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Athletics Teaching Based on Multimedia Network Resource System Integration Based on Computer Technology

Xiaohua Li*

School of Physical Education, Hunan University of Arts and Science, Changde 415000, Hunan, China
17075106@qq.com
**corresponding author*

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Abstract: With the emergence of computer technology (CT), traditional educational technology has been challenged, and the theories and methods of modern educational technology that have been replaced have gradually penetrated into various educational levels and campus education and teaching. Modern educational technology has constructed a modern teaching mode through the integration and combination of most disciplines. The modern teaching mode has formed a digital, networked and computerized system. Therefore, this paper uses CT to design a multimedia network resource system, and applies the system to the actual track and field teaching, so that students can learn through the multimedia teaching resources included in the system. To more track and field competition skills, use scientific training methods for daily training. After comparing the teaching results of the physical quality of the students in the two classes, it is found that the use of the multimedia network resource system in this paper can also achieve a good teaching effect compared with the traditional teaching mode.

1. Introduction

Nowadays, due to the lack of opportunities for students to participate in track and field competitions to show themselves, coupled with the improvement of material level, track and field sports are getting less and less attention. Athletics day involves a wide range, and teachers have a heavy teaching task. Teachers are more likely to pass by in a touch-and-go style, and more to complete the teaching progress, and cannot give careful and detailed explanations, demonstrations and careful guidance. What students build can only be the appearance of actions, and they learn

superficially and in a hurry. Therefore, it is necessary to establish a multimedia network resource system suitable for students to watch teaching videos at any time, to improve students' interest in track and field events, and to improve the quality of teaching.

At present, many students have conducted in-depth discussions on the integration of track and field teaching with multimedia network resource systems based on computer technology, and the research results have been fruitful. For example, the network teaching system is widely used in colleges and universities(CAU), reflecting the efficiency and speed of modern teaching methods [1]. In recent years, CAU have combined modern educational technology to improve teaching quality. Computer network teaching system is an effective means and tool to cultivate students' active learning ability. The application of network teaching system(NTS) has better interaction than conventional teaching. It is not only limited to the one-way teaching of theoretical knowledge of courses, but more importantly, it realizes interactive, multimedia and collaborative teaching based on the network through the NTS, and fully mobilizes the desire of students to actively research problems and innovate and seek knowledge, so as to make up for it. The deficiencies of the traditional education model [2-3]. In track and field teaching, teachers lack flexible teaching methods and mostly adopt "sheep-herding" teaching, coupled with the similarity of students' practice methods, which is also one of the reasons for students' lack of interest in track and field public elective courses. Track and field teaching in CAU ignores the individual differences and different physical and mental development characteristics of students, and uses difficult and extremely complex sports to move into college track and field teaching courses [4]. The multimedia network resource system has multiple service functions such as multimedia teaching, guidance on difficult problems, and on-demand teaching courseware. The system shares resources in the computer network, provides students with a more flexible learning method, and greatly improves the teaching efficiency [5]. Although there are not many applications of CT and multimedia network resource system in track and field teaching, it is enough to prove that these modern educational technologies have a great role in promoting track and field teaching.

This paper first puts forward the key technology and development platform of designing multimedia network resource system, then builds the system architecture with the support of computer technology, and analyzes the functions of the system, including courseware on demand, multimedia courseware production, courseware resource management, and then analyzes the system In the application of track and field teaching, the difference of students' physical quality before and after experimental teaching was compared between the systematic teaching method and the traditional teaching method.

