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Efficiency of the use of multimedia tools in the learning process for the physical education of students by using means of handball

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Abstract
Purpose: The purpose of the study is to improve the effectiveness of the educational process in physical education based on the use of handball with a multimedia program.
Methods: To obtain the results, the methods of analyzing scientific and methodological literature, the method of pedagogical experiment and demonstration were used.
Results: It is important to note an increase in the effectiveness of students' technical and tactical actions (TTA) fulfillment in the process of playing activity as a result of the use of computer technologies: the number of ball passes increased (10.6%), the effectiveness of ball passes increased (10.2%); the number of TTAs increased (11.8%), and the efficiency of shots on goal (10.3%), with reliability ($p < 0.05$-0.001) $t = 2.07$.
Conclusion: The use of multimedia technology with the use of video materials, animation, interactive whiteboards contributed to competently working with information: to be able to collect the facts necessary to solve a certain problem; monitor or analyze them, putting forward hypotheses for solving problems; make the necessary generalizations, comparing with similar or alternative solutions; establish statistical patterns; form reasoned conclusions; apply them to identify and solve new problems; to be sociable, contact. Work independently on the development of one's own morality, intellect, and cultural level.

Keywords: Educational process, handball, students, information technology, multimedia.

Introduction

The use of information technologies qualitatively changes the content, methods and organizational forms of training, which, under certain conditions, can contribute to the preservation and development of the individual abilities of students, their personal qualities; the formation of cognitive abilities, and their self-improvement. Practice shows that using a computer has many advantages over traditional teaching methods. When using information technologies in the classroom, the student is involved in the educational process as an active participant. This is especially important when compared with traditional forms of education, in which he is passive. Computer programs make it possible to individualize training, make it possible to organize independent actions of students (Ermakov, 2005; Smirnov, 2012).

The pedagogical experiment was carried out in two stages and was of an ascertaining and exploratory nature. It was held in the 2016-2019 academic year, and 40 students of the main groups of I and II courses of the Tashkent State Economic University participated in it.

The purpose of the study is to increase the effectiveness of the educational process in physical education based on the use of handball means with the use of a multimedia program.

Each student has the opportunity to work at his own pace, not depending on weaker or, on the contrary, strong classmates. The computer contributes to the formation of his reflection of his activities, allows you to visually represent the result of his actions. Our work experience shows that students who actively work with a computer develop a higher level of self-education skills, the ability to navigate in a stormy stream of information, the ability to highlight the main thing, generalize, and draw conclusions. Therefore, the role of the teacher in disclosing the possibilities of modern information technologies in the process of both natural and humanitarian disciplines is very important (Abduazimova, 2011).

Specialist (Ishdavletov, 2012) used ICT in teaching technical and economic disciplines. In the methodology for the application of educational technologies, teachers of technical and economic disciplines actively use multimedia development of classes in the form of an electronic presentation of educational material using interactive methods. In particular, to study the topic "Technical and economic calculations of postal production processes in teaching an academic discipline" Organization and planning of postal communications were prepared by electronic presentations.

A large group of researchers (Koshbakhtiev et al., 2007) are considering the possibility of using information technologies in the educational process of physical education and the training process. The means of in-

formatization include: the system of a telemetric computer complex about the data of the physical state of the subject and "Dynamics-S", the system of the heart rate monitor-interface-computer.

Based on the study of the means of innovative technologies of the heart rate monitor, interface, computer, thesis was performed (Masharipov, 2008).

The author (Erdonov, 2008), using a heart rate monitor, revealed that the competitive activity of young football players is carried out on average at a pulse rate of 180 beats / min, and educational and training activity occurs at a pulse rate of 120-150 beats / min. Naturally, the cardiovascular system is not prepared for play activities.

Also, the author (Babicheva, 2011) substantiated the technology of health related aerobics in the one-year educational cycle on physical education of female students. To substantiate the technology of using health related aerobics in the educational process of students, an experiment was conducted to assess the cardio load of each lesson. Continuous organization of registration and analysis of the student's heart rate indicators throughout the lesson made it possible to follow the changes in the functional state of the cardiovascular system.

