

# Research on Influence of Multimedia Network Teaching Platform and Effective Interaction on Physical Education Curriculum Based on Smart Classroom

Liwei SUN

*Sports Department, Xi'an Aeronautical University, Xi'an 710077, Shaanxi, China*  
*\*13572008575@163.com*

## **Abstract**

*With the development of computer information technology and multimedia Internet technology, human beings have entered a new era of knowledge and network. Education information construction is an important way for the modernization of education, in this paper, the author research on influence of multimedia network teaching platform and effective interaction on physical education curriculum. For the necessity of multimedia and network assisted instruction, 68.57% teachers think that multimedia teaching is very important, and it is necessary means of physical education teaching. Multimedia network teaching platform can also integrate the latest sports information resources, students can watch all kinds of large-scale sports events by online video.*

**Keywords:** *Multimedia network, Teaching platform, Virtual classroom, Physical education*

## **1. Introduction**

With the economic globalization, the rapid development of science and technology the rapid progress and development of computer information technology, communication technology, Internet technology, visual and multimedia technology is changing with each passing day, the modern technology has been deeply into people's daily life [1]. The emergence and development of new science and technology is bringing convenience to people, and it also influences and changes people's traditional way of life gradually. With the development of computer information technology and multimedia Internet technology, human beings have entered a new era of knowledge and network [2-3]. The reform and development of education, the level of scientific and technological knowledge determines the overall national strength of a country and its competitive power in the whole world. How to use modern science and technology to improve and improve the contemporary education is a constant research topic [4]. According to China Internet Network Information Center (CNNIC) statistics, China's Internet has been in the provinces and municipalities to get comprehensive coverage, although the area of distribution is uneven, some remote and minority areas coverage is relatively low, but the growth of Internet users presenting increasing trend.

Education informatization is the only way for the modernization of education, and is also an important part of the modernization of education [5]. From the perspective of technical attributes, the basic characteristics of educational information is digital, networking, intelligent and multi media. Network makes the information resources can be shared, the activities of space and time is limited, and the interpersonal cooperation is easy to realize [6-7]. At present around the world using the technology of multimedia and network teaching methods are varied, including network teaching, web-based teaching, electronic distance education (E-Teaching), online teaching and learning (MDP) teaching and virtual teaching, virtual teaching). Internet popularization and application and new multimedia technology development and application of modern teaching methods to

provide a new way, the combination of the two arises at the historic moment, multimedia network teaching method, and as the technology of multimedia and network teaching in the teaching process implementation, called the multimedia network teaching platform [8]. Because of its openness and interactivity, multimedia network teaching has been unable to compare with traditional teaching. It is famous for its rich resources and powerful functions. It emphasizes that the students are the main body, which can run through the whole process of teaching and learning. Multimedia network teaching platform provides students with a more intuitive visualization of real-time interactive learning platform.

## 2. Application of Multimedia Network Platform in Physical Education Teaching

### 2.1. Interactive Network Multimedia Teaching

At present, the forms and methods of implementation of multimedia network teaching platform can be divided into two types: one is the on-line network teaching system based on video conference, from the whole teaching process, it still takes the teachers as the main principle is to break the constraints of time, will expand the scope of the traditional classroom, but no a new breakthrough in the learning mode; the other is a network multimedia teaching based on autonomous learning, which is the teaching resources in multimedia database or Web page form stored in the server, the students themselves to browse these data to learn, in this way, students basically from the teaching of teachers the guidance, the invisible way to the difficulty of learning. Use a can make teachers and students interactive teaching through the network and multimedia technology, main research direction of future construction of network teaching and learning environment. Therefore, to explore on interactive multimedia network teaching platform design and create ideas. It has very important practical role and significance.