2. Analysis of Key Technologies

2.1. Key Technologies of Multimedia Network Resource System Design

(1) Interactive technology

Interaction is the basis for computers to work. Without interaction, computers cannot complete even the most basic work. Interactivity has become the most basic feature that distinguishes computers from other media [6]. Human-computer interaction and instant feedback are one of the distinctive features of computer systems. The classification of interactive technologies is based on the interaction of media. The interactivity of media has two capabilities and characteristics, one is its ability to directly interact with people; the other is the ability and characteristics of media to support the interaction and interaction between people [7]. The interactive research of teaching using multimedia network resource system should start from the audience's thinking. The main points of interaction in the past were the difficulties and key points of teaching, and gradually developed into the mastery of knowledge points. At present, it is gradually shifting to the direction

of the database. Entering important knowledge content into the database system can solve the difficulties and problems in the teaching process. Focus on real-time calls and queries [8-9].

(2) IP multicast technology

IP multicast technology is a network transmission technology that sends a relatively uniform data to several destinations as a whole. Multicast technology can avoid the problem of occupying too much network bandwidth, and can also avoid congestion during transmission, so as to achieve less packet loss during data transmission. In view of the immediacy characteristics of multimedia data to be transmitted in this system, this IP multicast technology is used to realize [10-11].

(3) J2EE development platform

J2EE is a set of technical architectures that are different from traditional development platforms. It includes many canonical technical structures that can make the system designed in this paper perform better [12].

2.2. t Test

This paper uses t test to analyze the difference results of students' physical quality in various track and field events and different teaching methods, and tests the significant difference through the P value.

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{(n1-1)R_1^2 + (n1-1)R_1^2}{n1+n2-2}(\frac{1}{n1}+\frac{1}{n2})}} \tag{1}$$

$$t = \frac{\overline{d} - \lambda}{R_d / \sqrt{n}} \tag{2}$$

Among them, $\overline{X}_1$ and $\overline{X}_2$ represent the sample mean, n1 and n2 represent the sample size, R_d is the sample standard deviation, and λ is the mean.

In this paper, assuming that the complexity of all candidate models is known, a new model selection algorithm is given based on the significance t-test of the difference of the block 3x2 cross-validation indicators. The specific process is as follows:

$$t_{pq} \frac{\hat{\mu}3\times 2(Ap, Aq)}{\sqrt{\frac{1}{6}\sum_{i=1}^{3}\sum_{k=1}^{2}(\hat{\mu}_k^{(i)}(Ap, Aq) - \hat{\mu}3\times 2(Ap, Aq))^2}} \tag{3}$$

3. Design of Multimedia Network Resource System Based on Computer Technology

3.1. System Architecture

Dispatcher (DSPT): Responsible for establishing communication with the terminal and maintaining the stability of communication, encoding and decoding related content, performing request routing, and dispatching upstream and downstream messages.

Provisioning Data Provider (PDP): In order to ensure the scalability of DSPT and ensure that it does not depend on specific services. The routing information delivered to the terminal and the routing information of the DSPT stream to other components are not encoded in the DSPT. The routing information is dynamically generated by PDP according to different parameters and provided to DSPT for query.

Device/Customer/Service Data Provider (CDP): CDP is actually a subject database. Responsible for maintaining core data such as user information, device static information, device dynamic information, and user subscription relationships. CDP provides a query interface to SH in the form of a service.

Service Integrator (SI): SI is responsible for integrating all stakeholders to provide specific services to users. This HUB-type structure enables service participants such as CC and CP to directly interact with the SI through the interface without developing interfaces with other stakeholders.

Management Platform: Responsible for equipment management, service management, configuration management, operation management, maintenance management, as shown in Figure 1.