In sports practice, multimedia programs on health-improving aerobics, athletic gymnastics have been developed. Modern sports such as handball, football, basketball, etc. require a high level of mastery of technical techniques: throws on goal, dribbling an opponent, passing and passing the ball, therefore the educational and training process at all stages of preparation should be based on the possibility of a detailed analysis of the individual technique of athletes. For this, it is no longer enough to simply visualize the technique of each player due to the fact that the high speed of performing techniques of gamers often does not allow sufficiently accurately catching individual nuances of their individual implementation (Ignatieva et al., 1996). This requires a wider use of information technologies at all stages of preparation, especially when improving techniques and tactical actions, which determined the purpose of the study.

Methods

The analysis of scientific and scientific-methodical literature on the problem of using individual sports games (football, basketball, volleyball) and oriental types of single combats (taek-wondo) of non-traditional means (aerobics) as independent means of the educational process in physical education of students was carried out. The use of modern information technologies in the educational process.

The following were determined: the number, significance, efficiency of technical and tactical actions: heart rate dynamics using a heart rate monitor, an interface, a computer, allowing to identify the average, maximum, minimum values; time and percentage of aerobic, aerobic-anaerobic, anaerobic power.

Correlation analysis of indicators of technical and tactical actions of competitive activity was carried out, which made it possible to purposefully design a program for using handball in the educational process.

In the process of physical education of students, multimedia technology was used: presentation using an interactive board of elements and TTA of handball players, animation showing the technique of throwing the ball at the goal, feints (opponent's lines), players' actions according to the system 1-4 and five in a line. Analysis of matches based on the display of video recordings of matches. Individual assignments were given for self-study. Visual aids were used to enhance the learning effect. They explained the technique of throwing from a place, dribbling the ball, throwing in a jump over the block and showing visual aids made by themselves using video filming and computer processing of materials, as well as videotapes recording the technique of throwing or passing the ball by professionals. The video cassette was viewed once a month. Visual aids were given to each student for detailed study of the house for an unlimited period. When preparing the visual aid, athletes of the highest categories (not lower than the first) were invited, the most successful materials were selected.

The display method included viewing posters, diagrams created using computer technology, and the existing set of such illustrations in digital educational resources and the Internet was used.

The demonstration method included demonstration of video samples (the game of the major league teams), videos, animations illustrating the ways of solving the implementation of techniques, tactical interactions took no more than 10 minutes. Clear and meets all the requirements we have created with the help of graphic editors (Point, Photoshop, CorelDraw).

The key and important elements of shots on goal, interaction in pairs, triplets were highlighted and executed in the form of separate images, slides with the involvement of such software products as MS Word, MS Publisher.

In the classroom, students watched a video slide, and at the same time, the rule of adding forces by vectors was explained in detail to the students. A demonstration of the effective technique of passing the ball in handball is given, in which all muscles must work, and first of all, the legs, since this is the largest vector component in the sum of the acting forces in a given movement. Thus, the muscles, when correctly engaged in the movement, create the force that contributes to the accurate and strong sending of the ball to the target (fig. 1). This force is the result of the addition of all the vectors of forces that provide this movement. Therefore, when passing the ball, all muscles must work. This is relevant from the point of view that the most common mistake among students of handball players is standing on straight legs when passing and throwing the ball. In this case, the possibility of not only the speed-power component of the movement is lost, but also the possibility of a strong and accurate transmission. It is also advisable to bend the legs when passing the ball, since the largest muscles, which are the muscles of the lower extremities, are involved in the action, which provides the speed-strength aspect when performing this technique.

This material was presented in the form of video slides, in which the material was combined, which mutually reinforced its understanding by the students.

Further research involves the development of the scientific and methodological direction of the use of information technologies in the educational process when using handball means.



Figure 1. Fragments of the educational-methodical video slide for justification based on the rules for adding forces according to the vectors of the ball passing technique.

Figure 2 shows a diagram of a computer program for ensuring the educational process in physical education of students of the technology of using handball.