**Figure 1. Multimedia Teaching Tools**

At present, the student in the school learning largely depends on the normal classroom teaching to complete, and in the interactive multimedia network teaching platform, by way of video on demand in any place at any time to learn. The second stage is "learning and teaching", to student learning based, teachers to teach as a supplement, including student to teacher knowledge for practice, review and preparation. At the same time, teachers conduct periodically online tutoring and answer students' learning process in question. This is a repeated process, not a learning can be one-time to learn new knowledge and skills. We present interactive multimedia network teaching platform, as a network of virtual learning environment, the realization of its function mainly according to the cognitive theory design, and choice in the learning of new knowledge and old knowledge review, learning process arrangement on fully stressed learners the dominant position of the teachers just a information resource provider and the learning process of the helper.



Figure 2. Multimedia Database

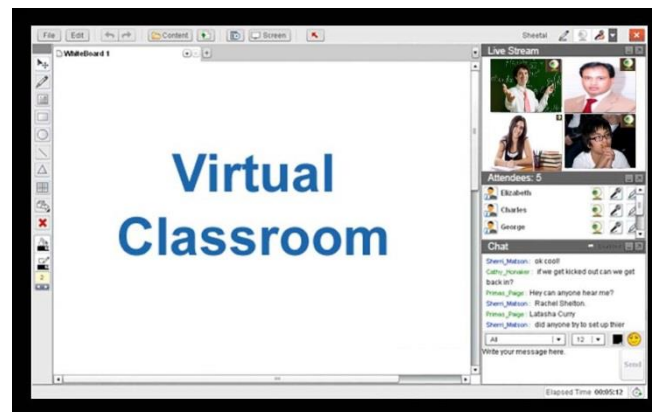


Figure 3. The Virtual Classroom

- Interactive network teaching students need to resolve problems is varied, the interactive teaching platform should first have a powerful interactive function, such as: to provide instant communication function between students, between teachers and students; according to different students and the actual situation of learning ability, allowing students to independently control the learning process.

- Scientific: the traditional classroom teaching needs to follow the teaching rules, to adapt to the characteristics of students. Network teaching is no exception. The design of interactive teaching platform should conform to the laws of teaching and learning, at the same time, it should conform to the requirements of modern educational technology, so that the teaching content is correct, the teaching strategy is scientific and reasonable.

- People oriented: the platform is to create a platform for people to serve, the user is the user and the maintenance of the platform. In the design of interactive platform should stand in the learner's point of view, fully consider the needs of learners, and strive to platform.

Difference of multimedia network teaching and traditional classroom teaching, classroom teaching content level is by the teacher by telling a step by step completed, and multimedia network teaching, teachers need to will these associations through the organization of the content of three-dimensional revealed, guide students to experience, and we should pay attention to not affect the students understanding of curriculum backbone, not to make students feel that the content of chaos. Therefore, the construction of teaching information data is the key to the successful application of the interactive

network multimedia teaching platform. We can through the following aspects: the existing video tape and courseware to streamline and selection, digital processing; purchase; collected from Internet, download the materials, materials, software; book, pictorial images of digital scanning. Self developed making multimedia teaching materials, electronic documents, electronic lesson plans, material.

## 2.2. The Decision Tree Algorithm

In the method of data mining, decision tree algorithm is one of the common methods to solve practical problems in data mining, pattern, classification is the data item is mapped to a class definition process, from the corresponding properties and input value vector. A classifier is a prediction of another attribute in other known properties sample model .

Decision attribute information gain algorithm in C4.5:

Set the sample class label  $C_i, i=1, \dots, n$ , the case set is  $T$ , then the information entropy is:

$$CiInfo(T) = - \sum_{i=1}^n \frac{frequ(C_i, T)}{|T|} \times \log_2 \frac{frequ(C_i, T)}{|T|} \quad (1)$$

Suppose choose a  $Y$  with different values of  $w$ , the conditional entropy can be expressed as:

$$E_w = \sum_{i=1}^n \frac{|T_i|}{|T|} \times \inf o(T_i) frequ(C_i, T) \quad (2)$$