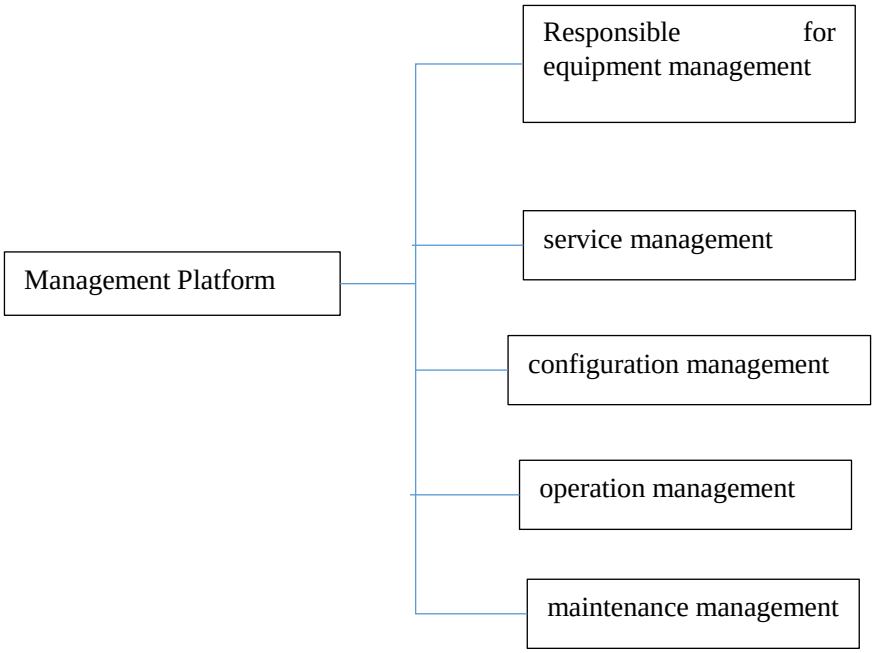

Figure 1. Management platform organization

Monitoring Platform: Responsible for the monitoring, analysis, alarm, statistics and other functions of the network, host, middleware, and application. And SLA evaluation can be carried out.

3.2. Functional Requirements Analysis of Multimedia Network Resource System

(1) Demand for courseware on demand

Courseware-on-demand is a basic learning unit based on courseware, which is available for students to learn on-demand or download. The students' learning status information can be simply counted and analyzed through the system. Courseware can be roughly divided into multimedia courseware and non-multimedia courseware according to its characteristics. Commonly used multimedia courseware formats include wmw format, Real format, QuickTime, Flash format, Silverlight format, etc. The characteristic of this type of courseware is that a server is required for students to order on demand. Supported by professional video-on-demand software. Non-multimedia courseware generally has the characteristics of high bit rate, resulting in a large amount of data. In order to solve this problem, we will use video conversion technology and NET-VOD video on demand system.

The courseware on-demand function is mainly responsible for the on-demand function of the courseware after the user enters the system. After the user enters the system, verify the identity and enter the corresponding courseware management module with a legal identity. The user first enters the course name of the course to be taught, and then selects the courseware corresponding to the course taught to be on-demand. If the choice is correct, it will prompt the on-demand success. If the choice is wrong, it will prompt unsuccessful. The detailed operation flow chart is shown in Figure 2.

