s own cognitive sphere, goal-setting, as well as readiness for intellectual activity are practically significant components of health-preserving thinking.

This aspect, first of all, includes the need for relative formation of specialized knowledge, “meta-knowledge” and “metacognitive” strategies, as well as the actualization of valuable mental skills and technology-oriented understanding of their optimal competence – based on ap-

*e-mail: bruney333@yahoo.com

**e-mail: klochkoob@gmail.com

plication and further development. The development of meta-cognitive strategies is important in this direction. Therefore, we are talking about the importance of updating metacognitive strategies, metacognitive thinking and knowledge. Indicative intellectual components can ensure the development of health-preserving competence of a physical education teacher as an effective professional toolkit. Metacognition as an intellectual and reflexive phenomenon was studied by Flavell in the late twentieth century [2, 3]. He identifies metacognitive knowledge, feelings, goals, objectives, actions (or strategies) [3], skills, experiences. Metacognitive studies have been studied by Koriat [4] who speaks of their conscious and unconscious dimensions. Purposeful application of such metacognitive phenomena as self-assessment and self-management of cognition, as well as self-regulation, self-organization and self-control [5, 6], is relevant for the formation and practical application of health knowledge; to reveal the creative potential of the individual. The use of metacognitive phenomena in the concept of self-regulation of learning (SRL) is educationally significant [7]. For the disclosure of the significance of our problems, the studies of Aktağ et al. are important [8] and Bulut, [9], that indicate the need to develop the metacognitive spheres of physical education teachers and other teachers, considering this as an important component of their qualification improvement.

The value-ethical understanding of the teacher's role as a specialist, who is a person who reveals and forms in students eudemony, arete, kalokagatia, harmony as defining metastrategies of maintaining and shaping their health, personal and intellectual growth is important in this aspect. Thus, important ways of a teacher's self-improvement in our opinion are the relative actualization of his/her metacognitive sphere [10] and the archetypal dimension of consciousness [10].

A significant aspect of the problem of metacognitive and archetypal phenomena integrative application is the development of health-preserving competence of physical education teachers as a holistic and systemic professional-personal and intellectual-value phenomenon. In this anthropological model, the components of health-preserving competence (cognitive, activity-discursive, personal-existential, anthropocultural and inclusive-humanistic), which we define and set formally, are consolidated into "intellectual-activity-personal" integrity, into competence – at the level of neuropsychological processes. Accordingly, we emphasize the possibility of targeted influences at the level of baseline conditions in the development and formation of competence in order to optimally integrate the above components into a certain integrity in health competence. As factors of health competence components integration into a single integrity, we consider metacognitive (knowledge, strategies, goals) [10] and archetypal phenomena that can be represented in the format of strategies, algorithms, principles, narratives, professional and cultural myths, legends, mythologists, and stereotypes.

Metacognitive strategies are an important aspect of the health-preserving competence of a physical education teacher. They (metacognitive strategies) in our pedagogical system are part of the cognitive component of health-

preserving competence of a physical education teacher [10]. Metacognitive strategies as a teacher's mental tool are aimed at maintaining health both at rest and during exercise. They are important for the development of anticipation (the ability to predict events) as an important component in the prevention of certain disorders that can be caused by exercise. In the scientific literature, the problem of improving the methodology and methods of developing metacognitive strategies of a physical education teacher in postgraduate education as a significant aspect of his health-preserving competence of a physical education teacher is insufficiently covered. This, together with the importance of metacognitive strategies of the physical education teacher for the preservation of life and health of students in the conditions of physical activity represents this problem as relevant.

The purpose of the study. Improving the methodology and techniques for the development of metacognitive strategies in postgraduate education as important aspects of health competence of physical education teachers.

2 Methods of the research

The study was conducted on the basis of a system of methods and approaches, the main of which were: metacognitive [2–9, 11–13], methodology of archetypal psychology of C. G. Jung [14], archetypal pedagogy [15], competence, axiological. Were used: narrative, holistic, philosophical, epistemological; transdisciplinary; preventive [1] approaches and analysis of scientific literature.

The following concepts were used to develop the metacognitive component "Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to increase the health-preserving competence of a physical education teacher" [10]: intellectualization, professionalization, anthropologization, humanization, critical thinking, tolerance, knowledge transfer, existentialization.

Use of own methodological developments. To determine the system-organizing ideas, images, strategies, values and intentions associated with the archetypal level of consciousness and diagnosis of constitutive metacognitive knowledge, goals, strategies aimed at preserving the health of students, revealing their freedom, personal and creative potential, as well as understanding the role of a physical culture teacher in health preservation and actualization of his/her value-semantic sphere, the professional and personal growth 2 questionnaires were developed: № 1 "Analysis of simplifying health-preserving metacognitive strategies and interpretations", № 2 "Understanding health-preserving metacognitive strategies".

Questionnaire № 1. "Analysis of reducing health-preserving metacognitive strategies and interpretations".

1. The health-preserving activity of a physical education teacher mainly concerns the sphere of his/her professional activity, adaptation, efficiency and especially cannot affect his/her spiritual development and personal growth. (Yes / No / I don't know)

2. Mostly, health is seen as physical, mental and social. Other aspects of health are not significant in educational practices of its preservation. (Yes / No / I don't know)
3. Physical health is central to educational practices. Consideration of psychological and spiritual health in the context of historical memory actualization of ecological (Chernobyl and Fukushima disasters) and social (Holocaust, Holodomor, World War II, conflict in the East of Ukraine) catastrophes are not relevant issues in educational health-preserving practices. (Yes / No / I don't know)
4. If the health-preserving technology or technique is perfect and tested, it can be used in physical education classes without analyzing the health status and individual, age, sex, gender characteristics of children and students' reactions to these influences. (Yes / No / I don't know)
5. If the student's medical certificate states that he/she is healthy and admitted to physical education classes, this makes it practically impossible to develop acute cardiac diseases during exercise and, accordingly, eliminates the need to monitor such a student to prevent possible health problems. (Yes / No / I don't know)
6. Physical activity, proper nutrition and exercise, which are the basis of a healthy lifestyle, are the determining factors that ensure a person's health, so there is no need to take into account the prevention of possible disorders that may never occur. (Yes / No / I don't know)
7. Health is mainly formed by a person himself/herself through physical activity, hardening and proper nutrition. At the same time, the impact of culture and communication on health is insignificant, and it is almost absent. (Yes / No / I don't know)
8. To increase the effectiveness of physical education, there are minor health problems (such as runny nose, lethargy, low mood) which can be ignored. (Yes / No / I don't know)
9. Rapid and significant growth of the adolescent and, accordingly, the presence of the formed physical qualities (strength, endurance, etc.) almost always indicate good health. (Yes / No / I don't know)
10. The more a person moves, the better his/her health is. (Yes / No / I don't know)
11. If students are healthy, then for effective classes, in order not to waste time and effort during training, there is no need to analyze the dynamic state of their health to identify and prevent possible violations. (Yes / No / I don't know)
12. Significant concentration of the child in the physical sphere as a result of physical culture and sports only

