

Fractal ESG model increasing axiological rationality of physical culture during coronavirus pandemic epoch: methodological aspect

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Abstract. The article presents the methodological approach to solving the problem of overcoming physical culture recession at higher educational establishments, caused by COVID-19 pandemic. The aim of the research is to start anti-crises trajectory of physical culture development, directed toward the imperatives of fractal ESG model “gold standard”. **Materials.** We estimated the effectiveness of fractal pedagogics technologies transfer into cognitive dynamics of physical culture increase in terms of ESG. **Research methods.** During a yearly cycle we organized dynamic observations over the functional state and fitness of 240 students at the age of 18-19. Representativeness of the model is estimated according to the dynamics of the results in 100 meters running, standing long-jumps, dip up, vertical chin-up at a crossbar. **Results.** We synthesized fractal ESG model, in the structure of which we defined existential modus E (environmental), which gives fractal dimension of physical culture. Modus S (social) increases social responsibility for physical culture and sport development in the system of higher education. Modus G (corporate governance) provides peak activity trends, which are achieved by means of fractal pedagogics methods use. **Conclusion.** The results of the research prove that the created fractal ESG model helps to reduce destructive consequences of the pandemic. The effectiveness of the combined use of physical culture, sport, tourism and fractal pedagogics resource base on ESG platform is proved by the activity and psychosomatic health of students improvement. We see the improvement of results in speed-power oriented tests: deadlift, carpal dynamometry, amount of vertical chin-ups at a crossbar, standing long-jumps. In terms of adversarial character of sport and fitness increase the increase of students’ alertness is achieved. Physical recreation and tourism means combining stimulates hedonistic effect of lessons. The received research results prove the possibility to use fractal ESG model when solving scaled problems in “Public health” and “Sanitary shield of Russia” national projects.

Keywords: alertness, volatility, modus, polynomial, reparation ability, fractal.

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Introduction

The urgency of creating the anti-crises strategy of physical culture development, directed toward destructive consequences of COVID-19 pandemic overcoming, is conditioned by health-creating possibilities realization in the national projects “Public health” and “Sanitary shield of Russia”. The matter concerns conceptual base, which is an alternative to the misleading practice of keeping students from physical culture, sport, fitness and tourism during the pandemic. This problem marking out is motivated by constructiveness of lockdowns study, organized at Johns Hopkins University, the USA. The authors came to the paradoxical conclusion: prohibitive practice, which took great

resources, led to negative effects – starting from dysfunctionality of social institutes to aberration of behavior and a personality’s psychophysical state [4,5]. That is why the conceptual base of the anti-crises strategy includes ESG imperatives and existentiality – social paternalism- corporativity, which characterize ontogenetic fractality of physical culture. In the definition by B. Mandelbrot (1975) fractal (lat. fractus – fragmented) is the regulator of endogenous processes and modi, which synchronizes the efforts concerning the formation of axiological rationality of the system [1].

The absence of a universal experience in the sphere of cognitive technologies of fractal pedagogics and elective physical culture diffusion,

transfer of student sport resources, tourism, fitness, recreation and motor rehabilitation (Brownian motion) means the need for fractal ESG model creation. The processes of technologies transfer and diffusion, synergetically connected with the increase of axiological rationality of the discipline in the system of higher education are realized on the platform of three modi, which have their own conceptual essence. The modi are the following: existential modus E (environmental), which forms typological community of health-creating mindsets and patterns in terms of fractal dimensionality of the discipline. Modus S (social) replicates the narrative of social responsibility of a higher educational establishment for physical culture resources use, which helps to diversify educational process on the platform of fractal pedagogics. Modus G (corporate governance) is oriented toward peak trends of activity, which are achieved in relevance of a genetic, phenotypic polymorphism and sexual determination. As it is seen basal technological track is connected with the transfer of physical upbringing and fractal pedagogics technologies, psychodynamic mindsets connected with health creating and cognitive-behavioral stereotypes of activity formation.

