THE USE OF MODERN MULTIMEDIA RESOURCES IN THE PRACTICE OF SPORTS AND PHYSICAL EDUCATION

ВИКОРИСТАННЯ СУЧАСНИХ МУЛЬТИМЕДІА РЕСУРСІВ У ПРАКТИЦІ СПОРТУ ТА ФІЗИЧНОГО ВИХОВАННЯ

Vako I. I.[1], Grygus I. M.[2], Nikitenko O. V.[3]
[1]National University of Ukraine on Physical Education and Sport, Kyiv, Ukraine
National University of Water and Environmental Engineering, Rivne, Ukraine
[3]University of State Fiscal Service of Ukraine, Irpin, Ukraine

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Анотації

The purpose of the study is to develop a multimedia project "DOMINI", which involves building up the basics of hand-to-hand combat in young athletes. **Methods:** to achieve the goal, the authors used the analysis of documentary materials and qualimetry, i. e., expert assessments. Expert evaluation was carried out with the participation of 20 experts (coaches with more than 5 years of experience). The results of the expert evaluation laid the groundwork for developing the "DOMINI" multimedia project designed to build up the basics of hand-to-hand combat in young athletes. The elaboration of the multimedia project was driven by the transformation and rethinking of innovative scientific ideas. The advantages of resorting to the didactics of multimedia, in particular the multimedia project "DOMINI", are as follows: the option of creating a coach's original didactic product; accessibility for coaches to design and use the basic modules of the multimedia project; simultaneous involvement of several perception channels of the athlete in the learning process, which contributes to the integration of information received from several different sensory organs; stimulation of cognitive aspects of learning, i.e., perception and awareness of information; opening the door for independent work of young athletes; individualization of the training process; prospects for practicing remote communication via social networks and messengers; distribution of instructional material, presentations, videos, etc. The multimedia project "DOMINI" is a component of the training environment, an electronic tool aimed at building up the basics of hand-to-hand combat in young athletes, upon which the integrity of the didactic cycle of the pedagogical process is maintained by the arrangement of the information structure, and the ground of pedagogical activity is the interaction of the athlete with the multimedia environment. Using modern multimedia resources – the latest software, 3D images, modern graphics, and virtual reality – allows coaches to significantly expand the toolkit for the technical training of young athletes and conduct training sessions diversely and creatively.

***Key words*:** multimedia resources, information environment, hand-to-hand combat, basics, young athletes.

Мета дослідження: розробити мультимедіа-проєкт "DOMINI" , що передбачає формування в юних спортсменів базової техніки рукопашного бою. **Методи:** для досягнення поставленої мети послуговувалися аналізом документальних матеріалів, а також кваліметрією, тобто методом експертних оцінок. Експертне оцінювання проводили за участю 20 експертів (тренерів зі стажем понад 5 років). Результати експертного оцінювання слугували підставами для розроблення мультимедіа-проєкту "DOMINI" , спрямованого на формування базової техніки рукопашного бою в юних спортсменів Розроблення мультимедіа-проєкту "DOMINI" уможливила трансформація та переосмислення новітніх наукових ідей. Перевагами звернення до дидактики мультимедіа, зокрема мультимедіа-проєкту "DOMINI" , постають такі: можливість створення тренером власного дидактичного продукту; доступність для тренерів проєктування та використання базових модулів мультимедіа-проєкту; одночасне залучення кількох каналів сприйняття спортсмена у процесі навчання,

що сприяє інтеграції інформації, отриманої від кількох різних органів чуттів; стимулювання когнітивних аспектів навчання, як-от: сприйняття й усвідомлення інформації; розкриття можливостей самостійної роботи для юних спортсменів; індивідуалізація тренувального процесу; перспективи практикування віддаленої комунікації шляхом реалізації потенціалу соціальних мереж і месенджерів; диференціація навчально-тренувального матеріалу, презентацій, відеороликів тощо. Мультимедіа-проєкт "DOMINI" – це компонента тренувального середовища, електронний засіб, спрямований на формування базової техніки рукопашного бою в юних спортсменів, де цілісність дидактичного циклу педагогічного процесу забезпечує певна організація інформаційної структури, а основою педагогічної діяльності виступає взаємодія атлета з мультимедіа середовищем. Використання сучасних мультимедіа ресурсів – новітнього програмного забезпечення, 3D зображення, сучасної графіки, віртуальної реальності – дає змогу тренерам значно розширити арсенал засобів технічної підготовки юних спортсменів, проводити навчально-тренувальні заняття різнопланово та креативно.