has a positive effect on the preservation and formation of health and the student's development. (Yes / No / I don't know)

13. Rapid and significant physical development and growth of the adolescent should correspond to physical activity, which should be increased in proportion and in relation to his/her development. (Yes / No / I don't know)
14. Motor activity and preservation of health are aimed at the development of the motor sphere of the individual, his/her physicality has no special and significant connection with the preservation of the Earth and the environment. (Yes / No / I don't know)

Questionnaire № 2 in the format of affirmative formulations presents strategies that are formed on the basis of humanistic, poliontological, democratic understanding of human nature and health.

Questionnaire № 2. "Understanding health-preserving metacognitive strategies".

1. Carrying out dynamic health observation during physical education classes is a necessary strategy of a teacher, which ensures the preservation of life and health of students. (Yes / No / I don't know)
2. Knowledge and understanding by a physical education teacher of the reasons and mechanisms of actual disturbances development which can be formed or shown during physical activity provides preservation of students' life and health. (Yes / No / I don't know)
3. Humane, understanding, tolerant and compassionate treatment of students is the basis of health competence. (Yes / No / I don't know)
4. Physical development and preservation of students' health in relation to the formation of their values aimed at caring for the Earth and its preservation is an important strategy of a physical education teacher. (Yes / No / I don't know)
5. The relative development of bodily arete – health, strength, beauty and spiritual arete – kindness, sophrosyne (moderation, harmony), reason, mercy is decisive in the harmonization between the physical and spiritual-intellectual spheres of students. (Yes / No / I don't know)
6. For his/her harmonious development, a person must be directed not only to the outside world, but also to himself/herself, that is, to be engaged in self-knowledge, which is an important aspect of modern child-centered practice of physical culture. (Yes / No / I don't know)
7. Understanding the primacy of being determines the phenomenon of existential health, which is revealed by means of physical culture as significant for the individual and his/her harmonious development. (Yes / No / I don't know)

Statistical methods. We need to prove the statistical significance of the study results. For this purpose we will use the Wilcoxon's T-test [16]. We consider the results of the study on one sample of data in two different experimental conditions.

We will prove the statistical significance of the difference in the results of testing Physical Education Teachers before and after the experiment. We put forward hypotheses:

H_0 : The value of the test results of Physical Education Teachers after the experiment is lower than the value of the test results before the experiment at the level of significance $p < \alpha$.

H_1 : The value of the test results of Physical Education Teachers after the experiment exceeds than the value of the test results before the experiment at the level of significance $p < \alpha$.

We rank the results.

The change in the values of the test results in the direction of increasing the corresponding values after the experiment is considered "Typical".

Calculate the sum of the ranks of "atypical" shifts (S_{atyp} , formula (1)):

$$S_{atyp} = \sum_{i=1}^n R_i, \quad (1)$$

where:

n – number of "atypical" shifts,

R_i – ranks of "atypical" shifts ($i = 1, 2, \dots, n$).

Using a statistical table taking into account the level of statistical significance α ($p < \alpha = 0,05$ or $p < \alpha = 0,01$) and the number of studied indicators n we find S_{typ} .

Hypothesis H_0 is rejected, hypothesis H_1 is accepted in case of exceeding at the level of significance $p < \alpha$ "typical" shifts over "atypical" $S_{atyp} \leq S_{typ}$.

Hypothesis H_1 is rejected, hypothesis H_0 is accepted, in case of exceeding at the level of significance $p < \alpha$ "atypical" shifts over "typical" $S_{atyp} > S_{typ}$ at the level of significance $p < \alpha$.

3 Results and discussion

To develop and manifest the metacognitive abilities of the teacher, we present the concept of "Logos of health-preserving competence" as part of the cognitive component of this competence (figure 1 and figure 2) [10]. To actualize the personal-professional factor of the teacher's professional activity based on the interaction of the archetypal and partly emotional sphere, we developed the concept of the "Myth of health-preserving competence" as part of the personal-existential component of this competence. [10]. The Myth of the health-preserving competence of a Physical Education Teacher is presented as a professionally oriented aspect of consciousness in which both the deep irrational archetypal mental reality and the rational principle are manifested [10]. The Myth of health-preserving competence manifests the individual and collective unconscious and, to some extent, the existential dimension of the human (figure 1). Myth is associated with

emotional origins, with anthropohistorical and cultural-historical stereotypes of decision-making, actions, perceptions, orientations to certain values and meanings, Mythos is closely related to the phenomenon of culture in general and, accordingly, is a specific holistic, emotional and figurative way of mastering reality. Mythos forms a certain psychological and emotional charge and background, which in turn contribute to the optimal functioning of the professionally oriented metacognitive sphere of the specialist – the logos. We consider the myth and logos of health-preserving competence as a whole and interconnectedly and interdependently (figure 1 and figure 2).

For the development of metacognitive strategies, we have developed and applied "Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher" [10]. In addition to the development of metacognitive strategies, this technique is aimed at actualizing the archetypal dimension [10] of consciousness (presented as a Myth of competence) which is energetically powerful and thus creates a certain psychological background for revealing the metacognitive nature of the specialist.

During the development of this technique, 4 components (blocks) were laid in its basis. This methodology is based on the integration of such components (figure 1) "Logos of health-preserving competence of physical education teachers", "Myth of health-preserving competence of physical education teachers", "Determining health-preserving strategies" and "Metacognitive-semantic context".

