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"ARTIFICIAL CONTROL ENVIRONMENT" METHODOLOGY: THEORETICAL JUSTIFICATION AND TEST SOLUTIONS

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Abstract

Ihor Vypasniak, Nazarii Fedyniak. "Artificial control environment" methodology: theoretical justification and test solutions. Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk

Relevance. The methodology of the "artificial control environment" consists of forming a complex of special conditions during human physical exercise. This approach is aimed at targeted correction, management and development of motor patterns. The main characteristics of such an environment are its controllability, focus on specific tasks and dynamism.

Research tasks. To study the current state of the problem under study, to generalize domestic and international experience in using the methodology of "artificial control environment" in the process of physical exercise.

To accomplish the tasks set, an analysis of scientific and methodological literature, pedagogical research methods were used.

Research results. A. M. Laputin is recognized as the founder of the scientific paradigm of the "artificial control environment" in physical culture and sports. His contribution lies in the development of a methodological basis, conceptual apparatus and key principles. The central idea, empirically proven in his research and followers, is the dependence of the quality and nature of motor activity on the parameters of the external

environment. This conceptual position substantiates the need to use an "artificial control environment" to achieve the goals of correctional and preventive activities.

Conclusions. In world practice, similar ideas are being studied under the names of "technologically assisted physical activity" and "immersive fitness environments". The main areas of such research are the use of: robotics for rehabilitation; VR games for physical and cognitive therapy of the elderly; mobile platforms that create a gaming environment for home workouts.

Further scientific research will be aimed at developing and implementing the means and methods of "artificial control environment" in the system of health fitness classes for women in the second period of mature age in order to increase their effectiveness.

Key words: methodology; tools of "artificial control environment"; mature people; health fitness; corrective-preventive and health technologies.

Statement of the scientific problem. The methodology of the "artificial control environment" in the process of physical exercise involves the creation of a specially organized set of conditions aimed at the targeted correction, management and development of motor patterns [1, 4, 12].

Unlike the natural environment, where motor skills are formed spontaneously, the "artificial" environment is:

controlled: the specialist has full control over the elements of the environment (equipment, sequence of exercises, intensity of the load);

focused: it is focused on solving specific problems, for example, correcting posture, developing strength or flexibility;

dynamic: elements of the environment can change depending on the progress of the person, which allows achieving the maximum effect [2-4, 12].

A. M. Laputin is recognized as the founder of the scientific paradigm of the "artificial control environment" in physical education and sports. He substantiated its methodology, developed a conceptual apparatus and defined the basic principles [14, 15]. An important aspect of this paradigm, proven in the works of A. M. Laputin, is that the external environment in which a person moves has a significant impact on the quality and nature of his motor activity. This substantiates the need to use the "artificial control environment" for effective corrective and preventive work [14, 15].

The purpose of the study is to generalize the theoretical foundations of the methodology of "artificial control environment" in the process of physical exercise by mature individuals.

Research objectives:

1. To study the current state of the problem under study, to generalize domestic and international experience of the methodology of "artificial control environment" in the process of physical exercise.

Research methods. To accomplish the task, an analysis of scientific and methodological literature, pedagogical methods were used.

Presentation of the main research material. The methodology of the "artificial control environment" is actively implemented through multimedia information systems that create a controlled subject field. One of such developments is the Telemeter system, designed for remote monitoring of the spatial organization of the human body. It works by analyzing digital images obtained with photo or video cameras. The system is based on four modules: information, measurement ("Spatial organization of the human body"), a module for presenting results, and a database that provides a comprehensive analysis [7, 9-119] (Figure 1).

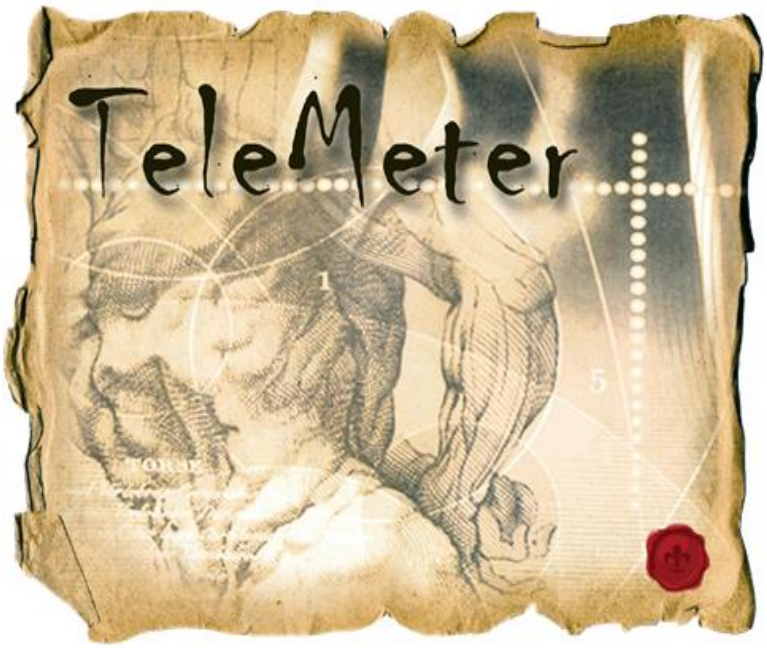


Figure 1. Printing from the computer screen. The main window of the program "TeleMeter "