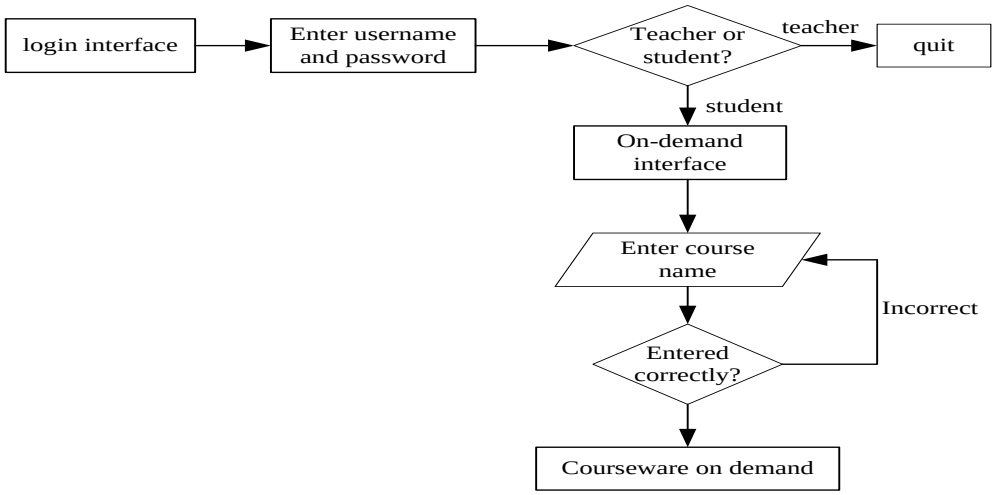

Figure 2. Courseware on-demand process

(2) Requirements for multimedia courseware production

Multimedia courseware production is a set of simple and easy-to-use multimedia production tools for teachers. It is easy to learn and easy to use. It can organically integrate the voice information, video recording, PPT, written text, system demonstration and other content of the teacher's lectures together.

After the teacher finishes teaching, just click "End of Lesson", the system will automatically generate the corresponding courseware and save it to the disk. Of course, it can also be edited and stored, and the corresponding index will be automatically generated to meet the needs of students for segmented on-demand. If there is no PPT, the system will automatically create blank slides as needed, which also implements the above functions. In addition, the multimedia courseware production tool can realize the multi-bit rate technology of audio and video to meet the on-demand requirements of various bandwidths, so that users with high, medium and low bandwidth can use it normally.

(3) Courseware resource management requirements

Courseware is the core resource of this system. Therefore, how to manage these courseware well and give full play to the role of these courseware is one of the core problems to be solved by this system. Therefore, this system will provide courseware management functions, which mainly include various aspects of the courseware. Operations, such as adding, deleting, and modifying courseware. On the other hand, in order to maintain the operating order of the system, the system will provide the function of courseware hierarchical authority management to solve the security problem of courseware data. For example, the system divides the courseware authority into teacher authority and super administrator authority. After logging in to the system, the teacher-authorized user can only delete and modify the courseware added by himself, but cannot modify and delete the courseware of other teachers, so as to avoid accidental deletion and modification.

4. Application of Multimedia Network Resource System Based on Computer Technology in Track and Field Teaching

4.1. Experimental Subjects

This paper selects two classes in a school for track and field teaching. The number of students in the two classes is the same, and the proportion of male and female students is the same, so that there will be no difference in gender and number of students. Among them, class A is an experimental class, which uses the multimedia network resource system for teaching, and class B is a control class, which uses traditional teaching methods for teaching.

4.2. Student Physical Fitness Test

(1) Physical fitness test before the experiment

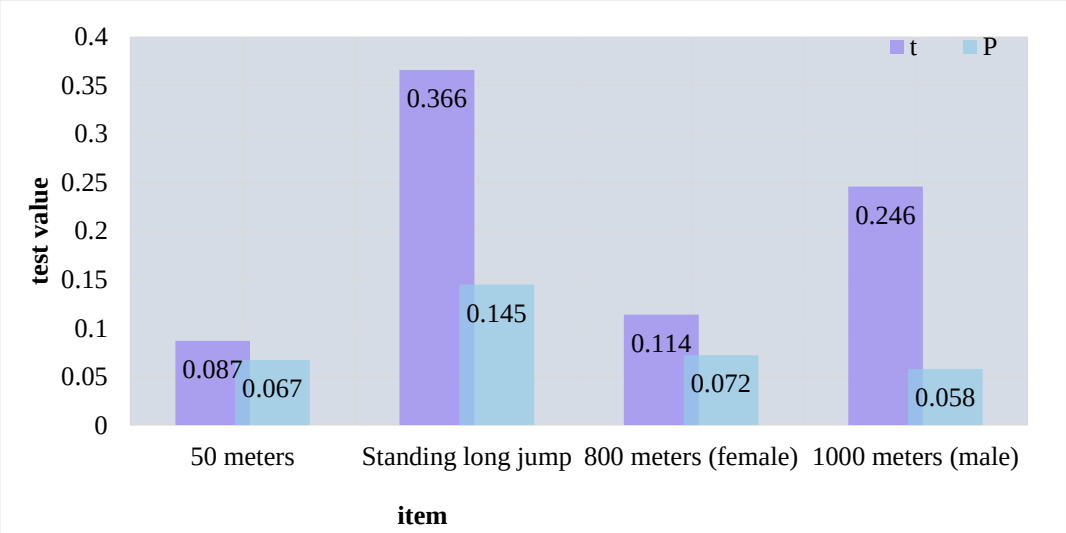

Figure 3. Independent sample test results of students' physical fitness before the experiment