Actualization of metacognitive, cultural, personal, existential potentials of the teacher, which is realized in the process of each of the course topics consideration ("Development of health-preserving competencies of physical education teachers in postgraduate education") is represented as "Metacognitive-semantic context" (figure 1). This concept is an important component of this technique. Accordingly, it is decisive in scope and significance. This concept is a system of purposeful assistance to the teacher in understanding the strategies for saving the lives and health of students, which are updated and formed within each of the course topics. Health-preserving strategies, which are formed in the system of "Metacognitive-semantic context" in relation to "Determining health-preserving strategies", are metacognitive strategies of the II (second) order, technologically oriented, concretized (specified), i.e., aimed at solving specific problems. The metacognitive-semantic context is "penetrating" and present in all topics of the course. Accordingly, it is aimed at the formation of practice-oriented "Determining health strategies" and, to some extent, "Mythos" and "Logos" of health-preserving competence.

Due to the fact that the formation of physical education teachers' ability to apply meta-cognitive strategies in educational practices and technologies of health is cross-cutting and system-organizing in this pedagogical system (and in the relevant training course), so the control of results, in addition to questionnaires, is also car-

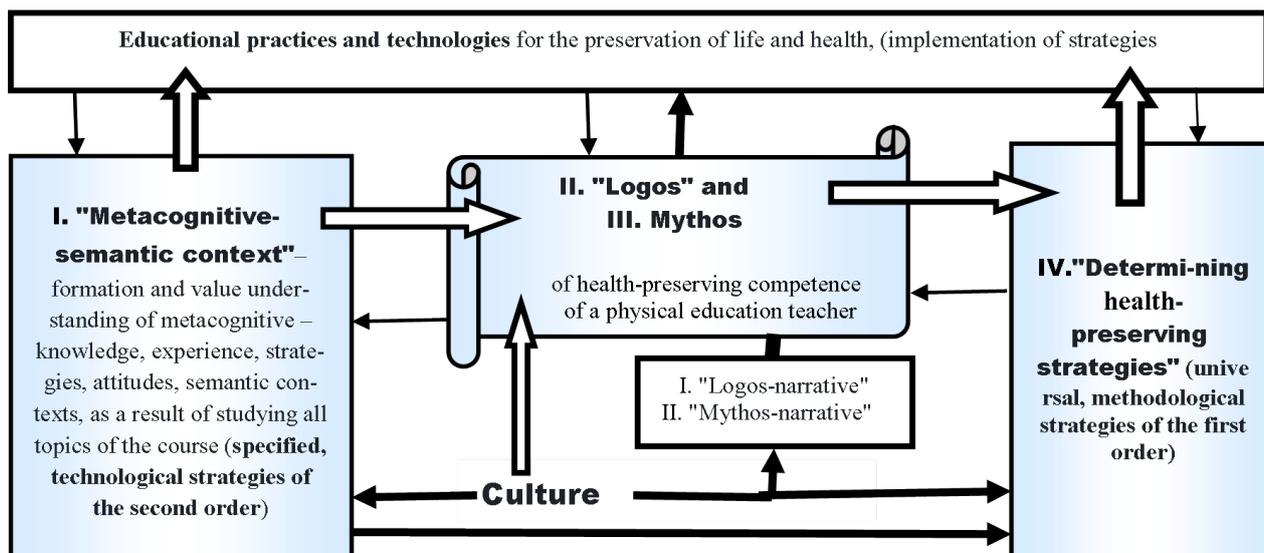


Figure 1. Conceptual and structural scheme of “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher”.

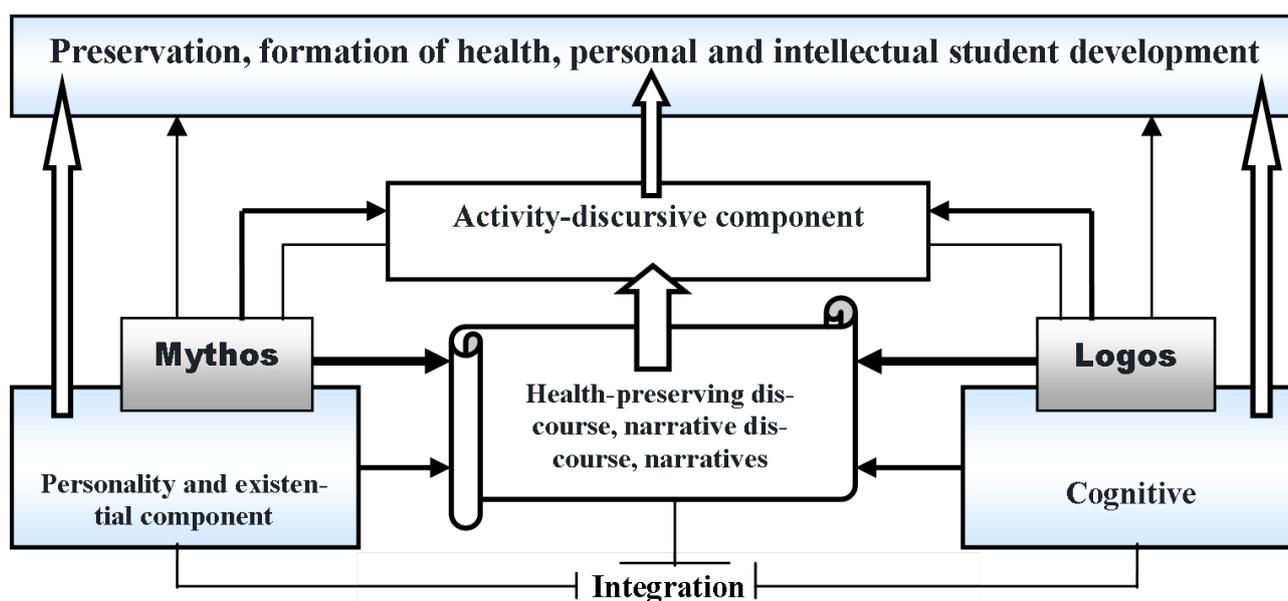


Figure 2. Conceptual and structural scheme of consolidation and implementation of health-preserving competence through the formation of health-preserving discourse and narratives of health through the integrative effects of “Mythos” and “Logos” of health-preserving competence of Physical Education Teachers.

ried out in the analysis of the level of formation of cognitive, personal-existential, activity-discursive components of health-preserving competence (in this study, we do not consider this aspect).