***Ключові слова*:** мультимедіа ресурси, інформаційне середовище, рукопашний бій, базова техніка, юні спортсмени.

Introduction. At the beginning of the 21st century, society reached an extremely high level of development, which is also manifested in the intensive dynamics of technological progress. It renders such a notable feature of modern society as a transition to an innovative model for developing science and technology. In general, the informatization of society is a catalyst and driving force of changes occurring in all spheres of human life and professional activity: it determines the integration of information technologies into industries and science [5; 6].

In physical education and sports, informatization is correlated with a sort of immersion in an innovative intellectual environment [1; 12: 13; 14; 15]. Transformations in the modern information society make adjustments to the educational-training process and coach activities by the origin and introduction of technical means and gadgets of a new generation that keep advancing the mastering of the technique of motor actions by young athletes, visualize it, and increase productivity [16].

First of all, it is essential to define that multimedia technology is "an information technology delivering on the potential of multimedia operation environments and relies on the simultaneous use of various means of presenting information, which ensures the use of a set of techniques, tools, methods and ways of collecting, accumulating, processing, storing, transmitting, producing audiovisual, text, graphic information under conversational interaction of the user with the information system" [14; 15]. At the technological level, multimedia is an integration of two or more means of transmitting information with a personal computer [5]. Amidst application in the educational and training process as one of information screen tools, together with television and video, experts [6] believe that multimedia is an aesthetically organized visual form of presentation of educational content, which is marked by an integration of two information streams (sound and visual) performing their specific tasks.

The scientific studies of the last decade refer to the relevance to specialists in physical culture and sports of the issue of building a rational system of teaching the technique of motor actions and developing innovative approaches to learning the performance of its specific elements most effectively [2; 8; 9; 20]. Under such an approach, teaching movements should be treated as a purposeful and systematic process of creating, improving, and implementing motor programs based on holistic images that memory stores. Therefore, motor programs appear as information systems of signals about the dynamics of the control object, environmental conditions, and the very state of the control system [2; 8; 9].

It is common knowledge that didactics is a branch of pedagogical science that deals with the theoretical foundations of education and teaching in their most general form. Didactics conveys the patterns, learning principles, tasks, education content, forms and methods of teaching and learning, stimulation and control in the educational process inherent in all subjects at all age stages of training [8; 9].

The analysis of professional literature [8; 9; 23] dedicated to the problem concerned made

it possible to identify inconsistencies in the terminological interpretation of didactics. Thus, scholarly discourse contains such terminological units as "multimedia didactics" and "electronic didactics of multimedia" distinguished by a supra-subject dimension.

Multimedia didactics is, on the one hand, the learning theory based on the use of a full range of means and methods of information exchange in general, and on the other hand, the use of multimedia technologies in the pedagogical process, that is, the creation of a multimedia educational environment, in particular. In such a way, the following definition seems interesting: "Multimedia technology is a transition via a computer from educational text to visualization, from a visual learning tool to another; an option to make the same movement but back. The progress in the multimedia environment is determined by the teacher or students" [3; 15].

The subject of electronic didactics of multimedia is the educational process organized in a virtual information environment, the patterns of such a process, and the methods and forms of organization corresponding to the patterns. Therefore, the discipline is regarded as a learning theory based on a set of means and methods of virtual information exchange [1; 5; 6].

To feel free in information flows, a modern specialist of any profile should be able to receive, process, and apply information via a computer, telecommunications, and other information means. Under such conditions, the mastering and applying information and communication technologies acquire the status of the most important components of the training process. The introduction of multimedia technologies requires updating the ideas and content of the pedagogical process, incl. sports training, timely and systematically [18, 22]. Hence, the selection and elaboration of a system of efficient didactic and pedagogical tools, which increase the motivation of athletes to be into sports and advance athletic technique, are key tasks of the initial training stage [14].

Pedagogy and practice of coaching employ a broad toolkit of methods, forms, and means. The latter, undoubtedly, have a positive effect on the emergence of motives that activate cognitive and productive activity in young athletes [2; 7].

Achieving a high level of motivation by young athletes to do sports allows awakening their interest, polishing athletic technique by testing innovative pedagogical technologies, including multimedia didactics, at training sessions. The above justifies the logic of academic focus on ensuring the proper use of modern multimedia projects at the initial training stage [15; 16].

The implementation of the above need is hindered by some contradictions between:

– intensive development of information technologies (hardware and software), the technological capacity of a children's and youth sports school, and the lack of an information environment favorable for the coach to solve the problem of building up the basics of hand-to-hand combat in young athletes;

– the aspiration of most coaches to build up the basics of hand-to-hand combat in young athletes from the individual trajectory of training and the undeveloped algorithm for designing such a trajectory amidst the information environment.