The mutual information is the mutual information is:

$$Gain(W) = \inf o(T) - E_w \quad (3)$$

C4.5 the use of standardized processing procedures, when there are a lot of different attribute values, using the heuristic search method is the most effective, the attribute information gain ratio method has better information gain. But will result in maximum information gain attribute  $W$  as to branch extended attribute information gain is defined as the rate:

$$Gainratio(W) = \frac{gain(W)}{SPlit(W)} \quad (4)$$

In this formula:

$$SPlit(W) = - \sum_{i=1}^k \frac{|T_i|}{|T|} \times \log_2 \left( \frac{|T_i|}{|T|} \right) \quad (5)$$

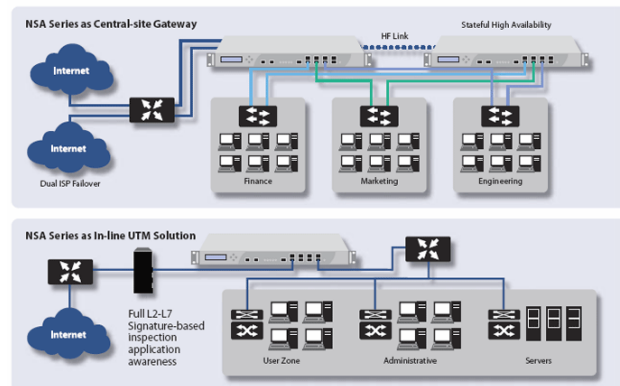
It is the use of the value of the  $W$  attribute data mining, branches to calculate the potential information. In the selection of the corresponding error rate on C4.5 using the information gain ratio criterion. As a branch of useful information is proportional to the rate of information gain and branch. More information contained in the package of branches, the greater the rate of information gain.

## 2.3. Multimedia Cloud Computing

Cloud computing is to calculate the distribution of tasks in the network, so that a variety of applications can be based on the need to obtain the computing power, storage space and resources. Cloud computing platform can provide different services for different user groups, to provide users with high quality service, at the same time and

reduce the cost of the service provider of enterprise, investment risk, the research has a wide business prospects. Multimedia teaching environment is a kind of teaching environment which uses various kinds of multimedia teaching equipment and modern educational technology. Cloud Computing Assisted Instruction is in the cloud computing environment, the use of cloud computing platform to build personalized information education. Learning environment, in order to help teachers to teach and students to learn, to promote communication between teachers and students, improve the quality of teaching. Under the teaching environment of in cloud computing, most of the teaching elements have achieved information digitization, teachers at home can understand the teaching environment, a lot of teaching to complete the task.

In recent years, the development of the Internet and the emergence of a variety of new multimedia services, based on the requirements of such services for infrastructure and resources, the deployment of multimedia services on the cloud computing platform is very valuable. This necessity is mainly reflected in: (1) multimedia services generally involve pictures, video, audio and other content, and the provision of these services requires a large number of computing resources. At the same time, due to the many multimedia services such as streaming media real-time have higher requirements, so the need for more provide services in the back-end resources has very high computing ability. (2) with heterogeneous terminals in daily life more and more people to accept multimedia service, and hope that this kind of service can be used at any time and in any place, cloud computing powerful processing capability is in line with the trend of the development of Internet and multimedia services. (3) in the era of mobile Internet development and traditional service based on 2G technology so as to meet the people's needs, the research and application of technology of 3G and 4G matures, users demand for new types of network applications and mobile Internet a lot of interaction, making the number of users increases in a geometric level, such as cloud computing usage put forward higher requirements.