”Determining health strategies” (figure 1) are formed on the basis of technological and value understanding of the developed “Mythos” and “Logos” of health-preserving competence, analysis of educational practices and experiences of health within the “Metacognitive-semantic context”, transfer of medical and hygienic, anthropological and psychological knowledge. The following “Determining health strategies” are used (this aspect is not consid-

ered in this paper): “Motor strategy”, “Strategy of body and physical development”, “Strategy – do no harm”, “Prevention strategy based on knowledge of the causes of violations” (“Etiological strategy”), “Strategy of kindness, mercy and tolerance as the basis of psychological health”, “Axiological strategy”, “Harmonization strategy”, “Earth care strategy”, etc. These strategies are presented as methodologically-value-oriented, universal, conceptualizing, defining, value-semantic, system-organizing, i.e., metacognitive strategies of the first order.

Logos of health-preserving competence. Metacognitive strategies are especially important in the health-

preserving competencies activities of Physical Education Teachers. The problem of metacognition is revealed in many studies [2–9, 11–13]. Metacognitive strategies are not only practically significant but also necessary in the health-preserving and life-saving activities of a Physical Education Teacher. Metacognitive strategies are part of the cognitive component of health-preserving competence, which determines the impact on goal setting, reflection on their own intellectual abilities and practical skills, activities, experiences.

In developing the concept of “Logos” we used Bloom’s taxonomy in the interpretation of Anderson et al. [17] and the taxonomy of Marzano and Kendall (“The New Taxonomy of Educational Objectives”) [18]. The logos of health-preserving competence correspond to the 4th metacognitive level – D (dimension – “Cognitive processes”), Bloom’s taxonomy and “Metacognition system” according to the Marzano taxonomy. At the same time, this concept of “Logos” is interpreted by us somewhat more broadly and is related to human teleology, its creative potential, existence and cultural dimension of existence.

The logos of a health-preserving competence Physical Education Teacher are a professionally oriented metacognitive ability. The Logos of health-preserving competence is formed on the basis of comprehension of the constitutive and constituent narrative – “Logos-narrative” aimed at actualization of metacognitive aspects of health-preserving thinking and reflection on one’s professional, intellectual and life experience [10]. An important aspect of the development of the Logos of health-preserving competence of a Physical Education Teacher is the reception and internalization of metacognitive knowledge, strategies, values, value-semantic contexts, attitudes, algorithms, stereotypes of thinking. Logos of health-preserving competence of a physical education teacher is an important aspect of the cognitive (intellectual-value) component of this competence, of which it is a part.

Logos of health-preserving competence of a Physical Education Teacher is formally developed and formed as a component of the cognitive (intellectual-value) component of the specified competence (figure 1). Functionally, logos of health-preserving competence is aimed at: the constitution of this competence into one whole on the basis of actualization of the metacognitive sphere of personality, including goals, strategies, intentions, understanding of experiences; intellectually oriented solution of complex and typical health problems; formation of health-preserving thinking and intentionality; interest in the ideas of humanism, child-centeredness, anthropologization; practical implementation of health-preserving strategies; actualization of cultural, value, ethical, intellectual and personal potential of the individual.

Logos reveals and forms the professional and intellectual culture of a teacher, his/her reflexive and self-reflexive skills and abilities to comprehend his/her intellectual experience. The logos of health-preserving competence, as a metacognitive system integrates competence and in the format of certain strategies and algorithms, determines the cognitive, intentional, reflexive and target aspects of the formation and implementation of all components of this

competence and, above all, the activity-discursive one. This is due to the fact that health-preserving activities are maximally and “externally” manifested in the activity-discursive component, are intellectualized and mostly discursive in nature. The teacher makes decisions by “manifesting” the logos – through metacognitive strategy and mainly implements it through the logos which in the cognitive aspect is knowledge, thought, attitude, and in the activity one is a word (in the sense of narrative and discourse). Thus this is the effect of the relationship and interaction in the systems “Logos – Praxis” (Praxis is used in the sense of activity, practice) “Logos – Praxis – verbalis (discursus)” (verbalis in the sense of verbal influence) (figure 2).

In connection with the COVID-19 pandemic, the problem of health in the modern world has acquired a qualitatively new value-ethical and life-giving understanding, as indicated in the study by Kamasz [19]. Accordingly, the role and importance of a teacher’s ability to form a professional (in the sense of health-preserving) discourse in the educational process, including narrative discourse and narratives about health, which we consider as a relevant component of the activity-discursive component of health-preserving competence of physical education teachers and a significant aspect of a healthy lifestyle. Real communication in the educational process, which includes narratives and narrative discourse, which is considered a significant aspect of health care, is a factor in the actualization of the archetypal dimension of consciousness and the development of metacognitive strategies. The problem of professional communication online in the pandemic COVID-19 is revealed by Kim et al. [20], who notes its imperfection. At the same time, it can be pointed out that in the conditions of quarantine and online communication the role of narrative, narrative discourse as well as health discourse in general, which are essentially the defining competence “tools” of professional activity of physical education teachers grows significantly. Accordingly, it highlights the importance of developing these concepts of “Mythos” and “Logos” of health-preserving competence of a physical education teacher as narrative-discursive in their essence. Thus, metacognitive strategies and the archetypal dimension of consciousness are both actualized and manifested in professional activities through professional health-preserving discourse, the defining component of which is narrative (as a teacher’s ability), narratives about health, which are revealed in narrative discourse.