As can be seen from Figure 3, after the independent sample T test, it can be seen that before adopting different teaching methods, class A and class B obtained the results in track and field events such as 50m running, standing long jump, 800m (female), and 1000m (male). The P values of 0.067, 0.145, 0.072, and 0.058 were all greater than 0.05, so it was concluded that there was no significant difference in the physical quality of the students in the two classes. That is to say, the physical quality of the students is similar, and it will not affect the subsequent experimental results.

(2) Physical fitness test after the experiment

Table 1. Students' physical fitness test results after the experiment

	t	P
50 meters	-2.512	0.002
Standing long jump	1.947	0.037
800 meters (female)	0.608	0.001
1000 meters (male)	1.326	0.013

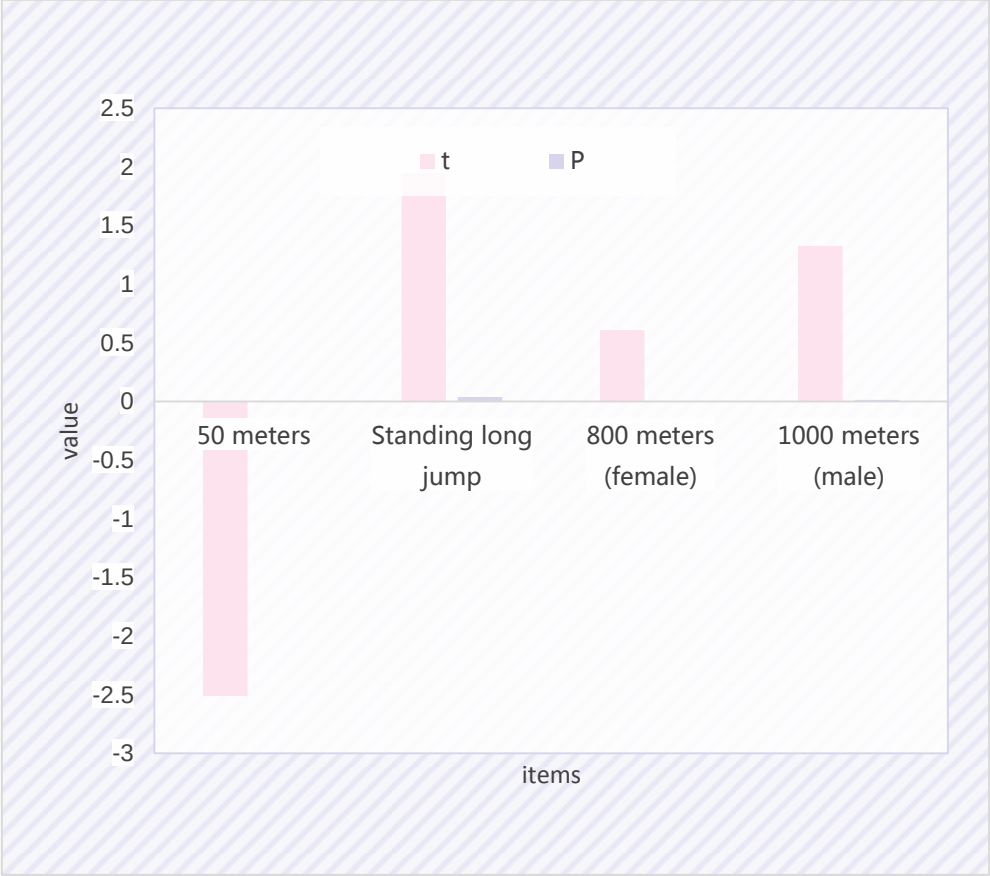

Figure 4. Test results

It can be seen from Table 1 and Figure 4 that after using different teaching modes, it can be seen from the P values of the track and field events in Class A and Class B that the scores of students in the two classes are significantly different, and the P values are 0.002 respectively. , 0.037, 0.001, 0.013, all less than 0.05, indicating that the two classes have achieved significant differences in the three aspects of 50 meters, standing long jump, and 800 meters (female)/1000 meters (male). The reason for the analysis is that the experimental class uses a multimedia network resource system of computer technology for teaching, and students can use the system to collect track and field skills, competition videos and other resources for learning. Through their interest, students gradually feel the importance of sports skills, physical fitness, etc. in physical education classes. Students find that only by insisting on exercising and actively practicing technical movements and skills will they continue to improve. The experiment also proved that the system teaching method has received a good teaching effect.

5. Conclusion

This paper analyzes the design of multimedia network resource system, uses computer technology and IP multicast technology to design system functions, and implements the function of multimedia network resource system on J2EE platform. The experiment of the system integrating track and field teaching shows that there are significant differences in the physical quality of students using the traditional teaching method of the system teaching method. The multimedia network resource teaching system can allow students to learn more motor functions, and its teaching effect is also very good.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] Perez Z, Zheng H. Design of multimedia engineering teaching system based on internet of things technology. International Journal of Continuing Engineering Education and Life-long Learning, 2019, 29(4):293-305.