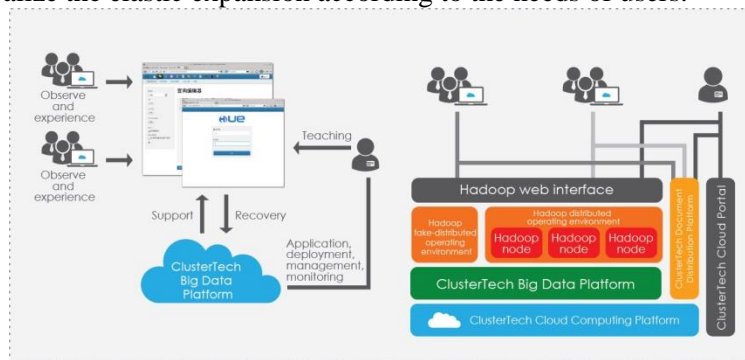


**Figure 4. Central-Site Gateway**

Cloud service platform: cloud computing originally scattered independent educational system, equipment management system, classroom, multimedia resources database, network teaching platform of organic integration in together, they relate to each other, complement each other together in support of a whole teaching activities. Educational system is mainly responsible for course arrangement, teaching management; equipment management system manages schools including teaching equipment, including a variety of instruments and equipment; multimedia classroom is an important place for teaching, real-time is necessary to grasp the dynamic information of the classroom, classroom presents the information of the classroom, equipment and the operation conditions, at the same time, course scheduling reference.

Cloud services terminal: cloud based service platform, the use of cloud management, support for multi terminal learning services. Multimedia teaching environment in a cloud

service terminal is refers to the teacher teaching place, mainly refers to the public multimedia classrooms, computer labs, digital language laboratory, mobile terminal equipment can be desktop computers, laptops, can also be netbooks, iPad, mobile phones, for learners to use multi terminal to carry out anytime learning. Teaching supporters: mainly including teaching management, teaching equipment maintenance personnel, cloud computing platform management. In the cloud computing environment for the multimedia teaching, through to large, highly virtualized education resource and application management, forming a set of resource pool, educational applications into one unified service, with the help of cloud services platform for the user to provide all kinds of service, realize the elastic expansion according to the needs of users.



**Figure 5. Cloud Computing Platform**

### 3. Research Design

#### 3.1. Characteristics of Physical Education in Colleges and Universities

Physical education teaching with other disciplines, is a planned, purposeful, organized to teach students knowledge, improve students' skills and physical strength, to cultivate students' Ideological and moral quality of the process. Sports teaching and other disciplines has its unique side, compared with other disciplines to attach importance to cultivate students' intelligence and psychology, sports discipline more attach importance to the cultivation of students' physical strength and skills, personal will. Compared with other subjects, the characteristics of physical education teaching can be discussed from two aspects of teaching content and teaching organization. First of all, from the aspects of teaching content, teaching is to teach sports knowledge, sports movement technology, motor skills in three aspects as the main teaching content. The most fundamental purpose is enhancing individual student physique, sports teaching which belongs to the technical teaching, mainly for students' self body practice. And then from the teaching organization in terms of physical education in particular sports venues and schools in the outdoor natural environment, teaching needs a larger space, teaching process with different equipment and venues. The number of classes per class is less than a dozen people dozens of people, each student's quality level, athletic ability is different, on the basis of the movement of the master is also different. In addition to the physical education teaching is also affected by the environment, so the organization of physical education has the complexity and diversity. Characteristics of physical education teaching in Colleges and universities is the combination of theoretical teaching and technical teaching, teaching theory mainly covers the present situation of the development history of sports, sports, sports and sports related to the human body and the psychology of knowledge, the rules of the major sports events organization and various sports, judgment principle and so on. The technology teaching is the use of existing venues and equipment, through the teacher's presentation and display and students to complete the practice of imitation and practice. In the physical education teaching in Colleges and universities is inseparable from the theory of teaching and technology teaching, theoretical teaching is the basis of

college physical education, technical teaching is the practice of college physical education. So in college physical education teaching, the unity of theory and practice is very important. College physical education teaching, but also need to pay attention to the teaching process of teaching and learning in a timely manner to communicate and interact. Physical education in Colleges and universities also pay attention to the personal preferences and development as the premise, the implementation of personalized teaching.

