Research on the Application of Computer Technology in Sports Training

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Abstract. The rapid development of modern sports has put forward higher requirements on the relevance, scientificity and rationality for physical training. The traditional physical training method that based on experience can no longer adapt to the new situation of sports development in the new era, which has obvious lag and limitations. Within this context, this paper discusses physical training and computer technology, analyzes computer-aided systems for physical training, and studies the application of computer technology in physical training.

Keywords: Computer Technology; Physical Training; Application.

1. Introduction

Physical training is a systematic, dynamic and continuous project that involves many disciplines such as psychology, biomechanics and kinesiology and includes many aspects such as athlete information collection, training program design, technical movement diagnosis and correction, daily nutrition planning, and fatigue recovery during and after competition and so on. In physical training, the factors affecting athletes' performance are very complicated. The traditional empirical physical training model has low relevance, specialization and scientificity, which may lead to the disconnection between the training contents and the athletes' physical function enhancement needs, and even cause athletes' physical injuries due to excessive sports load. Computer technology, with its powerful data collection and analysis capabilities, can be used as an "auxiliary tool" for physical training, providing decision support for physical training through its diversified functions, thus improving the level of physical training.

2. Physical Training and Computer Technology

Physical training is a systematic project involving expertise in many fields such as physical dynamics, kinesiology, and psychology and including high level control, technical diagnosis, and skill evaluation. In addition, physical training is a dynamic process that is always in the process of adjustment. With the athletes' skill level increasing, the training content, training methods and training intensity can also change [1]. Therefore, in the process of physical training, there is a huge amount of information generating at all stages, which contains key factors that affect athletes' performance, such as mental ability, tactical ability, motor intelligence, and motor skills. Under the traditional sports training model. Coaches usually rely on human observation to identify the merits of athletes' movements and rely on experience to analyze human movement, which is limited. In addition, athletes and coaches have different understanding of the same movement, which may lead to low applicability of the diagnosis results due to their inherent differences in technical diagnosis, which cannot be a driving force for athletes to improve themselves.

The development of modern sports has put forward higher requirements for sports training. Computer technology-assisted physical training can improve athletes' sports skills and make them achieve better grades in actual competitions. This kind of computer-aided training is not an isolated case. For example, the U.S. Goltzak bobsled team used computer technology to simulate bobsled devices to train athletes before participating in the 1991 Winter Olympics, overcoming the shackles of devices and external factors on sports training, which made the Goltzak bobsled team perform well in the Winter Olympics. Then in the America's Cup, the French team used computer technology to

integrate hundreds of sailing videos and information to distill the race strategy and applied it to daily training, which led to their victory in the regatta. This shows that the application of computer technology in physical training can ensure scientific and quantifiable training, and significantly improve the athletes' ability to compete.

3. Computer-Aided Systems for Physical Training

The current computer-aided systems applicable to physical training mainly include Video-based motion analysis system, three-dimensional human motion tracking system, three-dimensional virtual environment-based training system, etc. Different systems have their own advantages and disadvantages.For instance, Video-based motion analysis system is low-cost, simple and functional. It can realize the function that capture and comparison analysis of human movements, but it is time consuming and difficult to guarantee the accuracy. 3D human motion tracking system can obtain 2D and 3D data of human movements with high accuracy, but it is only applicable to indoor sports training. In the actual application, it is necessary to consider the characteristics of sports, competition needs, etc. It is adhering to obey the principle of unity of technical and economic introduction of computer technology and auxiliary systems. In addition, the application of computer technology has reduced the workload of manual statistical analysis, and the content and methods of physical training have been comprehensively adjusted, so it is necessary to make comprehensive planning and detailed arrangements for the application of computer technology and explore the sports training program, which can give full play to the advantages of computer technology, so as to strengthen the training effect and improve the quality of training with the assistance of computer technology.

4. Application of Computer Technology in Physical Training

Under the background of highly informationized era, physical training is characterized by specificity, high load, quantification and science. Coaches should not only have rich experience in sports, but also be good at using computer technology to collect, process and explore training information, and understand the hidden rules behind the information, so as to improve physical training by technology. From a comprehensive point of view, the application of computer technology in physical training is reflected in the following aspects.

4.1 Application of Computer Technology in Training Information Integration

Although in the process of sports training, atheltes' physical fitness, sports skills and other aspects have some similarity, the intrinsic motivation to participate in physcial training, psychological quality, stress resistance and other aspects have greater variability. As we can see from the previous sections, physcial training is a comprehensive activity that integrates motor skills, mental ability and motor intelligence [2]. In addition to physical fitness and motor skills at the physiological level, the psychological quality of athletes and their attitude toward physical training will affect their training effects. It requires coaches to provide targeted and differentiated training contents and methods for different athletes based on their physiological base, personality, interests, strengths and diverse motivations.