[2] Qafzezi E, Bylykbashi K, Spaho E , et al. A New Fuzzy-Based Resource Management System for SDN-VANETs. International Journal of Mobile Computing and Multimedia Communications, 2019, 10(4):1-12.

[3] Nayyef Z T, Amer S F, Hussain Z. Peer to Peer Multimedia Real-Time Communication System based on WebRTC Technology. International Journal for the History of Engineering & Technology, 2019, 2.9(7):125-130.

[4] Canovas A , Rego A , Romero O , et al. A robust multimedia traffic SDN-Based management system using patterns and models of QoE estimation with BRNN. Journal of network and computer applications, 2020, 150(Jan.):102498.1-102498.14.

[5] Wallace J , Beidler E , Covassin T . Assessment and Management of Sport-Related Concussion Teaching Trends in Athletic Training Programs. Athletic Training Education Journal, 2018, 13(2):112-119.

[6] Adat V , Tselios C , Politis I . On Security Against Pollution Attacks in Network Coding Enabled 5G Networks. IEEE Access, 2020, PP(99):1-1.

[7] Leroux S , Bohez S , De Coninck E , et al. Multi-fidelity deep neural networks for adaptive inference in the internet of multimedia things. Future Generation Computer Systems, 2019, 97(AUG.):355-360.

[8] Soltanian A , Naboulsi D , Glitho R , et al. Resource Allocation Mechanism for Media Handling Services in Cloud Multimedia Conferencing. IEEE Journal on Selected Areas in Communications, 2019, 37(5):1167-1181.

[9] Wright F D, Conte T M. Standards: Roadmapping Computer Technology Trends Enlightens Industry. Computer, 2018, 51(6):100-103.

[10] Sawada Y, Shen G, Yoshino N. Computer and Information Technology, Firm Growth, and Industrial Restructuring: Evidence from Manufacturing in the People's Republic of China. Asian development review, 2018, 35(1):133-154.

[11] Park S, Mcleod K . Multimedia Open Educational Resources in Mathematicsfor High School Students with Learning Disabilities. Journal of computers in mathematics and science teaching, 2018, 37(2):131-153.

[12] SANGHOON, PARK, KENNETH, et al. Multimedia Open Educational Resources in Mathematics for High School Students with Learning Disabilities. Journal of computers in mathematics and science teaching, 2018, 37(2):131-153.