### **3.2. Advantages and Characteristics of Multimedia Network Teaching**

Multimedia network teaching provides a new teaching mode for people, multimedia network teaching platform established for learners to build a resource rich knowledge platform provides more learning opportunities and more comprehensive information resources to those who want to acquire knowledge. Multimedia network teaching of the teaching activities of the new change, from the original pure knowledge "teach" to lay a good foundation to pay more attention to the cultivation of students' creative spirit and practical ability, as well as the system of lifelong learning. Multimedia network teaching appear breaks the limits of time and space in the traditional teaching mode, with very strong spatial and temporal advantage, can make students not only in class time is not only in the classroom is not only the learning and exploration of knowledge and teachers face to face under. Multimedia network teaching make educational resources sharing is possible, through multimedia network teaching platform can sharing the information and equipment to realize the optimization, so that the whole teaching process can be with smooth, can better accomplish the purpose of teaching.

The development of modern Internet already covered the world, through the Internet, people can integrate the teaching resources of the countries all over the world, realize the sharing of global resources, with the world's leading teaching synchronization, really make the integration of global education. Thus even if a body in education is relatively backward, lack of teachers, teaching resources scarce economic less developed areas of people, also can through the multimedia network teaching platform to the latest and most comprehensive study, grasp the latest teaching objective. A computer network and place all, can the independent learning, whenever and wherever possible access to the latest and most comprehensive knowledge.

- Flexible teaching time: multimedia network teaching by means of modern Internet technology and multimedia technology breaks the traditional teaching time and space constraints, the learners as long as necessary computer equipment through Internet links and multimedia network teaching platform of the interview can be anywhere in the of autonomous learning, thus learners can better arrange their own learning time.

- Education is rich in resources, multimedia network teaching by modern Internet technology can well realize the sharing of resources of globalization, Internet has a large and comprehensive teaching materials, learners can choose suitable for their own courses to learn, the latest and most comprehensive data can be obtained easily. Network resources have a strong timeliness, the network education resource information update in a timely manner, students can also real-time access to the latest educational information and the most advanced cutting-edge knowledge.

- Strong multi - media, multimedia and network technology has powerful multimedia. In the process of teaching, multimedia network teaching can Application of multimedia technology and Internet technology provides friendly interface, can the teaching content through multimedia (video, audio, animation) method to carry on the comprehensive analysis and display, is conducive to the students of the teaching content of intuitive understanding, so as to strengthen the mastery of knowledge learning, to enable students to acquire knowledge in a vivid image of the multimedia teaching.

- Strong interaction: in the network multimedia real-time communication technology, students are not required to meet the teacher can real-time online and teacher

of communication and contact, timely detection of learning of the existence of the question, and can guide and answers.

## **4. The Application of Modern Science and Technology in the Multimedia Network Teaching Platform**

### **4.1. Computer Aided Instruction**

Computer aided instruction is a variety of teaching activities under the help of computer, in order to discuss the teaching content, arrange the teaching process and carry out the teaching and training methods and techniques. Computer assisted instruction technology for the majority of students to provide a good learning environment for private. Through the comprehensive application of the computer technology such as multimedia, hypertext, artificial intelligence and knowledge base, it overcomes the shortcomings of the traditional teaching methods. The use of computer assisted instruction can save a lot of time, improve the teaching quality and teaching efficiency, and achieve the optimization of teaching objectives. The computer aided instruction system is composed of hardware system and software system:

Hardware system: the composition of the hardware system of multimedia aided instruction (Figure 4-1). It includes: CPU (controller and operator), memory, input devices, and output devices. Commonly used input devices: disk machine, CD machine, tape machine, digital camera, scanner, video capture card, audio, MIDI synthesizer, a microphone, a modulation / demodulator and network adapter, keyboard, mouse, pen based input devices, and. Commonly used output devices: disk machine, disc recorder, tape machine, printer, film recorder, high brightness projector, display, a sound card and the amplifier and speakers, MIDI synthesizer, modulation / demodulator and a network adapter.

Software system: multimedia assisted instruction software system, including operating system, various forms of courseware, title, teaching management system and its development and support environment software. Obviously, at the present stage, the focus of computer aided instruction in medical colleges should be the development, application and research of the application system of courseware, item bank and teaching management system. Along with the computer hardware technology development and large-scale production, hardware prices declining to carry out computer aided teaching hardware foundation is solid; and increasingly urgent needs is to adapt to the various forms of practical teaching courseware and related to the application of the system. Therefore, the development of various forms of high quality courseware and its application in teaching, the computer aided teaching play a greater role and advantages and promote itself development, this is each in teaching with advanced teaching model of the educators should strive to achieve the goal.

