

SCTCMG 2021**International Scientific Conference «Social and Cultural Transformations in the Context of Modern Globalism»****USING AR-TECHNOLOGY IN THE TRAINING PROCESS OF HEARING IMPAIRED CHILDREN**

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Abstract

The relevance of the present research stems from the fact that the structure of sports activity of hearing-impaired athletes has objective features and depends on their psychophysiological potential. Augmented reality technology (AR-) allows you to modernize training sessions. The aim of the study is to substantiate the use of AR- technology for more effective teaching of the technique of movements in the educational and training process in athletics for children of the initial stage of learning with hearing impairments. In the course of writing the work, theoretical methods of generalizing the materials of scientific and methodological literature, testing, method of analysis, processing and interpretation of the data obtained, methods of mathematical statistics were used. In our research the main tests for the evaluation of the training effect with the use of AR-technology are: 20-metres run at flying start, 100-metres race, standing long jump, jumping rope time trial. The effectiveness of the use of AR-technology has shown positive dynamics by all criteria of the tests applied in this study. This technology is quite simple in application and use. Apart from the above hearing-impaired athletes, the results of this research can be applied to some other children with special needs engaged in sports.

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1. Introduction

The requirement of modern society is the disclosure and realization of the potential of every person, including deaf and hard of hearing children. As practice shows, due to their physical and mental characteristics, it is much more difficult for them to enter socialization; they are often forced to adapt to society, to look for themselves in its life (Apokin & Usaeva, 2019). A specialized agency of the United Nations Educational, Scientific and Cultural Organization is the initiator of the program of the global movement "Education for All". Its ultimate goal is inclusive education. UNESCO considers the achievement of more general goals of social integration – meeting the needs of children, youth, adults in addition to inclusion through adaptive physical culture and paralympic sports.

The development of children with hearing impairment cannot be complete without physical education and sports. Thanks to the introduction of motor activity into various spheres of a deaf child's activity, it is possible to provide not only the correction of deviations, but also the necessary level of his physical condition (Katrenko et al., 2019). Vygotsky (2003) wrote: "... the educator has to deal not so much with biological factors as with their social consequences" (p. 382).

2. Problem Statement

Hearing impairment limits the amount of external information, there is no internal speech and verbal mediation, which causes inhibition in development and a slight decrease in perception, thinking, memory, imagination and all cognitive activity in general. This is due to the fact that speech does not participate in the process of solving visual problems. Sport eliminates the impossibility of communication between the deaf and hard of hearing with all other people, since they compete according to the same rules as healthy athletes.

Sports activities with this contingent have both general and their own specific (remedial) tasks. The solution of the problems of the first direction consists in teaching motor actions and in communicating knowledge in the field of sports training, the second one consists in correcting disorders and compensating for the activity of all physiological systems of the body, which determines the selection of pedagogical technologies.

"Pedagogical technology is one of the specific types of pedagogical science (applied pedagogy), designed to provide ways to achieve certain goals, increase the efficiency of the educational process and ensure its high level" (Kopylova, 2020, p. 507).

3. Research Questions

Modern means of communication are a resource that significantly expands the educational opportunities of an individual based on free access to information, as well as an important tool for the social integration of people with disabilities (Katrenko et al., 2019).

A significant breakthrough in the way of presenting educational and training material and in mastering the technique of new movements is carried by the technology of augmented reality (AR-) (Poddubnaya et al., 2019). Based on the analysis of the didactic capabilities of modern information

technologies, means and taking into account the peculiarities of the physical and psychomotor development of a child, existing in modern science, it is AR-technology that can significantly expand the educational and training process. Consequently, in the educational and training process with deaf and hearing impaired children, it should be clearly demonstrated what they will have to master in the near future in sports.

The AR technology (AR – "augmented reality") is based on the result of introduction of sensory data into the field of perception, purposing to augment data about the environment and to improve the perception of information (Kozin & Vitman, 2018). The augmented reality allows imposing images, text, video and audio components on the existing image or space by means of computer technologies. Generated this way the augmented information can be read from the marker by various digital devices, such as smartphones, tablets, AR-glasses and helmets, etc. As a marker any graphic visual object on which can be added multi-format virtual objects by special software tools (Kulikova & Poddubnaya, 2018; Malova et al., 2019).

4. Purpose of the Study

The educational process for the hearing-impaired should be built up with respect to certain specific characteristics of the nervous system, namely fragmentariness and slowness of acoustical perception, distortion and incompleteness of verbal representations connected with sensory-sound derivation (Stepanenko & Pechko, 2016). In working process with this category of children, the information on the further movement or action should be transmitted mainly by the means of visualization. Among these are posters, photo and video display and etc. For this reason, in training with deaf and hearing-impaired athletes, the applications of visual methods of training and exercising are mainly used, thus facilitating communication, building rapport between trainer and athlete, as well as taking an individual approach to the correction of the faults (Rasskazov & Muller, 2018).

Accordingly, the purpose of our research is to prove the use of AR technology to enhance moving technique in educational and training process on track and field for the hearing-impaired children of the basic level (Malova et al., 2019).

5. Research Methods

In the course of the research, the following methods were used: testing, pedagogical experiment, mathematical and statistical data processing.