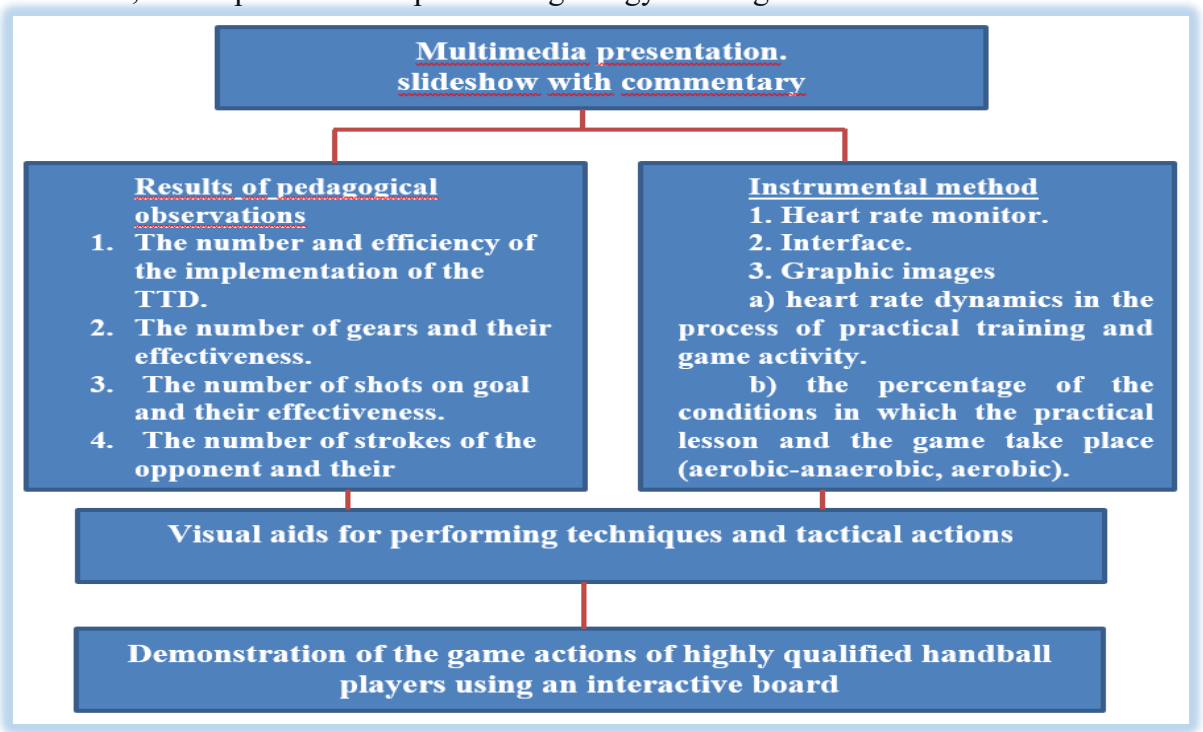


Figure 2. Conceptual model of a computer program for ensuring the educational process in physical education of students using handball means.

The structure consists of a slide show with a teacher's commentary:

- the results of pedagogical observations;
- heart rate indicators recorded by the heart rate monitor of competitive activity and practical exercises in physical education;
- visual aids for the implementation of techniques and tactical actions;
- videotapes of high-qualification handball sportsmen performing game actions.

Results and discussion

The main features of this technique were as follows. Along with training and improving techniques and tactical actions, an emphasis was placed on the development of speed-strength abilities. For this, we used:

- special exercises for the development of strength and explosive strength;
- exercises to develop the speed of performing techniques and tactical actions;
- when improving the technique of performing passes and throws, an emphasis was placed on both the accuracy of these techniques and the speed-power aspect of their implementation under the conditions of the opponent's resistance, while the traditional methodology provides for teaching these techniques without emphasizing the development of the stated qualities.

Analysis of the pulsograms of the practical lesson using handball means showed:

Figure 3 shows the dynamics of heart rate during a practical lesson using handball. On average, the lesson was held in the optimal zone of 160 beats / min for young men aged 20 years (from 150 to 177 beats / min according to V.A. Maslyakov, V.S. Matyazhov). The lowest heart rate at 5 minutes when performing a slow run is 110 beats / min. The highest indicator at 40 minutes when passing the ball in motion. Due to the high intensity of the exercises (the density of the lesson is more than 85%), it lasted 60 minutes.