### **4.2. The Popularization of Multimedia Network Platform in College Physical Education**

Multimedia network teaching platform using the latest B/S (Browser / server) structure. Characteristics of the structure are as follows: client application environment for the standard of common web browser, all applications are stored on a web server, when needed can directly download; more easy to management and maintenance, because the client does not need special software, when to upgrade the network application, server software can be updated. This structure has good scalability and openness, B / S structure using standard TCP / IP protocol, the school can expand the system at any time according to the needs of their own development.

College sports multimedia network teaching platform is the Internet developed a for a set of system of PE Teaching in Colleges and universities. It is not only the university



students are independent, personalized learning and communication of sports knowledge platform based on, but also the carrier of an effective auxiliary function of daily physical education teaching in Colleges and universities. According to the characteristics of college sports, college sports multimedia network teaching platform, in the promotion process should have at least the following modules:

- Sports information module: the main function of the module is interconnection network in the latest sports information resources integration and interconnection network in major sports information web site of the new sports information and information resources retrieval and released and the module, for students and teachers get the latest sports information and information resources. Students and teachers in Colleges and universities can learn about the latest sports information through the module, and at the same time, it can also watch all kinds of large-scale sports events. Schools can also use this module to release the latest relevant school sports information.

- Physical education teaching module: sports teaching module is the core module of college sports multimedia network teaching platform, the main function of the module is to display and assist the teaching process of college physical education. Which course the module contains the introduction, electronic teaching materials, teaching lesson plans, multimedia network courseware, live broadcast teaching, teaching videos, course resource collection sub modules. Through the physical education teaching module, the teacher will teach the information resources to edit and upload, students can learn through this module for the physical education curriculum, independent of sports learning. With the help of the multimedia network courseware, we can also make the multimedia animation display of the higher degree of difficulty in the course of physical education, so as to make the students understand and grasp the action essentials better.

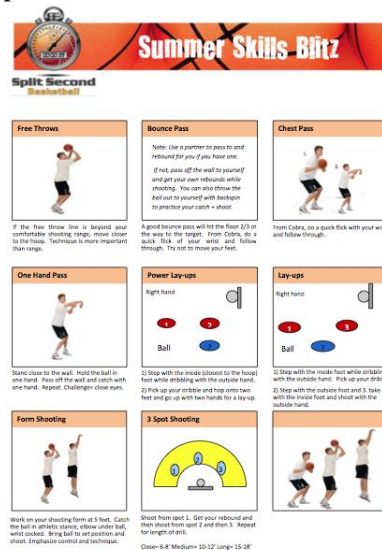


Figure 6. Online Basketball Teaching Demonstration

- Real time communication module: one of the characteristics of multimedia network teaching is the real-time communication technology. Multimedia network teaching platform has a very strong function of information resources sharing. The timely communication between teachers and students is conducive to the smooth progress of the teaching of physical education. In traditional PE Teaching of colleges and universities, as the medium of instruction to the class as a unit, a larger number of students, communication between teachers and students have a certain degree of control, and multimedia network teaching platform for students and teachers online interaction can be achieved. Multimedia network teaching technology support, can allow students and teachers to achieve remote face to face communication. In this way, we can improve the

interaction between teaching and learning, improve the teaching level and teaching efficiency. Table 1, shows the comparison between teachers and students under the traditional physical education teaching mode and the mode of multimedia network based teaching platform.