T. Ivchatova [5, 6] developed an automated system for managing the training process in health fitness. Its basis is the "PERFECT BODY" program, which consists of modules:

screening, analytical assessment, correction, monitoring, nutrition, reference, terminology and history.

This program allows individualizing the training process for women taking into account the spatial characteristics of their body and implementing modern health technologies. It turns training into a closed control system with the ability to self-monitor [5, 6] (Figure 2).

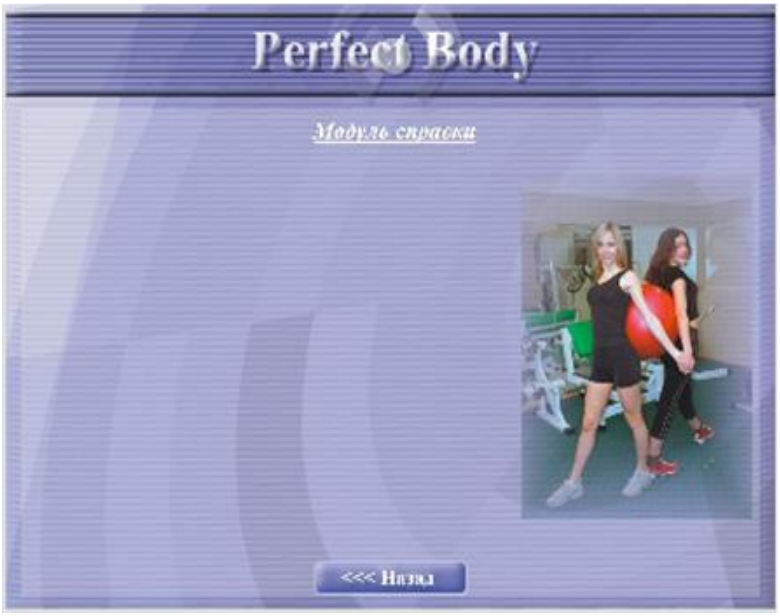


Figure 2. Printout on the computer screen. The main window of the program "PERFECT BODY"

Its development was based on the methodology of body shape correction based on body mass geometry. The program has an automated modular structure, where each of the seven modules performs a specific function: from screening and analytical assessment to monitoring, allowing you to adjust the training process based on a comparison of actual and predicted indicators. In addition, the system provides reference and retrospective information, as well as nutritional recommendations [5, 6].

The development of the Pilates computer fitness program for women in the first period of mature age is based on the use of the Pilates system [17]. The program, implemented in the object-oriented programming language Microsoft Visual Basic 6.0, is self-sufficient and does not require additional software. Its interface is designed to ensure maximum convenience, allowing the user to obtain all the necessary information (including goals, opportunities and contacts) through a specialized module [17] (Figure 3).