Figure 4 shows the percentage of the time it takes to complete handball. The greatest amount of time 39 minutes 24 seconds was taken by exercises on the pulse (160-180 beats / min) in anaerobic-aerobic conditions and within 20 minutes 36 seconds, the set exercises were performed aimed at familiarizing with the individual-tactical actions of the handball player at the pulse rate up to 160 beats / min under aerobic conditions.

Figure 5 reflects the overall percentage of the student's fulfillment of exercises aimed at learning the improvement of tactical actions in anaerobic-aerobic conditions (55.4%) and in aerobic conditions (44.6%).

It is important to note that such a ratio of the intensity of the use of handball means is dictated, first of all, by the recommendations for the optimal zone (150-177 beats / min) and

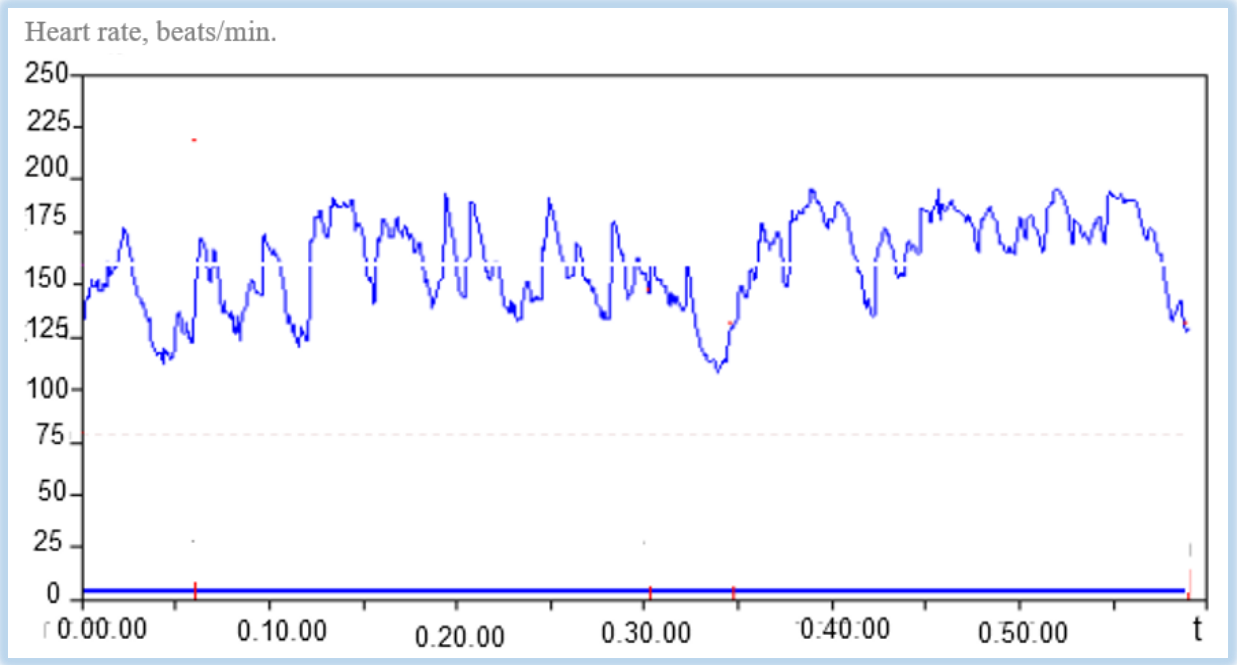


Figure 3. Dynamics of heart rate during a practical lesson with the use of handball means.