**Table 1. Comparison of Teaching Platform Model**

Teaching model	Teaching relationship	Corresponding relation
Traditional teaching mode	Directly, face to face	One to many
Multimedia teaching mode	Indirectly	Many to many

#### 4.3. Multimedia Teaching Ability of Physical Education Teachers in Colleges and Universities

For the understanding of multimedia and network assisted teaching necessity, PE teachers also show different attitude. The results of the survey Table 2, showed that 68.57% of the teachers think that multimedia teaching is very important, is a necessary means of physical education, each teacher should master. In addition, up to 34.29% of the teachers think that network teaching is not necessary. In contrast, PE teachers on simple multimedia aided teaching master degree is much higher than the application of network aided teaching. Therefore, teachers accept the network aided teaching the new teaching means there exist certain differences. In this respect, understanding of normal college PE teachers are higher than other schools, which may be related to the school culture target. The normal universities pay more attention to the demonstration and teaching effectiveness. High level courseware cannot do without making a good software, according to the survey, there are 8 2.86% of the physical education teachers can skilled use of PowerPoint courseware for multimedia aided teaching and 11.43% of teachers can skilled application of PowerPoint, author ware and flash and a variety of software making courseware for multimedia aided teaching. Even though, strictly speaking, PowerPoint not real multimedia authoring tool, but it can also be support for video, audio, images, animation and other multimedia elements, and the operation is simple, the effect of courseware is also good, can basically meet the general teaching courseware making. Therefore, the making of multimedia teaching courseware is not restricted multimedia aided teaching an important factor in the popularity of sports teaching in Colleges and universities.

**Table 2. The Cognition of Multimedia in College Physical Education Teachers**

Survey content	A	B	C
Multimedia teaching attitude	0% unnecessary	31.43% more important	68.57% must master
Understanding of network teaching	34.29% not necessary	54.29% is more important	11.42% must master
Multimedia software	17.14% will use PPT	17.14% simple to use PPT	11.43% will use a variety of software
Courseware source	8.57% copy others courseware	62.86% independent making courseware	28.57% to process others courseware

From teachers to survey the situation (as shown in Table 3), 60% of the teachers think limit yourself without the use of multimedia and network teaching the main reason is less fixed multimedia classroom, no multimedia teaching places. In addition, interview survey of PE teachers in Colleges and universities is generally believed: leaders should pay more

attention to it and multimedia assisted teaching effect of application is the impact of the important problem of Multimedia Assisted Teaching.

**Table 3. Reasons for Restricting the Use of Multimedia and Network Assisted Instruction**

Factor	Proportion
Own computer level is limited	29.10%
The quantity of multimedia classroom is insufficient.	60.57%
Leadership does not pay attention to multimedia	2.86%
Other	8.57%

## 5. Conclusions

Under the new environment for teaching, different from our traditional classroom model means changes in many aspects, especially in the new curriculum implementation process, the advantages of network teaching is increasingly being used, but many teachers of the operation is not very skilled, the play and there is a big gap between the integration design of teaching, students in the learning process to adapt to the new learning methods. In this case, the interactive multimedia network teaching platform, users should be the breakthrough: has the brand-new teacher view, student view teacher in the interactive multimedia network teaching platform is the organizer of the study, it is necessary to meet the challenges of multiple roles; students is always the master of learning, how to give full play to the students in the network environment initiative requires teachers in the teaching design and platform integration pay more attention to the students' attention, were used to induce the appropriate. Qualified for the ability of network and multimedia technology, we now with network and multimedia technology, teachers need to skilled these technology operation ability, to have the idea of good teaching design and network design. In addition, teachers should be good at selecting information sources, for the teaching of the reasonable choice and curriculum design task. The use of interactive multimedia network teaching platform will bring great benefit to our teaching, but still need we based on the reality of the situation to continue to find the problem, to solve the problem, really give play to the advantages of interactive multimedia network teaching platform, bring new vitality for our teaching.

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## Authors



**SUN Liwei**, (1981.9) Tongliao, Inner Mongolia, China, Current position,grades: the lecturer of Sports Department, Xi'an Aeronautical University, Xi'an,China. Scientific interest: Theory of Sports Pedagogy and Training. Publications: more than 8 papers published. Experience: He has teaching experience of 12 years, has completed four scientific research projects.