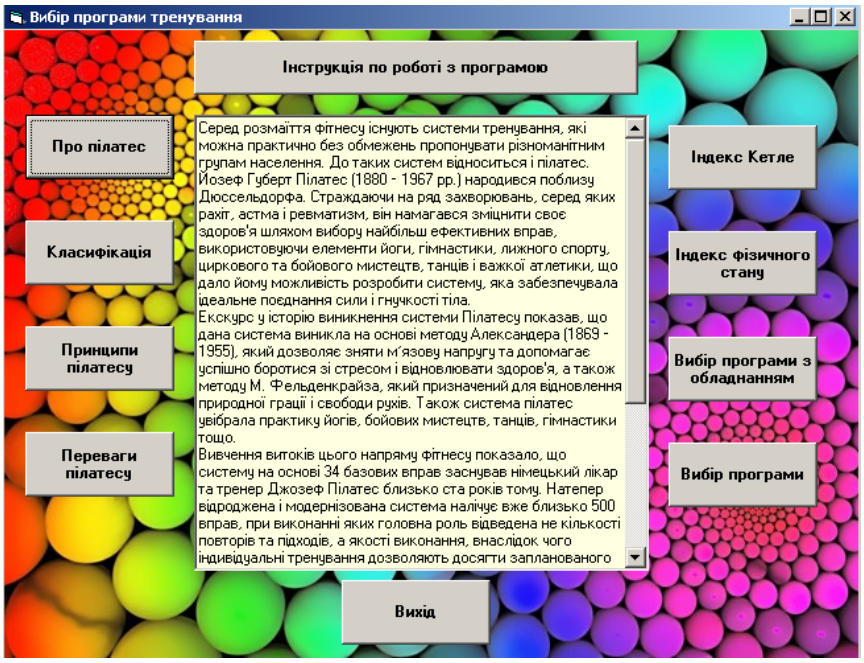
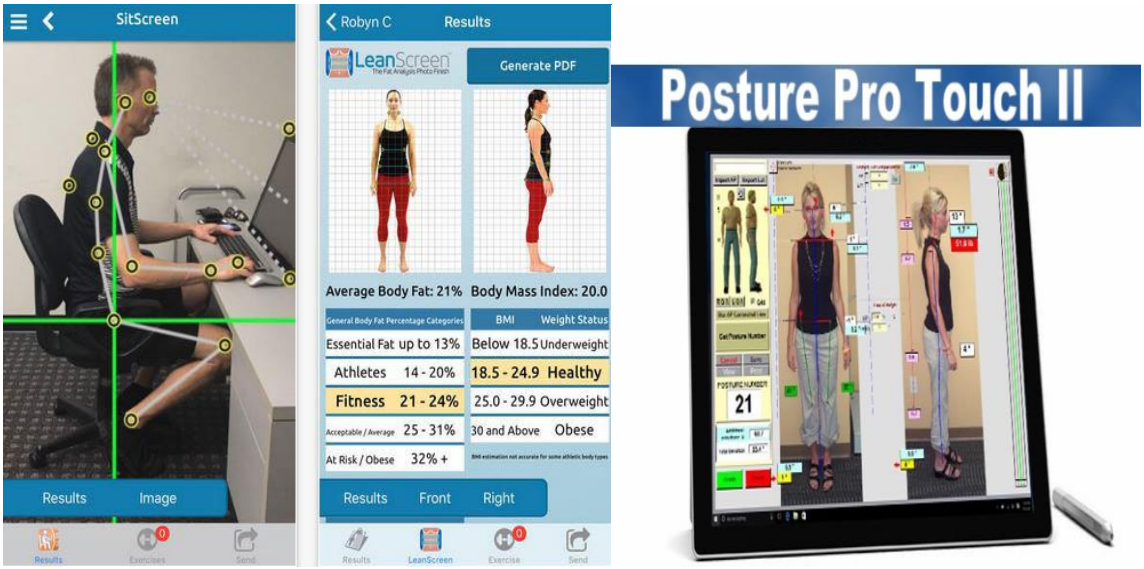


Figure 3. The main window of the computer program "Pilates"

The introduction of modern technologies into the field of posture analysis is illustrated by two solutions. The first is the PostureScreen application for iPhone, which allows you to assess body composition, posture, and posture. It uses video cameras and has annotation tools, and its integration with WebExercises improves ease of use (Figure 4, a). The second solution is Posture Pro Touch II, a portable hardware and software complex based on a tablet PC. It is designed for in-depth posture analysis and recommendations (Figure 4, b) [11, 16].



a b

Figure 4. PostureScreen and Posture Pro Touch II application window

Yu. Rudenko [8, 13] developed the structure and content of the technology for correcting posture disorders in mature men during health fitness classes.

This technology is based on the principles of systematicity, unity of theory and practice, determinism and health orientation. It consists of three stages, includes conceptual, organizational and diagnostic components and provides for the use of specialized equipment, such as: isotonic rings, rolls, miniballs, fitballs and the "Reformer" simulator. The effectiveness of the measures used is assessed according to certain criteria [8, 13].In order to provide men with methodological material for independent training, Yu. Rudenko developed specialized video lessons. These videos were later used as a basis for individual lessons (Figure 5) [8, 13].

Figure 5. Screenshots of the title pages of video lessons

A promising direction for further scientific and practical research is the substantiation and testing of the tools of the “artificial control environment” in the process of health training for women in the second period of mature age.

Conclusions. The concept of "artificial control environment" was substantiated and popularized by the Ukrainian scientist A. M. Laputin. This environment is created thanks to a set of technical means and methodological techniques that allow controlling motor activity. In world practice, similar ideas are studied under the names "technologically assisted physical activity" and "immersive fitness environments". The main areas of such research are the use

of: robotics for rehabilitation; VR games for physical and cognitive therapy of the elderly; mobile platforms that create a gaming environment for home workouts.

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