Thus, we define two aspects of the Logos concept of health-preserving competence – competence, which is, as part of a competence – “Logos” (figure 1) and formally-constituent, which is presented in the format of a narrative – “Logos-narrative” (figure 1). The first (as a component or the aspect of competence) aspect was considered above. Let’s consider the formal-institutional aspect of the health-preserving competence “Logos-narrative” (figure 1), which is purposefully formed and represents a “formal metacognitive and intellectually valuable basis of competence”. Within the formal-constitutive aspect, the health-preserving competence logos-narrative is a purposefully formed narrative (see below a fragment

of the logos in the format of a narrative), concise, conceptual, generalized, value-oriented representation of the main defining and system-organizing ideas, ideals, conceptions, values, meanings, images (of a person, action, etc.), decision-making, algorithms, action strategies, knowledge, metaphors, directions. That is, the logos-narrative of competencies is a short concise story, which is structured by highlighting the main groups of ideas, values, problems and directions. The defining and main among them are the following – Person (child), Teacher, life, health, move (motor activity), prevention of violations, preservation of the Earth.

Functionally, the logos-narrative (figure 1) of health-preserving competence is aimed at:

- 1) formalized, systematic, generalized, value-oriented presentation and disclosure of basic ideas, visions, strategies, values, based on which both the competence and its cognitive component are developed;
- 2) constitution of competence into one system integrity on the basis of metacognitive phenomena actualization, narrative and intellectual-value potential of personality;
- 3) conceptualization of the competence main components and certain specific strategies;
- 4) selection and comprehension of knowledge, problems, strategies, values necessary for realization of competence;
- 5) identification and demarcation of the main systems of problems on the solutions to which the competence is directed;
- 6) representation of anthropological, humanistic and ecocentric values and meanings as a rational basis for health-preserving activities;
- 7) definition of basic values, meanings and direction of competence;
- 8) determining the role of a teacher as a subject of professional activity and the importance of its metacognitive potential in the implementation of health preservation;
- 9) anthropologically-value, child-centered and intellectually-oriented understanding of the child as a subject of educational interaction;
- 10) intellectually-oriented and humanistic, anthropologized, ecocentric and value disclosure of the health phenomenon.

To understand the methodological and constitutive meaning of the health-preserving competence logos-narrative, it (logos) can be metaphorically called a “constituent document” or a “constitution of competence”. Thus, the logos of health-preserving competence (see below) plays a creative-founding, constitutive and integrative role in the construction and in the process of this competence formation.

Based on the methodological and technological-value understanding of the health-preserving competence logos and metacognitive strategies of professional activity, professional stereotypes, algorithms and intellectual traditions, professional discourse, values and meanings, two questionnaires № 1 and № 2 were developed (see “Methods of the research”). Questionnaire № 1 reveals the presence of simplifying and reducing ideas about the person (child) and his/her health. Questionnaire № 2 presents idealized system-creating and constitutive health-preserving competence of ideas, ideals, visions, values, and narrative preconditions of metacognitive strategies.

Let’s present in an abbreviated format the logos of health-preserving competence of a physical education teacher.

Logos-narrative of health-preserving competence of a physical education teacher (as a constitutive competence narrative) (6 points out of 12 are abbreviated).

1. The logos of health-preserving competence of a physical education teacher is considered as a system of concise, holistic, interconnected, anthropologically-value-based and intellectually-oriented representation of basic ideas, ideals, visions, approaches, attitudes, values, meanings, intentions, directions, ethical and aesthetic guidelines on the basis of which competence is developed and formed and which are part of it in the format of the metacognitive aspect. At the personal-professional level, the Logos of health-preserving competence reflects and actualizes the spiritual-intellectual and intentional essence of a Physical Education Teacher as an intellectual and an intelligent person and his/her ability to professionally oriented conceptualization and strategic thinking. The logos of competence is presented as a “metacognitive” way of self-improvement and a “meta-intellectual” tool of the teacher aimed at maintaining the health and disclosing the creative and personal potential of students. The logos of competence is developed within this pedagogical system on the basis of: ideas of humanization, anthropologization, Europeanization, axiologization, freedom, cordocentrism, child-centeredness, tolerance, gender equality, paideia, harmony, knowledge transfer, ecologization, goals of sustainable development, and using inclusive, innovative, anthropological, culturalogical, existential, and psychological approaches.
2. The theory and practice of preserving and forming the health of children and preserving their lives are through the professionalization and axiologization of the Teacher of Physical Education, are also important for the development of his/her professional subjectivity, self-improvement, actualization and self-realization. According to professional positions, the development of special and specific knowledge, intellectual skills and understanding of normative and pathological anthropological phenomena both at rest and during exercise, as well

as the ability to interpret them, are necessary for effective health.

3. Person in his/her essence is holistic, polyontological, multidimensional, intentional (directed), ethical and creative. Person is understood as a spiritual, corporeal, social, dialogical, merciful, kind, intelligent, motor, temporal creature. This determines the understanding of the health and physical activity phenomenology in formats related to the above attributes. Accordingly, health is multidimensional and is seen as spiritual and physical, as a manifestation of well-being, harmony, charity, as a manifestation of movement, as an existence (existential health), etc.
4. The motor sphere and motor activity of a person is considered to be decisive in its existence, in its maintenance and formation: health, including psychological and spiritual; character and behavior; intelligence and creativity; adaptation and development; emotional sphere; as an ecophilic way of interacting with the Earth and preserving the environment. Homo Sapiens and Homo Educandus are represented as Homo Locomotorium and as Healthy Person.
5. Health is considered as an attributive feature of a person, as a personal, physical, mental, educational, anthropological, culturological, autopoietic, value, and ethical phenomena. Health is presented as a given and as a way of its formation and preservation; both the actual and real existing phenomenon and the potential for life, its manifestation and vitality. Life and health are optimal and harmonious interaction and integration of competitive strategies and phenomena. There are both harmonizing and competitive strategies between the physical, the intellectual and the spiritual. Excessive and prolonged concentration on the physical sphere due to excessive physical activity and sports can lead to the formation of a disharmonious personality. Measure in the effects on person and his/her body, is the path to health – “Servare modum, finemque et enere naturam quae esequi” (Latin: “Keep the measure, adhere to limits, follow nature”). The basis of maintaining health is determined by a healthy way of life and a healthy lifestyle, the defining component of which is optimal and individualized physical activity. The system-organizing component of preserving and maintaining health is the prevention of diseases, problems and health risks during exercise in general, as well as the correction of certain pathologies with the use of physical culture.
6. A healthy lifestyle is considered on the basis of understanding: health as well-being, health, which is an individualized phenomenon; health as harmony with oneself, with the environment and with the Earth; health as homeostasis (balance); health as self-care and self-knowledge; health as existence and as a special subjective time.