The aim of the research is to start the anti-crises trajectory of physical culture development, which is based on the imperatives of “gold standard” of fractal ESG model.

Objective-subjective sphere of analysis forms the effectiveness estimation of fractal ESG model modi in opposition to the increasing pandemic. The aim achievement is conditioned by endogenic processes diffusion: synthesis of cognitive vector of elective courses and fractal pedagogics, transfer of sport and fitness technologies, increase hedonistic vector of recreation and tourism, motor rehabilitation adaptability. The research is organized on the basis of interdisciplinary theories and synthetic approaches: theory of systems, synergetics, theory of the transferring processes, theory of fractals (V.G. Budanov, E.N. Knyazeva, S.P. Kurdyumov, B. Mandelbrot, I. Prigozhin and others).

Materials and Research Methods

Logic substantiation of the fractal ESG

model structure is based on the results of dynamic observations, organized during the yearly cycle. In terms of the presented research works we organized anthropometric measures, fitness testing and functional state evaluation among 240 students at the age of $18,1 \pm 0,4$, boys ($n=108$ people) and girls ($n=132$ people). While evaluating the factors of pandemic influence on students' health we used the complex of diagnostic means, which help to model current, delayed, accumulative effects of training. Activity sociometric evaluation was held according to “Life Style Index, LSI” and “Life quality” – sf-36 methodologies [4]. Selective screening of the functional state parameters was held according to replicators PWC170, HR (heart rate), AP (arterial pressure), the duration of heart cycle R-R, ИИМ, general metabolism (GM); postural transformations – circumference of chest, shoulder, waist, hip and shin. Fat (gmt) and muscle (mmt) body mass were revealed with the help of “ABC-01 Medass” device. According to the dynamics of visual-motor reactions of БОД, ПДО, SAN, T-r max we estimated psychomotor state of the respondents.

The representativeness of the fractal ESG model was defined according to the results in 100 meters running, standing long-jump, dip up, chin-up at a crossbar. During the results handling we used the methods of fractal and correlation analysis at STATISTICA 6,0 program.

Research results and Discussion

The first aspect of the research is concentrated on analysis of fluctuations of structural-energetic processes and students' activity rhythms, caused by restrictive measures of the pandemic. We revealed the connection between structural-energetic deficiency and the increase of phobic anxiety within the following limits: 9,0-10,1 points (0,501). Desynchronization of the functional activity rhythms turned out to be connected with the lower threshold of physical working capacity PWC170 13,0-14,2 kgm/min/kg, caused by insufficient motor activity (MA) within the limits of 3,1-4,0 ths. steps (1,0-1,1 hour) and power inputs 2505-2610 kcal (0,432). The result of psychophysical state worsening is the indices decrease in 100 meters running, standing long-jump, dip up, chin-up at a crossbar.

At a methodological ESG platform we synthesized fractal-resonance construction, which is concentrated on psychophysical discomfort and hypodynamia. There are functionally connected composite regulators in the structure of ESG model: mobilization M_e -, motor D_s -, regulatory R_s - and functional F_g , which form dimension of copying-strategies of inclusive behavior of students (1).

$$ESG = f(\sum M_e + D_s + R_s + F_g) \quad (1)$$

Fractal ESG model includes address directed cross-trainings, added by dancing cases, health creating technological games and trainings in order to stimulate the processes of inclusion and students' physical culture loyalty increase. Syntonization of the regulator was organized taking into account the minimum of the criterial "gold standard" function, which is chosen in a way that its minimum corresponds with the expected state taking into consideration the genetic and phenotypic polymorphism and sex determination [2]. It means that physical training of men included Barbell Workout cases, LB + Stretch, Crossfit. Training of women was added by Discorobics, Dance Latino, Funky Jazz. Proportionality of the loads of different power in the cases was defined according to the results of discriminant analysis of 81 aggregated parameters.