Given the above, the authors note that the individualized trajectory of building up the basics of hand-to-hand combat within the information environment is a personal vector of technique training, development and implementation of a young athlete's motor capabilities; it ensures the consideration of his personal characteristics, allows the coach to choose information technologies and electronic communications based on the individual training plan he designed, and contributes to increasing the effectiveness of sports and technique mastery.

The purpose of the study is to develop a multimedia project "DOMINI", which involves building up the basics of hand-to-hand combat in young athletes.

Methods. To achieve the goal, the authors used the analysis of documentary materials and qualimetry, i.e., expert assessments. Expert evaluation was carried out with the participation of 20 experts (coaches with more than 5 years of experience).

Research results and discussion. Modern multimedia projects "DOMINI" become a sig-

nificant component of the pedagogical process, which is associated with their didactic potential, as well as a dynamic study of design issues and particularities of their use in training in recent dissertation works [15, 17].

Numerous publications [13; 14; 16] describe a range of advantages of computer multimedia learning technologies compared to traditional approaches to building up motor action techniques. Therefore, using computer didactic materials that simulate an artificial management environment [16] allows, first, the coach to work with a larger number of didactic materials, providing the necessary take-off and arrangement; secondly, individualize the training process; thirdly, consistently enrich the bank of didactic materials. One of the fundamental ideas of modeling an artificial management environment with the didactic capacity of information technology involves modeling via a computer as a new means of teaching other means of learning, thereby creating an information subject environment of conventional learning [16].

In the digital improvement of sports training and dynamic introduction of information resources into pedagogical practice, the problem of designing the latest multimedia tools, which are effective for building up the technique of motor actions in young athletes specialized in hand-to-hand combat, and their employment in the information and pedagogical environment becomes actual.

An expert assessment of ways to enhance the effectiveness of teaching young athletes with the relevant specialization the basics of hand-to-hand combat is a direction that is subject to dynamic development and is marked by a significant scope of application. In general, the examination involves clarifying the current state as such. Any actions related to the performance of scientific and pedagogical expertise are selected and implemented by competent persons with expertise in the field under study – experts. The present scientific research considered, as indicated above, an expert evaluation with the participation of 20 experts.

During the survey (the concordance coefficient was W=0.82, χ^2=32.40), the experts stated that the failure to use modern information systems in training young athletes is the reason for the low efficiency of teaching the basics of hand-to-hand combat to athletes with the appropriate specialization at their initial training (first rank).

Among other reasons for low efficiency, the experts also named poor professional experience of coaches of a children's and youth sports school working with young athletes and the school's insufficient facilities and resources (the second and third ranks respectively).

It is noteworthy that the experts attributed the fourth place to the non-conformity of the curriculum of the children's and youth sports school with modern trends in the development of hand-to-hand combat".

In teaching the basics of hand-to-hand combat to athletes within their primary training, the experts (the concordance coefficient was W = 0.81, χ^2 = 49.68) emphasize the feasibility to use complex information-methodological systems (the first rank), as well as information-methodological systems for monitoring th\e assimilation of theoretical information by athletes (the second rank).

According to the experts, a narrowly focused involvement of information-methodological systems, which provide theoretical information on the main areas of theoretical training (the third rank), in the process of training athletes specialized in hand-to-hand combat is admissible.

The results of the expert evaluation were the basis for developing the MP "DOMINI" designed to build up the basics of hand-to-hand combat in young athletes (Fig. 1).

Fig. 1. Home page of the MP "DOMINI". A computer screen shot

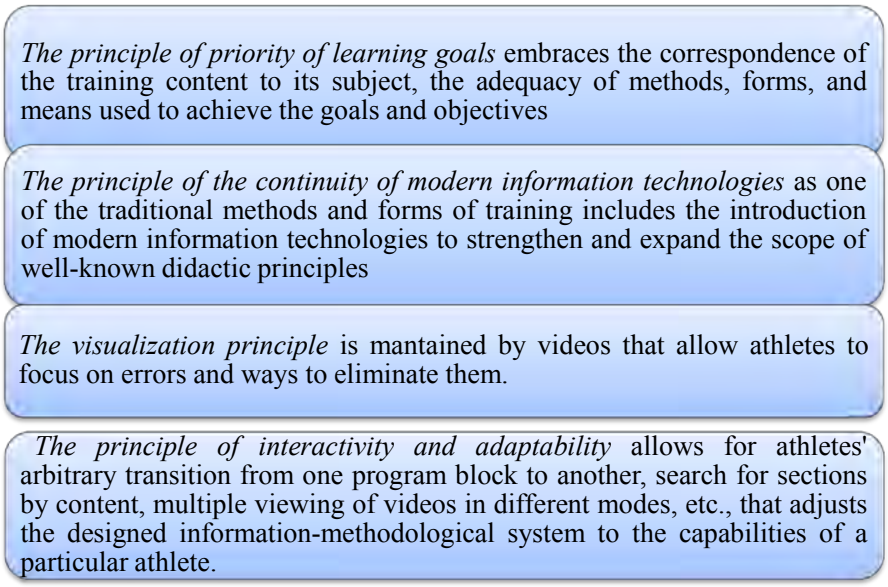

Fig. 2. Principles of implementing multimedia technologies in the educational and training process [15]