Experimental study. Consider the results of a study conducted in 2017–2018. 816 Physical Education Teachers were invited to the study. The experimental group consisted of 411 people. The study was implemented in 9 institutions of higher education in Ukraine: Chernihiv Regional Postgraduate Institute of Postgraduate Pedagogical Education named after K. D. Ushinsky, Communal institution of the Lviv regional council “Lviv Regional Institute of Postgraduate Pedagogical Education”, Communal institution “Sumy Regional Institute of Postgraduate Pedagogical Education”, Communal institution “Zhytomyr Regional Institute of Postgraduate Pedagogical Education” of the Zhytomyr Regional Council, Communal Higher Educational Establishment “Kherson Academy of Continuing Education” of the Kherson Regional Council, Donetsk Regional Inservaise Teacher Training Institute, Drohobych Ivan Franko State Pedagogical University, Municipal Institution “Zaporizhzhia Regional Institute of Continuing Pedagogical Education” of Zaporizhzhia Regional Council, Nikolaev Regional Institute of Postgraduate Pedagogical Education.

Consider the results of testing Physical Education Teachers using Questionnaire № 1 “Analysis of reducing health-preserving metacognitive strategies and interpretations” before and after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher” (table 1, table 2, and figure 3). The answer “No” to Questionnaire № 1 is a positive result. We prove that the excess of the values of the test results after the experiment over the values of the test results before the experiment is statistically significant.

As can be seen from table 1, table 2, and figure 3 there are no “atypical” shifts S_{atyp} as a result of Physical Education Teacher testing using Questionnaire № 1 “Analysis of reducing health-preserving metacognitive strategies and interpretations” (table 1, table 2, and figure 3). Therefore, the sum of the ranks of “atypical” shifts according to the formula (1) $S_{atyp} = 0$ according to Wilcoxon’s T-test [16].

Using the statistical table [16] we find the critical value of Wilcoxon’s T-test for $n = 14$ and $p < 0,01$ $S_{typ} = 15$.

Therefore, at the significance level $p < 0,01$ $S_{atyp} = 0 < S_{typ} = 15$. Hypothesis H_0 is rejected, hypothesis H_1 is accepted, ie, at the level of significance $p < 0,01$ value of Physical Education Teacher test results using Questionnaire № 1 “Analysis of reducing health-preserving metacognitive strategies and interpretations” after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher” significantly exceed the value of test results before the implementation of this methods.

Such a positive dynamics of the results of testing physical education teachers indicates the development of metacognitive strategies. In developing this Questionnaire № 1, typical cognitive and cognitive-value phenomena (errors, strategies and professional attitudes) that are present in the modern professional consciousness and culture of

Table 1. Values of testing indicators Physical Education Teachers using Questionnaire № 1 “Analysis of reducing health-preserving metacognitive strategies and interpretations” before and after (*b/a*) the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher”.

Question number, <i>n</i>	The number of “yes” answers before/after the experiment	The number of “no” answers before/after the experiment	The number of “undecided” answers before/after the experiment
1	31/8	293/402	87/1
2	83/7	171/398	157/6
3	9/2	334/406	68/3
4	65/3	299/303	47/5
5	79/12	247/392	85/7
6	78/4	303/399	30/8
7	57/13	298/387	56/11
8	87/7	271/395	53/9
9	123/33	276/347	12/31
10	264/133	132/274	15/4
11	15/5	323/396	73/10
12	205/37	124/351	82/23
13	168/41	221/355	22/15
14	79/13	313/386	19/12

the teacher are purposefully used. Accordingly, in the course of the training we purposefully analyze them both at the level of “Metacognitive-semantic context”, i. e. in the study of specific topics of the course and in the formation of “Determining health strategies” by updating the “Logos” and “Mythos” of health-preserving competence. The result of learning is the development of metacognitive strategies based on the teacher’s critical assessment of typical reduction ideas about the child and his/her health.

A slight increase in learning outcomes is observed for question № 4 (see Questionnaire № 1). This is due to the fact that teachers traditionally understand the issue of health-preserving interpretation of the medical document content in which the student is recommended to attend physical education classes. Guided by a system of approaches and experiences, including medical, we update the thesis that according to the content of the medical document, the child can really be healthy. At the same time, the teacher must take into account the following two important aspects: 1) the state of the child’s health in the medical document is recorded at the time of his/her examination by the doctor, which means that after his/her examination by the doctor and the child’s condition may remain (that is he/she is healthy) or he/she will have certain problems or illnesses; 2) a completely healthy child under the influence of physical activity can develop acute illnesses that form against the background of complete health, such as injuries or acute cardiac disorders.

Let’s check the results of testing according to Questionnaire № 2 “Understanding health-preserving metacognitive strategies” using Wilcoxon’s T-test [16] (table 3, table 4, and figure 4). The answer “Yes” to Question-

Table 2. Values of “no” answers of testing indicators Physical Education Teachers using Questionnaire № 1 “Analysis of reducing health-preserving metacognitive strategies and interpretations” before and after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher”.

Question number, <i>n</i>	The number of “no” answers before the experiment, <i>b</i> ₁ , (%)	The number of “no” answers after the experiment, <i>a</i> ₁ , (%)	The value of the differences between <i>a</i> ₁ and <i>b</i> ₁ , <i>a</i> ₁ – <i>b</i> ₁ , (%)
1	71	98	27
2	42	97	55
3	81	99	18
4	73	74	1
5	60	95	35
6	74	97	23
7	73	94	21
8	66	96	30
9	67	84	17
10	32	67	35
11	79	96	17
12	30	85	35
13	54	86	32
14	76	94	18

Table 3. Values of testing indicators Physical Education Teachers using Questionnaire № 2 “Understanding health-preserving metacognitive strategies” before and after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher”.

