A collaborative approach to harmonizing online and offline activities for teenagers in the era of digital technology

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Abstract

Objective of the study was to create and theoretically support a synergistic framework for the equilibrium between virtual and physical activities in adolescents aged 12 to 18 in the context of the digital transformation of society.

Methods and structure of the study. Based on the examination of WHO data and the pilot implementation in a sports school (with a sample size of 60), a framework is suggested that encompasses five functional components: educational-methodological, motivational-stimulating, regulatory-infrastructural, diagnostic-adaptive, and socio-cultural. The framework is put into practice through educational initiatives, gamification, digital monitoring systems, and cultural practices. The study employs methods such as literature review, questionnaire surveys, and qualitative data analysis.

Results and conclusions. The preliminary findings of the model evaluation revealed a decrease in screen time of 15-20% and an increase in physical activity of 20-30%. The key principles of operation are a positive feedback loop, dynamic activity planning, and content symmetry. A positive feedback loop fosters motivation by linking digital and physical accomplishments. Dynamic planning personalizes the activity schedule, considering biorhythms, academic workload, and seasonal factors. Content Symmetry offers exercise programs that mirror the time spent on digital devices. The model encourages the development of sustainable motivation for a healthy lifestyle, reducing the risks of physical inactivity and digital exhaustion. The model is still undergoing testing, which will enable us to refine its effectiveness on a larger scale.

Keywords: *synergetic model, balance of activities, teenagers, digital technologies, physical activity, physical inactivity.*

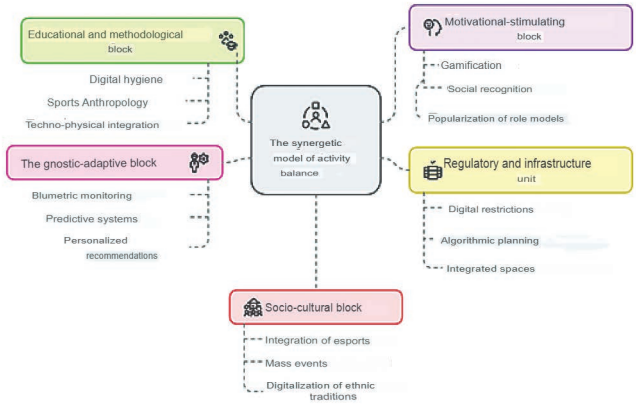
Introduction. Modern teenagers (12-18 years old) They face an anthropo-digital conflict: the technological environment provokes a lack of motor activity [2] and a transformation of value orientations [1]. According to WHO data [6], only 19% of adolescents meet the recommendations for physical activity (at least 60 minutes per day), while the average screen time exceeds 7 hours per day. Traditional pedagogical models that ignore digital habits are losing their effectiveness, which actualizes the development of models that integrate the principles of synergetics [3] and sports anthropology.

Objective of the study was to creation of a collaborative framework to address the disparity between online and offline physical activity among teenagers by incorporating digital resources into the realm of sports.

Methods and structure of the study. The study involved 60 adolescents (12-14 years old), pupils of the specialized educational and sports institution «Children's and Youth Sports School of Petrikovskiy district» (Gomel region, Belarus) at the age of .Selection criteria: absence of chronic diseases, consent to use fitness trackers. Research methods: analysis of WHO data and scientific and methodological literature, data collection through fitness trackers, questionnaires, model design based on a synergetic approach.

Results of the study and discussion. The analysis of current trends indicates a complex and contradictory situation in the field of physical education of adolescents in the digital age. To overcome

these contradictions, it is necessary to innovatively rethink existing approaches and develop new models based on the synergy of digital and physical activities. This will not only reduce the risks associated with physical inactivity and excessive use of digital technologies, but also form a stable motivation among adolescents for a healthy lifestyle and harmonious development in modern digital reality. To resolve the contradictions, we have developed a synergetic model aimed at reducing the imbalance between virtual and physical activity in adolescents through the integration of digital tools into sports culture (see figure).



The structure of the synergetic activity balance model

The structure of the model includes five functional blocks interacting on the basis of the principles of synergetics [4]: an educational and methodological block (teaching digital hygiene, physical culture history), a motivational and stimulating block (gamification (challenges), API integration of achievements in social networks), a regulatory and infrastructural block («digital quarantines», smartschedule), diagnostic and adaptive block (biometric sensors, gamified checklists), socio-cultural block (AR quests, esports with a physical component). At the same time, the model provides key functions: preventive, adaptive, culture-forming (see the table).

The testing of the synergistic model was carried out on the basis of a specialized educational institution «Children and Youth Sports School of the Petrikovsky District» (Gomel region, the Republic of Belarus) with the participation of 60 young athletes at the age of 12-14 years of qualification of the I-III category. The model includes five blocks: educational, methodological, motivational-styling, regulatory and infrastructure, diagnostic-adaptive and sociocultural.

In the educational and methodological block, adolescents received training in digital hygiene, sports anthropology and techno-physical integration. The curriculum included teaching on screen time standards, techniques for switching attention, physical education history and sports benefits for mental health.

To increase the motivation, gamification (Chellengi and virtual awards), social elevators (public recognition for sports successes), popularization of role-playing models and automatic publication of achievements on social networks through the API of fitness trackers were used.

Digital quarantines (zones without gadgets in a sports school), smart schedule (balancing online activity and training), physical and civil spaces (coworking with simulators) and coach bots in messengers for reminders about the breaks and proposals of mini-exercises were introduced.

For monitoring and adaptation, biometric sensors were used to monitor stress, sleep and physical activity, as well as gamified checklists for simplified self-control.

The basis of the sociocultural block was e-sports disciplines with the physical component, flash mobs of mixed reality and ethno -sports measures.

Interim results of testing and their discussion.

1. Participants increased the average physical activity time by 20-30%.

2. The average time spent by participants behind digital devices decreased by 15-20%, which indicates a more rational distribution of time between virtual and physical activity. Reducing screen time is

Distinctive features of the synergistic model from traditional models

Criterion	Traditional models	Synergetic model
Target	Increased load	Balance of activity
The role of the teacher	Controller	Synergy moderator
Tools	GTO standards	AR quests, API integration

consistent with Smith Etal data. [4], which noted the effectiveness of gamification. The growth of physical activity confirms the hypothesis of synergy of digital and traditional methods [5].

3. 78% of respondents noted a significant increase in interest in sports and physical activity due to the use of gamification and social incentives.

Conclusions. The developed model demonstrates the potential for harmonizing the virtual and physical activity of adolescents. Key success factors-integration of sports into digital identity through AR quests and gamification. Research restriction is a small sample. Prospects include the introduction of neuro interfaces and the expansion of testing.

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