



Research on the Application of Big Data Analysis Auxiliary System in Swimming Training

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Abstract. In the field of sports, the success of computing technology in various industries has been paid more and more attention by the majority of sports teachers and coaches. We know that the intervention of high technology in the field of sports teaching and training not only improves the scientific training and teaching to a new stage, but also brings about the rapid improvement of the level of competitive sports. It is the development direction of modern physical education and training to apply high-tech achievements to sports training and physical education. The emergence of computer-aided system technology provides a powerful impetus for the development of sports to a faster and better level. This paper attempts to expound the composition and characteristics of the computer-aided system and the particularity of swimming teaching and training, applies the computer-aided system technology to swimming teaching and training, and probes into and analyzes the feasibility of the application of the computer-aided system in swimming teaching and training.

Keywords: Computer aided system · Swimming teaching · Swimming training · Application · Feasibility

1 Introduction

With the rapid development of computer technology, its application has penetrated into all areas of society, effectively promoting the development of social information. Mastering and using computer technology has become an essential skill for people. Especially in recent 10 years, computer technology is widely used in aerospace, aircraft design, mechanical design, environmental simulation, three-dimensional animation and so on. With the increasingly fierce sports competition and the continuous improvement of sports training level, high-tech means are more and more widely used in sports competition and training teaching. However, the computer aided system (CAS) has not been developed in the field of sports due to the difficulty in designing funds for technical talents. We know that the intervention of high technology in the field of sports teaching and training not only improves the scientific training and teaching to a new stage, but also brings about the rapid improvement of the level of competitive sports. It is the development direction of modern physical education and training to apply high-tech achievements to sports

training and physical education [1]. With the development of physical education, the improvement of sports training level and the deepening of specialization, athletes and coaches are forced to improve their sports technology, training methods and high-tech equipment to adapt to the fierce competition of high-level competition. It also makes PE teachers use high-tech means to improve the quality of PE teaching and provides new methods and ideas. Therefore, the application of computer-aided system in swimming teaching and training has a very broad prospect and great significance.

2 Application of Computer Aided System in Swimming Teaching and Training

2.1 Composition and Concept of Computer Aided System

Computer aided system includes: Computer Aided Design (CAD), computer aided manufacturing (CAM), computer base education (CBE), etc.

CAD is to help all kinds of designers to design. Because of the computer's fast numerical calculation, strong data processing and simulation ability, CAD technology has been widely used. For example: innovative design of swimming technique and quantitative analysis of world excellent swimmers' technology. CAD not only improves the speed of technological innovation, but also improves the innovation quality and speed of movement.

Computer aided education CB includes: Computer Aided Instruction (CAI), computer aided test (CAT) and computer management instruction (CMI). Computer aided instruction (CAI) is a kind of teaching method that uses computer as teaching medium to teach learners. It makes great changes in the teaching mode, teaching content, teaching method of educators. Teachers in class (one person, one pen, one brush) has gradually become history. With the popularity of computer, CA has gradually become an important means of teaching. At present, there are three kinds of CAI: Network CAI, multimedia CAI, intelligent caicat and CMI, which is to use the development of computer and network technology to carry out teaching management (exchange and transmission of teaching documents, test papers, etc.) and examination.

CBE includes: CAI (Computer Assisted Instruction), cat (computer aided test) and CMI (computer management instruction). Computer aided instruction (CA) is a kind of teaching method that uses computer as teaching media to teach learners. It makes great changes in the teaching mode, teaching content, teaching methods of educators. Teachers in class (one person, one pen, one brush) has gradually become history. With the popularity of computer, CA has gradually become an important means of teaching. Now there are three kinds of CAI: Network CAI, multimedia CAI and intelligent CAI. With the development of computer and network technology, cat and cm are used for teaching management (exchange and transmission of teaching documents, test papers, etc.) and examination [2].

2.2 Hardware Equipment Required by Computer Aided System

The hardware environment of CAD and CAA mainly includes: host computer (PC, PC workstation), graphics and image processing system (input device and output device).

With the improvement of the level of competition, the athletes and coaches put forward higher requirements in the design innovation of technical movements and learning advanced technology. If athletes can learn from foreign advanced technology, and then according to their own characteristics to form a set of nearly perfect technology, is the key factor to win the competition. In swimming training, the training and innovative design of movement technology still stay in the stage of artificial design based on experience, only relying on Coaches' language explanation and demonstration, athletes try carefully.

3 The Basic Theory of the Auxiliary Software for Monitoring the Load of Sports Training

3.1 The Basic Theory of the Auxiliary Software for Monitoring the Load of Sports Training

Concept refers to “the practice process in which people summarize the common essential characteristics of things in the process of repeated practice and cognition, and leap from perceptual knowledge to rational knowledge”. Concept is a knot that people use to understand and master the net of natural phenomena, a stage in the process of cognition, and the beginning of problem solving. It is the connection and interpretation of the connotation and extension of things, and the scientific logic of logical judgment of the development of things. Therefore, this research software will start from the concept of “sports training load”, analyze the essence of things, seek truth from facts, and lay a scientific and rigorous theoretical foundation for the whole design and research work [3].

Sports training is a process in which people try to change some aspects of the body's ability through some training means and methods. Sports training is a process in which people take the initiative to transform the body's shape, structure and function. It can be concluded that swimming training refers to the process of actively changing the quality and ability of the human body through the means and methods of swimming professional training, so that the human body can adapt to the development of swimming events in shape, structure and function.