Question number, <i>n</i>	The number of “yes” answers before/after the experiment	The number of “no” answers before/after the experiment	The number of “undecided” answers before/after the experiment
1	348/397	8/3	55/11
2	377/405	11/2	23/4
3	407/409	0/0	4/2
4	363/398	36/5	12/8
5	384/406	6/2	21/3
6	312/389	21/7	78/15
7	299/388	15/9	97/14

naire № 2 is a positive result. We prove that the excess of the values of the test results after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher” over the values of the test results before the implementation of these methods is statistically significant.

According to the values of table 3 and table 4 there are no “atypical” shifts *S_{atyp}* as a result of Physical Education Teachers testing using Questionnaire № 2 “Understand-

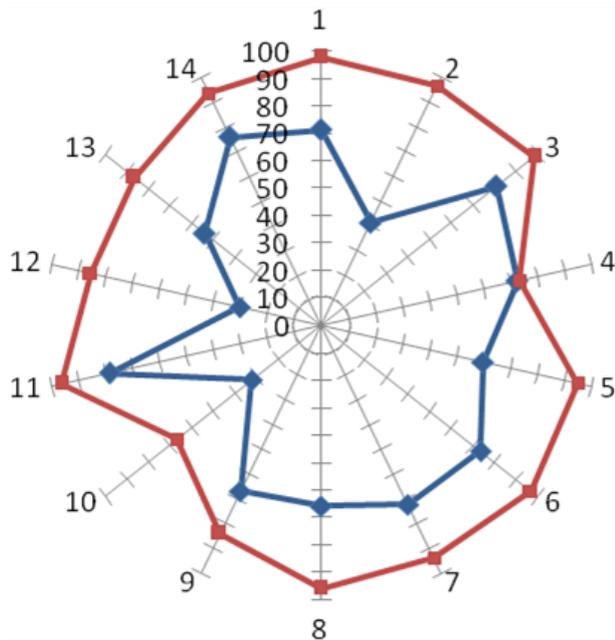


Figure 3. Graphical representation of test results Physical Education Teachers using Questionnaire № 1 “Analysis of reducing health-preserving metacognitive strategies and interpretations” before and after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher” (Blue color on the graph indicates the results of the study before the implementation of this methods, red – after the implementation of this methods).

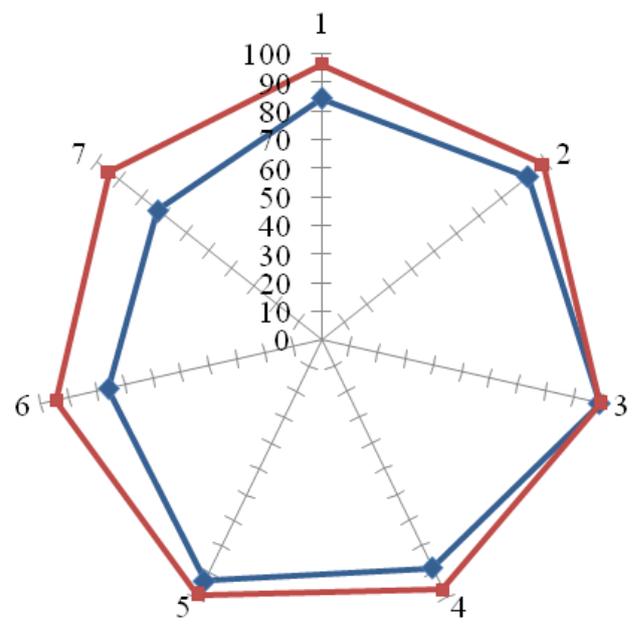


Figure 4. Graphical representation of test results Physical Education Teachers using Questionnaire № 2 “Understanding health-preserving metacognitive strategies” before and after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher” (Blue color on the graph indicates the results of the study before the implementation of this methods, red – after the implementation of this methods).

Table 4. Values of “yes” answers of testing indicators Physical Education Teachers using Questionnaire № 2 “Understanding health-preserving metacognitive strategies” before and after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher”.

Question number, n	The number of “yes” answers before the experiment, b_2 , (%)	The number of “yes” answers after the experiment, a_2 , (%)	The value of the differences between a_2 and b_2 , $a_2 - b_2$, (%)
1	85	97	12
2	92	99	7
3	99	100	1
4	88	97	9
5	93	99	5
6	76	95	19
7	73	94	21

ing health-preserving metacognitive strategies” (table 3, table 4, and figure 4). The sum of the ranks of “atypical” shifts according to the formula (1), $S_{atyp} = 0$ according to Wilcoxon’s T-test [16].

Using the statistical table [16] we find the critical value of Wilcoxon’s T-test for $n = 7$ and $p < 0,05$ $S_{typ} = 3$.

At the significance level $p < 0,05$ $S_{atyp} = 0 < S_{typ} = 3$. We reject hypothesis H_0 , accept hypothesis H_1 : at the level of significance $p < 0,05$ value of Physical Education Teachers test results using Questionnaire № 2 “Understanding health-preserving metacognitive strategies” after the implementation of the “Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to improve the health-preserving competence of a physical education teacher” significantly exceed the value of test results before the implementation of this methods.

The decisive factor in the obtained results is that the questions of the Questionnaire № 2, purposefully reflect the traditional strategies for modern education formed within the framework of competence, child-centered and humanistic paradigms. All issues contain an axiological dimension and are doctrinal and institutional. Accordingly, the strategies, visions and values mentioned in the issues were purposefully considered as significant and strategic in the preparation process. The slight increase in the results of the questionnaire on question № 3 (Humane, understanding, tolerant and compassionate attitude towards students is the basis of health-preserving competence). Due to the fact that this question highlights the role of humanism and charity as defining phenomena, therefore, both at the beginning and after graduation, no one pointed to a negative attitude towards such an understanding.