The second aspect of the analysis is connected with clustering of training volatility within the limits of anthropocentric semiotics, identity, norms of behavior and vital values at the platform of existential E modus. Verification of mobilization regulator M_e is seen in the increase of cognitive-behavioral addictions, alertness and students' essential powers, achieved during parametric regulation of the training. Narrowness of elective courses is compensated owing to the resources of fractal pedagogics in "Breakthrough toward physical harmony" project, which form psychodynamic mindsets for health creation. Proactivity of the induced resources of fractal pedagogics is demonstrated in "road map" of trainings and technological games organization. We are interested in the revealed progressive dynamics of students' psychomotor functions improvement, which is achieved during self-similar motor regimens of

elective courses induction, recreation, fitness and student sport (Brownian motion). It is proved by revealed anxiety and emotional discomfort level decrease among 68% of students. V.E. Voytsekhovich explains this trend by the increasing evolution of "life flow", capitalization of essential powers and motor activity potentiation. Existentiality of fractal model increase becomes a basic dominance of general metabolism (GM) increase, functional state and energetic systems improvement. The received results prove the expediency of fractal ESG model use in the national projects "Public health" and "Sanitary shield of Russia". It means that the aims-introspections of educational-methodical complexes (EMC) are transformed within the limits of fractal pedagogics –adding elective courses with trainings, programs of mutual activity, methods of developing cooperation, technological games of health creating orientation [3]. Synthesis demands evaluation means funds (EMF) and monitoring materials (MM) correction according to qualitative parameters of metabolic and functional states.

The third aspect of the analysis is concentrated on testing E modus in creating the developing environment "Physical culture is for everybody" in order to realize personal self-realization of students in their existential and ontological integrity. Actualization of motor D_e regulator is connected with morphological and physiological transformations control within the limits of the acceptable endemic costs, ergogenic effects and oxygen use O_2 . It also provides corrections in the working programs of strength oriented training among men on the basis of the following resources combination: «Body & Mind», Barbell Workout, LB + Stretch, Crossfit, stretching, running, respiratory gymnastics. Creature of cases is concentrated on students' needs in the sphere of biometric parameters of body and motor activity harmonization. In the training phases adjustment we used aerobic ($O_2C(O_2\text{consumption})$ 45-50% of MOC (maximal oxygen consumption), HR(heart rate) 130-150 beats/min.) and mixed (O_2C 70-75% of MOC, HR 170-180 beats/min.)) loads segmentation on the basis of «feedback». Regulator verification is demonstrated in the rhythm of physiological and bioenergetics functionals synchronization, which

provides peak trends of postural and functional transformations. In particular, in terms of the directed work on the problem body segments among men we revealed metabolic body mass increase (mmt) from $36,1 \pm 0,9\%$ – by 4,7% and well-proportioned fat mass of the body decrease (gmt) $17,1 \pm 0,4\%$ – by 3,1% ($p \leq 0,05$).

Positive metabolic shifts revealed among 72% of students are connected with muscles hyperplasia in chest from $86,7 \pm 5,1$ cm – by 5,1%, in hip from $52,2 \pm 3,2$ cm – 5,1%, in shin from $32,1 \pm 2,1$ cm – by 4,1% ($p \leq 0,05$). Cumulative effect is characterized by the results improvement in motor tests: dip up by $15,2 \pm 0,1\%$ ($p \leq 0,05$), 100 meters running – by $13,5 \pm 0,3\%$ ($p \leq 0,05$). The increase of strength and speed-oriented qualities is seen in the results of deadlift by $12,1 \pm 0,1\%$ ($p \leq 0,05$), carpal dynamometry Dmax by $14,0 \pm 0,1\%$ ($p \leq 0,05$), number of chin-ups at a crossbar from $8,0 \pm 1,1$ times – by 14% ($p \leq 0,05$), in standing long-jumps from $156,0 \pm 7,1$ cm – by 10,2% ($p \leq 0,05$).