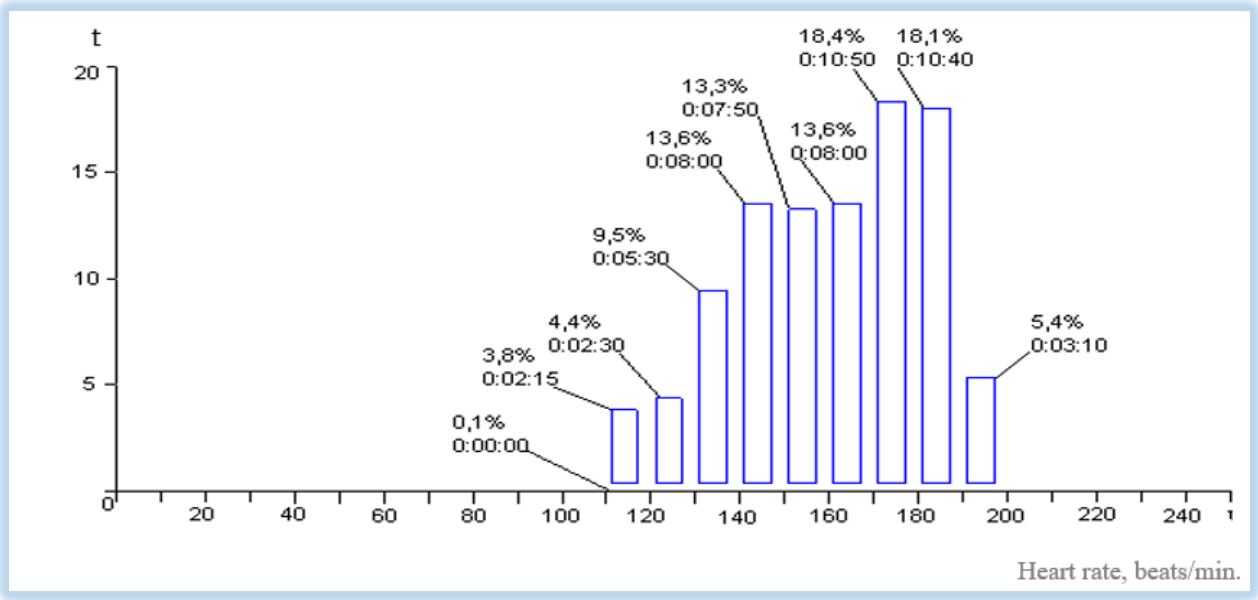


Figure 4. The ratio of the time of performing exercises in a practical lesson in percentage and time terms.