During the development of the multimedia project "DOMINI", the expert recommendations on achieving the multimedia product's compliance with ergonomic requirements, which contributes to the organization of a good visual environment, were taken into account. The study adhered to the principles of introducing multimedia technologies into the educational and training process [15] (Fig. 2).

The list of ergonomic requirements comprises ones for fonts, symbols, formulas; creating color harmony; information organization within a single window; working with several windows; organization of audio information; animated images.

The development of the MP "DOMINI" was also supported by adherence to the principles of pedagogical design, as follows:

– the principle of abstraction associated with the outcome of information processing, the evaluation of which helps choose among the possible options in favor of the most rational one, that is, the best option based on the selected performance criteria. The principle makes it possible to determine the goal of the exercise series that should be included in the MP;

– the principle of visualization which implies an increase in the number of information channels that permits asserting the experience of training and specific psychological and pedagogical studies, which prove the better assimilation of the material upon the involvement of the sense organs – sight and hearing [6].

Multimedia tools and technologies ensure the intensification of the pedagogical process and increase the motivation of young athletes after applying modern methods of processing audiovisual information, namely:

– contamination (mixing) of various audiovisual information;

– "manipulation" (overlapping, displacement) of visual information;

– realization of animation effects;

– deformation of visual information (increase or decrease of a particular linear parameter, image spread or compression);

– discrete presentation of audiovisual information;

– fixing the selected part of the visual information for its further displacement;

– demonstration of real processes, events in real time (video) [3; 6; 15].

The logic of the DOMINI design involved the implementation of several sequentially performed stages.

The first stage – according to the concept of goal-setting – included the formulation of the DOMINI goal – the creation of a multimedia

focusing the attention of a young athlete on potential common errors in the assimilation of a particular technique.

The second stage – based on the concept of structuring – was to build an information structure following the block principle (the components of the MP "DOMINI" are presented in the form of a Notebook: modules, sections, and sub-sections (Fig. 3).

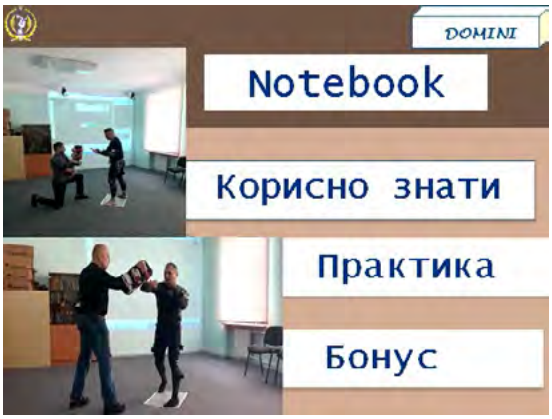

Fig. 3. The structure of the MP "DOMINI". A computer screen shot

As part of the implementation of the adaptability concept and by setting up an interactive component in the study, pedagogical content was nonlinearly organized, which contributed to presenting theoretical work material and practical tasks in response to the interaction of a young athlete with the MP "DOMINI".

The structure of the multimedia project "DOMINI" covers target, need-motivational, and content components.

The target component is designed to define the basic technique and set goals and tasks to be considered during the training. The need-motivational component is enhanced by software capabilities, namely, videos.

The module of reference and encyclopedic data (Fig. 4) is actualized in the MP "DOMINI" amidst a need-motivational component through introducing data on the history of the development of hand-to-hand combat in Ukraine, biomechanical classification of the musculoskeletal system, biomechanical aspects of movement, and scientific achievements in the relevant subject area.