3.2 Establishment of Swimming Training Load Monitoring Auxiliary Software Monitoring System

The monitoring system is the main body of this research design. In order to make this research design more practical and scientific, the indicators contained in the system must have the following principles: the established indicators must have been published in the current specialized works of swimming training theory in China, and the research results based on the indicators have proved that the indicators have practical monitoring significance, The principle of utility and evaluation: the selected indicators must be at least those that can be monitored by sports teams at or above the provincial level, and have public research records of continuous human body monitoring. The monitoring means, monitoring purposes and simple evaluation methods have been relatively

mature in practical application, and can not be limited to laboratory conditions, Moreover, the principle of quantitative statistics and analysis relevance is for the purpose of more objective comprehensive evaluation, and the selected index can at least be correlated with another index in the system determined by this study, which can be used for comprehensive evaluation. Except for single load function index.

The monitoring of swimming training load is divided into two parts: training intensity monitoring and training course load monitoring. Training intensity monitoring is mainly aimed at the body reaction of athletes with different energy supply systems under specific training intensity in the process of training course; training course load refers to the monitoring of athletes' functional status with the training stage as the measurement unit after the training course (Fig. 1).

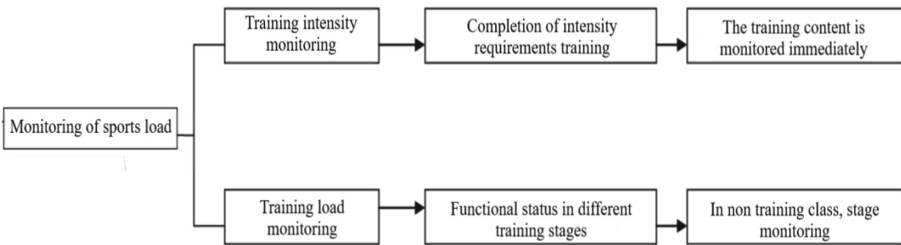


Fig. 1. Monitoring content of sports load monitoring system

4 Design and Application of Swimming Training Load Monitoring Assistant Software

The main function of the software is to input the “basic information” through the coach, and to classify, form, record and analyze the input information through the program written by the database language in advance. All the formulas and classification methods of background calculation are carried out according to the monitoring points and rules of each index in the above index system.

The working principle of this software is an auxiliary tool for coaches to calculate, classify and judge the existing and needed requirements such as index meaning, trend change and concept interpretation. Therefore, at the beginning of analysis, coaches need to input the information to be analyzed according to the format requirements of the software. The basic information to be input includes the personal basic information of the team members: including: name, gender, main event swimming style, main event distance, training years, date of birth, basic information of exercise monitoring (each class): main event amount, minor event amount, rowing amount, kicking amount, coordinated swimming amount, mixed swimming amount, technical swimming amount, intensity swimming amount; The results showed that: 1) the amount of leisure time, low intensity oxygen, aerobic anaerobic threshold, maximum oxygen uptake, lactate tolerance, peak lactate, peak lactate speed/burst strength; Basic information of exercise load monitoring) the intensity (heart rate, blood lactic acid index) of each energy system training

project completed in each training class: random swimming, low intensity aerobic, aerobic anaerobic threshold, maximum oxygen uptake, lactic acid tolerance, lactic acid peak, lactic acid peak speed/explosive power; 2) According to the test requirements of the indicators, the morning pulse, blood pressure, sonogram, hemoglobin, serum testosterone, cortisol, serum creatine kinase, blood urea and urine protein were tested before, during and after the training stage [4].

The process of training is a process of coexistence of individuality and generality. We should not only adopt the training means suitable for a certain training purpose, but also combine the individual characteristics of athletes in the application process. Therefore, personal characteristics is the most critical comparative reference evaluation standard in this study. Only when there is comparison can there be difference. Facing the same training purpose and the same training method, different athletes will have different reactions. Therefore, it is necessary to carry out similar reference based on the same event and gender. Any theory will develop to the refinement stage in the development process. Through successful examples, the index system can not meet the index reference of athletes with different characteristics, but to a certain extent, the standard system based on excellent athletes' test indexes can provide reference for the indexes collected in the same test environment.

5 Conclusion

From the perspective of instrumental innovation, the “swimming training load monitoring auxiliary software” provides coaches with instructions for observing and supervising the changes of relevant indexes such as exercise volume, exercise intensity and exercise load in the training process of swimmers, and the rules of changes through programmed and systematic means; compares with reference standards; and forms the work of purposeful sorting, recording and analysis, It is a special assistant software for the design of motion computer data platform technology. The target users of the auxiliary software are coaches and the target monitoring objects are athletes. According to the rules of swimming training, the main monitoring scope of this auxiliary software is: (1) monitoring of exercise volume; (2) monitoring of exercise load; thus four core operation templates are designed: (1) basic information record; (2) monitoring index record; (3) monitoring index monitoring evaluation; (4) monitoring means and method instructions. According to different monitoring requirements, the monitoring contents are divided into: (1) according to the monitoring time limit, It can be divided into real-time monitoring after class, daily monitoring and training stage monitoring; (2) according to the monitoring content, it can be divided into training amount monitoring, training intensity monitoring, training load and energy status evaluation; (3) according to the different ways of monitoring index calculation and analysis, it can be divided into: total training amount monitoring, seven energy supply system intensity plan prediction and completion monitoring, vascular system monitoring, oxygen operation ability system monitoring, and energy management system monitoring; Skeletal muscle and tissue cell damage monitoring; material and energy metabolism monitoring.

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