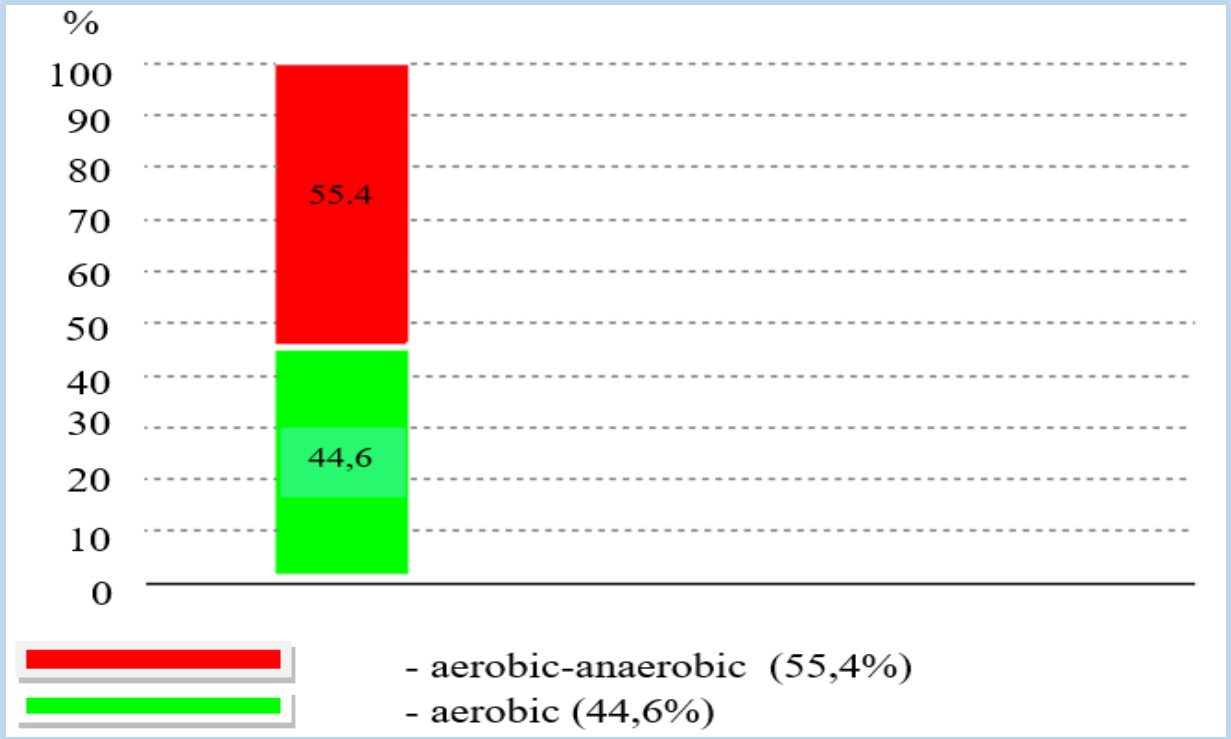


Figure 5. Percentage of exercise performed according to intensity zones.

not very high physical fitness of students, since exceeding it leads to significant fatigue and the effectiveness of TTA performance is significantly reduced.

The end of the practical lesson, using the means of handball, consists of the preparatory, main, and final parts. It is important to note the active participation of the trainer-teacher in the process of performing the exercises.

In the experimental group, at the beginning of the pedagogical experiment, a high variation was revealed in technical and tactical indicators: the effectiveness of competitive activity when playing handball 50%, passing the ball (number) X = 16 ± 6.6, their effectiveness 50%, the number of shots on goal X = 6 ± 6.0 and efficiency - throwing accuracy was 30%, with a high spread V = 41.8%.

Table 1. Dynamics of indicators of technical and tactical actions of the experimental group before and after the end of the experiment.

№	Indicators	Experimental group					
		before experiment		at the end of the experiment		credibility	
		$\overline{X}$	σ	$\overline{X}$	σ	t	P
1.	Ball passes: number	15	6,6	16	6,9	2,33	<0,001
	Efficiency %	50	0,19	60	0,01	2,44	<0,01
2.	Shots on goal: number	6	5,9	9	6,3	2,07	<0,05
	Efficiency %	30	0,19	40	0,01	2,41	<0,01
3.	Technical and tactical actions, number	22	10,9	26	11,50	2,98	<0,01

It is important to note the increase in the effectiveness of students' performance of TTA in the process of playing activity as a result of the use of computer technologies: the number of ball passes increased (10.6%), the effectiveness of ball passes increased (10.2%); the number of TTAs increased (11.8%), and the efficiency of shots on goal (10.3%), with reliability ($p < 0.05$-0.001) $t = 2.07$. (Table 1)

Conclusion

Thus, based on the above, the following conclusions can be drawn:

- that modern scientific research in the field of sports training methods and educational process in physical education of students is based on the wide use of modern information technologies, based on science-intensive, hardware, highly efficient computer and information technologies. It is important to note that the analysis of literary sources did not reveal studies related to the registration of the competitive activity of handball players, especially in the educational process of physical education of students, and the use of computer technologies in the educational process with the use of handball.

- that the use of multimedia technology with the use of video materials, animation, interactive whiteboards contributed to competently working with information: to be able to collect the facts necessary to solve a certain problem; monitor or analyze them, putting forward hypotheses for solving problems; make the necessary generalizations, comparing with similar or alternative solutions; establish statistical patterns; form reasoned conclusions; use them to identify and solve new problems; to be sociable, contact. Work independently on the development of one's own morality, intellect, and cultural level. Computer technologies allow modifying the educational-training process of a sports orientation, and characterizes the high efficiency in achieving the results of playing activity in handball. The use of computer technologies significantly enriches the pedagogical methods of improving students' game actions. The capabilities of computer technologies (slides, electronic textbooks, the global Internet) for storing, searching and transmitting information allows you to solve such problems as motivation for practical exercises, the desire for self-improvement, and maintaining a healthy lifestyle in general.

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