The pedagogical experiment assumed the organization of the educational-training process on a sports-game basis, providing a wide use (especially in the first two years of training) of the specialized game complexes and training tasks, which along with comprehensive physical training, allows bringing the athletes to understanding of the essence of track and field athletics as sport. The elementary preparation is based on gradual stepping up the training requirements, simultaneously targeting health promotion, development of physical qualities required in the chosen sport. It is also devoted to get the students acquainted with the technical range of track and field athletics and develop steady interest in the perspectives of sports activity.

6. Findings

Children took part in the study to substantiate the effectiveness of the use of information technologies in the process of sports training in athletics State Correctional Boarding School No.36 of Stavropol, participated in the research. At the preliminary stage of preparation, the groups were formed from children of 7 - 10 years old.

Sports with this contingent have specific features. Therefore, thematic developments of each training session are created purposefully for a specific task, or have a complex purpose. Sports and play activities are organized on the basis of a figurative or conventional plot, the nature and methods of performing actions are subordinated to the logic of the game process, their choice takes place in a changing environment. The training sessions include relay races, outdoor games, repetitive tasks, plot play compositions, a circular form of organization. Speech impairment of deaf and hard of hearing children involved in athletics complicates the perception of information related to the description and development of the technique of athletics exercises. Augmented reality allows young athletes to immerse themselves in the game environment in order to provide them with the opportunity to receive the necessary information and then demonstrate their results in the execution of the movements being learned.

The use of augmented reality technology (AR-) contributes to the development of sports technology, the intensification of the educational and training process, the correction of motor disorders, the comprehension of motor and speech information, the enrichment of special vocabulary and phraseology, the activation of intellectual activity, and also serves as an impulse to the development of spatial thinking, improves the quality the information received, promotes its assimilation, makes sports activities more attractive for deaf children. Using this technology, a coach or athlete has the opportunity to choose AR-applications for a specific program topic. Athletes, independently or with a trainer, control AR-objects: move them, rotate them, change the scale, view them from different angles, that is, interact with various interactive elements. Thanks to this, they can reliably perceive the elements they saw of the correct performance of various exercises, determine their own mistakes, see the shortcomings that are problematic to implement in real conditions. The synchronous fusion of visual and auditory information, which occurs in reality, creates a complete immersion in the information environment and activates interest in its perception, there is a "revival" of static application pages.

The use of AR-technology promotes mastering sports technique, stimulation of educational and training process, correction of motor skills disorder, interpretation of motor and speech information, enrichment by target language and phraseology, activation of intellectual activity. It also stimulates the development of spatial thinking, and improves the quality of the received information and its assimilation.

All decisions made in the process of teaching movement techniques must be consistent and hold the attention of athletes. At the same time, the tasks must be basically feasible. The trainee must clearly understand and understand the purpose of the training.

The educational and training process using augmented reality also has material advantages: there is no need to purchase stands, posters, boards and other visual aids. A two-dimensional marker placed in front of the camera, from which all information is read and analyzed, that's all that is needed to obtain the augmented reality effect.

Thus, AR-technology is a valid viable alternative in sports training for deaf and hard of hearing children. A positive point in its use is clarity, informational completeness and interactivity. But, despite the fact that augmented reality technology is included in the list of technological trends of the future, it is practically not used in sports activities. This is confirmed by the opinion of Katkhanova and Bestybaeva, who assert that "... at the moment there is no possibility of using AR technology in the educational process, since there is no single methodology for its application in the educational environment" (Stepanenko & Pechko, 2016, pp. 37-40).

In our study, the use of augmented reality technology (AR-) served as a didactic tool to create a suitable training environment for children with audio logical disorders. According to the results obtained, the augmented reality technology effectively influences the process of teaching the technique of movements, as it is able to demonstrate it with any degree of detail (Table 01).

Table 1. Physical Fitness Index for deaf and hearing-impaired children. The initial and final test measurements

No. p/p	Characteristics of the tests	Baseline M ± m	End points M ± m	M1 – M2	P
1	Run 100 m. (s)	16.74±0.06	16.28 ±0.06	0.46	< 0.001
2	Run 20 m. (s)	2.96±0.04	2.66±0.04	0.3	< 0.001
3	Long jump from the spot (m)	1.65±0.01	1.84 ±0.01	0.19	< 0.001
4	Jump Rope for 30 (s)	32.63±0.36	48.75±1.21	16.12	< 0.001

The scientific novelty of the work lies in the fact that augmented reality technology was first used in sports training with deaf and hard of hearing children, since it is extremely rarely used in education in Russia and is practically not used in adaptive physical culture.

7. Conclusion

With the correct methodological approach, it is advisable to introduce augmented reality technology (AR) into sports activities, which provides great opportunities and initiates new pedagogical approaches in sports training. Let us emphasize that the advantages of this technology have a corrective-compensatory orientation.

The augmented reality technology we use in the educational and training process is simple and accessible to almost any coach-teacher who owns a computer at the level of a non-programming user, and allows you to create electronic support for teaching high didactic quality in the field of athletics.

The developed complexes for teaching the technique of leading exercises in track and field athletics using AR-have successfully passed experimental operation in the conditions of the real training process of children and can be recommended for implementation in the educational process not only in groups of children with hearing impairment, but also in other health limitations.

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