Constructiveness of R_s regulator, included into the structure of S (Social) modus, is demonstrated in health creating values of elective courses capitalization. Dialectically they are connected with the personal development models, vitality formation, which provide the points of pandemic bifurcation overcoming. Modality of R_s regulator is conditioned by aims and standards of vitality quantification, collective identity, realized in terms of fractal-resonance paradigm. Using the resources of fractal pedagogics, sensitive to factors of pandemic, in the ideas of A.G. Madzhuga, are the instrument of health creating education of the holistic type [3]. The borders of life quality are defined by the standards of motor activity, registered in “Sport is the norm of life” project. R_s regulator is focused on stochasticity of training decrease, which is achieved owing to deep psyche resources, alertness, self-concepts and adaptive reserves (SAN) synchronization. It is indicative that the objective parameters achievement while regulating dissonance of mental and emotional “life flow” evaluations in fractal pedagogics and Discorobics, Dance Latino, Funky Jazz, Pilates combination. Autocatalysis of morpho-functional transformations development is proved by coordinating structure of

movements improvement, results of motor tests improvement: in 100 meters running from $17,1 \pm 0,3$ s – by 8,1% ($p \leq 0,05$), in body lifting from prone position arms overhead from $27,5 \pm 3,6$ times – by 7,5% ($p \leq 0,05$).

The representativeness of the functional F_g regulator in the structure of G modus is demonstrated in the quality of endogenic stimuli control improvement, which compensates the influence of pandemic turbulence. F_g defines the coordinate matrix, which takes into account stochasticity of adaptive processes, nonlinearity of the functional transformations in the evolution stages of autoregulatory forming. Workability of the regulator is demonstrated in wavelike differentiation of the loads, which stimulates adaptive processes at the extremum of activity. As soon as students gain higher conditions a teacher corrects the content of the training. The effectiveness of the regulator is determined by gamification of training (Beat Saber pattern), interactivity increase and access to information resources. From the position of the aiming function physical training is organized in terms of operating system, which helps to use the indication of adaptation nonlinearity. It is proved by most physiological parameters development of respiratory and cardiac systems – the base of students’ alertness and working capacity increase. Most students had positive dynamics of hemodynamics – HRmax, lung ventilating, phase structure of systolic part of cardiac cycle.

The created according to the priorities control over the quality of physical training transfers from the traditional algorithms to the control over self-similar processes of fractal ESG model. In the processes of prediction, indicative planning and control over the load of the educational labor, motor activity and rest we see constructive-creative dominance, which increases axiological rationality of physical culture. The transfer to a new trajectory of development is conditioned by the structural changes, normative-regulating base renewal, reference to professional standards. Prospectivity of ESG model is demonstrated in the context of singular combinatorics of the elective courses resources, students sport, recreation, fitness and tourism, which prevent depressive inertia of the

pandemic. For example, the algorithm of “ladder of achievements” provides convergency of technologies of problem based, developing and project based teaching. Thus, hierarchical structure of students’ physical training control is created, the system of the held sports-mass events is improved

Conclusion

The results of the research prove that taking into account the imperatives of ESG helps to prevent keeping students at a distance from physical culture, sport, fitness and tourism values. Realization of ESG fractal in the projection of new conditions of physical culture development would help to reduce destructive consequences of the pandemic. The effectiveness of the combined use of the resource base of physical culture, sport, tourism and fractal pedagogics on ESG platform is proved by the increase of activity and students’ psychosomatic health improvement. Fractal ESG model validity is demonstrated by the results of control over synergetically connected resources of fractal pedagogics. The model includes the complex of physical culture, sport and tourism intellectualization, directed toward volatility of personal resources control decrease. The received results prove the possibility to use fractal ESG model while scale objectives realization in the national

projects “Public health” and “Sanitary shield of Russia”.

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