4.2 Application of Computer Technology in the Development of Training Programs

Physical training plan is the guideline of the whole process of training, and the scientificity, reasonableness and feasibility of the plan will directly affect the trainning effect. Based on the application of computer technology to build the "athlete training information database", we further use computer technology to structure the athlete physical fitness and training effect evaluation index system, and input the data related to the athlete physical quality and training effect in the database, such as endurance, speed, flexibility, etc into the training skill evaluation model, which can comprehensively measure and quantitatively evaluate the training effects of athletes, and

automatically present the aspects of sports training that need to be improved, such as insufficient training load and inadequate training contents for athletes' lower limb endurance, etc. Therefor coaches can plan the training contents according to the evaluation results of different athletes, which can lay a solid and powerful foundation for planning. Then, with the help of computer, we can integrate the physical training resources on the network, refine scientific and professional training methods and intensity parameters and develop a physical sports training plan that includes immediate, medium and long term goals based on the training condition and physical condition of the athletes, which combined with the adjusted training contents and advanced training methods to ensure that every athlete can have a clear training direction and be able to develop a physical fitness program. In addition, coaches can use computer technology to regularly evaluate the athletes' physical performance and training effects, and adjust the stage goals and training cycles according to the evaluation results, which can ensure that sports training is in line with the growth pattern of athletes[3].

4.3 Application of Computer Technology in Technical Action Diagnosis

Technical movement diagnosis is the key point and difficult part of sports training, which requires coaches to combine project experience and visual observation to determine whether the athletes' technical movements meet the corresponding standards. The computer technology used in technical movement diagnosis mainly includes video capture, video coding and decoding, and panorama technology. Video capture is used to capture and store valuable video information of athletes participating in physical training. Video coding and decoding technology is used to compare athletes' movements with standard movements. After tracking athletes' movements, 3D technology is used to present athletes' movement routes and compare athletes' technical movement models automatically through video overlay comparison and movement decomposition. This not only enables athletes to understand their training priorities and improvement directions in the future, but also helps coaches to adjust their training plans. The panorama technology is used to extract 2D and 3D data, the VUCON equipment is used to obtain human body marker data, capture athletes' movements and analyze human movement patterns. It can help coaches judge the degree of standardization of athletes' technical movements through quantitative human movement analysis [4].

4.4 The Application of Computer Technology in the Simulation of Competition

In the competition of sports, athletes are in a relatively unfamiliar environment, especially in competitive games, the competitors, tactics and movements they faced are different. In some physical training programs, it is difficult to meet the physical conditions required by sports competitions, and in actual competitions, the athletes' confidence may be weakened by excessive psychological pressure and inaccurate technical movements, which may affect their subsequent normal performance. The application of virtual reality technology in computer technology can simulate the real game situation and give the athletes an immersive experience, which can, on the one hand, reduce the infrastructure cost in training and create a training environment similar to the real game with the support of virtual reality technology, which can significantly improve the training effect. On the other hand, coaches can make better preparationfor athletes in daily training and change the parameters of the simulation environment and set up "unexpected circumstances", which can significantly improve the psychological quality of athletes and make them calmly deal with unexpected situations in the competition. Therefor, it can build the foundation for their participation in the competition.

4.5 The Use of Computer Technology in Off-Site Interactive Training

The key point of physical training is not being limited to mechanical training under the guidance of coaches, the more important is self-improvement and improvement through practice and reflection on lessons learned. In other words, the main part of training has been transformed from coaches to multiple subjects. Athletes with different physical and athletic skills can significantly improve their competition ability through interaction with each other. Computer technology has the significant features of resource sharing and information interconnection, so coaches can integrate different levels

and types of training videos and graphic information on the computer platform, encourage athletes to use fragmented time to watch competition videos and learn from other athletes' successful training experience, which can stimulate athletes' enthusiasm and initiative to participate in training and improve the frequency of sports training. It can also increase the frequency of sports training. At the same time, the use of computer technology to create a real-time communication training information platform, which can athletes from different regions jointly implement sports training programs, complement each other's strengths in training, monitor and promote each other, break through the time and space constraints, significantly improve the quality of physical training, and give athletes a certain degree of training autonomy and decision-making authority.

4.6 The Use of Computer Technology in Technical Movement Simulation

Some sports, such as diving and gymnastics, which are distinguished by difficult technical movements, but some of them are dangerous and may cause physical injury if not careful. Therefore, we need to analyze the feasibility of the movement route before the preparation of the movement. The application of computer technology in the design of new movements has significant advantages: Firstly, based on the manual drawing analysis, action detail picture-in-picture display, action video synchronization comparison playback, action video overlay comparison, and motion trajectory reality, we can analyze and simulate the 3D model of human movement. Secondly, based on the above model, we can analyze the defects in the new action, improve the detail analysis of individual action, and form a beautiful and feasible set of action trajectory with the powerful computing function of computer technology. Finally, the feasibility of the new movements can be verified again, and if the movements conform to the basic principles of biokinetics and kinetics, they can be transformed into training contents, and the movements of the athletes can be adjusted according to the model during training.

5 Conclusion

The application of computer technology in physical training has been used for a long time, and it can improve athletes' physical quality, sports skills and psychological quality, which is beneficial to improve the professionalism, standardization, science and feasibility of sports training. At present, computer technology is mainly used in training information integration, training plan development, technical action diagnosis, real game simulation, off-site interactive training, technical action simulation, and includes video-based motion analysis system, 3D human motion tracking system, 3D virtual environment-based training system. In the actual application should be reasonably selected according to the actual needs of training, so as to give full play to the value of computer technology Application value.

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