4 Conclusion

We consider metacognitive strategies as an important aspect of health competence of a physical education teacher, which is a mental condition that provides effective goal setting, reflection on their cognitive and professional abilities, expression of intellectual feelings, actualization and comprehension of complex intellectualized experiences and practices. A methodology for improving the metacognitive strategies of a physical education teacher in postgraduate education has been developed. In pedagogical practice in the conditions of postgraduate education we apply the developed author's special course "Development of health-preserving competence of the teacher of physical culture". This special course includes the tried and tested "Methods of actualization of metacognitive abilities and archetypal measurement of consciousness to increase the health-preserving competence of a physical education teacher", which purposefully updates the meta-cognitive strategies of the teacher. Analyzing the specifics of professional activity and mental and activity features of health-preserving competence of physical education teachers, we form the concept of "Logos of health-preserving competence of physical education teachers". This concept, which reflects the rational, logical and metacognitive features of health activities and the corresponding competence of the teacher is represented in accordance with our concept "Myth of health competence of physical education teachers"

The logo of health-preserving competence of a physical education teacher is represented as a professionally oriented metacognitive sphere of a teacher. The purpose of the logo of health-preserving competence of a physical education teacher is to increase the effectiveness of maintaining the health of students by updating the purpose of the cognitive sphere and its focus on solving specific practical problems and developing self-reflective skills. It is important to reflect on professional intellectual experience and goal setting. The logo of the health-preserving competence of a physical education teacher includes the "Logos-narrative". This "Logos-narrative" represents formally selected and succinctly presented, basic, constitutive goals of cognitive strategies, ideas, concepts, values, algorithms of action, visions, interpretations, which underlie the health activities of physical education teachers and constitute this competence. "Logos-narrative" has a constitutive, motivating goal-setting function and is formed in the process of competence development and is used in its formation.

To study "Methods of integrative use of metacognitive and archetypal phenomena to improve the health competence of physical education teachers", two questionnaires were used to study the meta-cognitive strategies of physical education teachers. All issues had an axiological dimension and are doctrinal and institutional. The issues highlight the role of humanism and charity as determinants of the relevant modern Ukrainian Eurocentric trends in education reform. Wilcoxon's T-test was used to process the test results. The positive dynamics of learning outcomes

aimed at updating the goals of cognitive strategies is determined.

References

- [1] O. Klochko, V. Fedorets, O. Maliar, V. Hnatuyk, **166**, 10033 (2020), <https://doi.org/10.1051/e3sconf/202016610033>
- [2] J.H. Flavell, in *Metacognition, Motivation, and Understanding*, edited by F.E. Weinert, R. Kluwe (Lawrence Erlbaum Associates, Hillsdale, NJ, 1987), pp. 21–29, https://education.biu.ac.il/sites/education/files/shared/speculations_about_the_nature_and_development_of_metacognition.pdf
- [3] J.H. Flavell, P.H. Miller, S.A. Miller, *Cognitive development*, 4th edn. (Pearson Education, 2001)
- [4] A. Koriati, in *The Cambridge Handbook of Consciousness*, edited by P.D. Zelazo, M. Moscovitch, E. Thompson (Cambridge University Press, 2007), Cambridge Handbooks in Psychology, https://minervacognitive.haifa.ac.il/images/Board_meetings/2010/ptt/asher.pdf
- [5] H. de Boer, A.S. Donker, D.D.N.M. Kostons, G.P.C. van der Werf, *Educational Research Review* **24**, 98 (2018), <https://doi.org/10.1016/j.edurev.2018.03.002>
- [6] K. Ohtani, T. Hisasaka, *Metacognition and Learning* **13**, 179 (2018), <https://doi.org/10.1007/s11409-018-9183-8>
- [7] E. Panadero, *Frontiers in Psychology* **8** (2017), <https://doi.org/10.3389/fpsyg.2017.00422>
- [8] I. Aktağ, Ö. Şemşek, S. Tuzcuoğlu, *Journal of Education and Training Studies* **5**, 63 (2017), <https://doi.org/10.11114/jets.v5i9.2511>
- [9] İ. Bulut, *Universal Journal of Educational Research* **6**, 2697 (2018), <https://doi.org/10.13189/ujer.2018.061201>
- [10] M. Yevtuch, V. Fedorets, O. Klochko, T. Branitska, Y. Kozeruk, *Journal of Physical Education and Sport* **21**, 3084 (2021), <https://cutt.ly/3KCPuZ9>
- [11] M. Goudas, I. Dermitzaki, A. Kolovelonis, *International Journal of Sport and Exercise Psychology* **15**, 131 (2017), <https://doi.org/10.1080/1612197X.2015.1079791>
- [12] H. Kallio, K. Virta, M. Kallio, *International Journal of Educational Psychology* **7**, 94 (2018), <https://doi.org/10.17583/ijep.2018.2789>
- [13] G. Schraw, R.S. Dennison, *Contemporary Educational Psychology* **19**, 460 (1994), <https://doi.org/10.1006/ceps.1994.1033>
- [14] C.G. Jung, *Psyche and symbol; a selection from the writings of C. G. Jung* (Doubleday, Garden City, N.Y., 1958), <https://archive.org/details/psychesymbolsele0000jung>
- [15] C. Mayes, S. Persing, C. Schumacher, eds., *New Visions and New Voices: Extending the Principles of Archetypal Pedagogy to Include a Variety of Venues*,

Issues, and Projects (Rowman & Littlefield Publishers, 2021)

- [16] Y.V. Sidorenko, *Metody Matematicheskoy Obrabotki v Psikhologii (Methods of Mathematical Processing in Psychology)* (Rech, St. Petersburg, 2002), <https://www.sgu.ru/sites/default/files/textdocsfiles/2014/02/19/sidorenko.pdf>
- [17] L.W. Anderson, D.E. Krathwohl, P.W. Airasian, K.A. Cruikshank, R.E. Mayer, P.R. Pintrich, J. Raths, M.C. Wittrock, eds., *A Taxonomy for learning teaching and assessing: A revision of Bloom's taxonomy of educational objectives* (Addison Wesley Longman, Inc., 2001), <https://www.uky.edu/~rsand1/china2018/texts/Anderson-Krathwohl%20-%20A%20taxonomy%20for%20learning%20teaching%20and%20assessing.pdf>
- [18] R.J. Marzano, J.S. Kendall, *The new taxonomy of educational objectives*, 2nd edn. (Corwin Press, 2006)
- [19] E. Kamazs, *Journal of Physical Education and Sport* **21**, 1064 (2021), <https://cutt.ly/YKCS1sV>
- [20] M. Kim, H. Yu, C.W. Park, T. Ha, J.H. Baek, *Journal of Physical Education and Sport* **21**, 2049 (2021), <https://cutt.ly/fKCDVzI>