Fig. 4. Structure of the module of reference and encyclopedic data of the MP "DOMINI". A computer screen shot

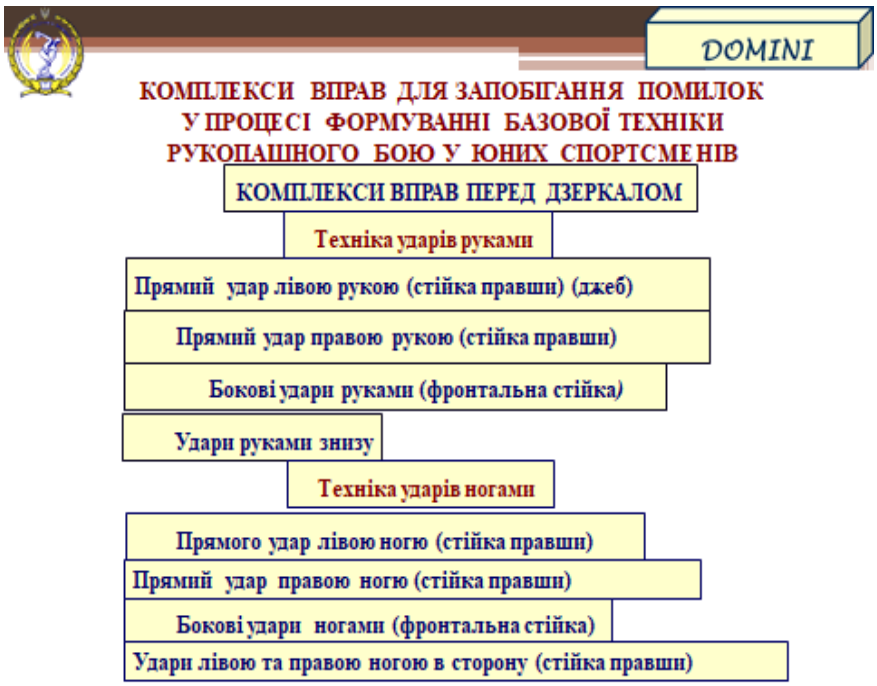

Fig. 5. Exercise series to prevent errors via the MP "DOMINI". A computer screen shot

The content component comprises expert information about potential common errors in mastering a particular technique. The employment of expert assessments resulted in developing exercise series aimed at preventing errors in building up the basics of hand-to-hand combat in young athletes and formulating recommendations for athletes to involve them in classes by relying on the MP "DOMINI" (Fig. 5).

It is essential to note that video and animation are the most effective means for transmitting the information content of the media environment: video images and animation as dynamic elements have a better pedagogical effect compared to static drawings.

Based on the scenario paradigm, the author's MP "DOMINI" focuses a young athlete on visualizing the basics of hand-to-hand combat. It is worth noting that the building of the correct motor actions occurs during the initial familiarization with the movement technique.

Interactivity as a key property of multimedia allows the user to interact with the MP "DOMINI". The latter means alternate information requests and actions performed in response. Interactivity shapes an open training system providing each athlete with the freedom to choose the trajectory of learning the basics of hand-to-hand combat. Interestingly, interactivity is a typical manifestation of the feedback principle since it allows a young athlete to individually change the settings and analyze the results while adjusting the pace of the presentation of theoretical material and the number of repetitions following his own needs and preferences.

The bonus module includes a library of useful Internet resources devoted to hand-to-hand combat; videos of injury prevention in hand-to-hand combat classes; videos of the principles of a healthy lifestyle.

Discussion. Literary analysis was supported by an emphasis on the identification and presentation of the central ideas, provisions, and findings of experimental studies, which determine the directions for improving the methodology of sports training of young athletes given the development of the system of knowledge in computer science and biopedagogy [2; 8; 15]. In particular, the methodological aspects of didactics of motor actions are covered in the works [9; 10; 11; 23]. The problems of the formation and advancement of the technique of motor actions in combat sports are elucidated in studies [14; 16; 17]. Information on the prospects of increasing

the effectiveness of training young combatants by relying on the integration of modern information technologies into the educational and training process is considered [16–19; 21].

Conclusions. The analysis of scientific knowledge represented in numerous studies on problems related to multimedia technologies highlighted such a notable feature of using multimedia technologies in the pedagogical process compared to traditional ones as the presentation of information not only in the text form but also as images that ensures maximum concentration of attention and contribute to better understanding, comprehension, and memorization of information.

The development of the multimedia project "DOMINI" made it possible to transform the latest scientific ideas. Therefore, the advantages of using multimedia didactics, in particular, the multimedia project "DOMINI", are as follows: the creation of a coach's original didactic product; accessibility for coaches to design and use the basic modules of the multimedia project; simultaneous involvement of several perception channels of the athlete in the learning process, which contributes to the integration of information received from several different sensory organs; stimulation of cognitive aspects of learning, i.e., perception and awareness of information; opening the door for independent work of young athletes; individualization of the training process; prospects for practicing remote communication via social networks and messengers; reasonable distribution of instructional material, presentations, videos, etc.

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