





Research on the Construction of a College Physical Education Training Platform Based on Collaborative CAD and Multimedia Network

Shi Ming¹ and Liu Zhirui^{2*}

^{1,2} Harbin Sport University, Harbin, Heilongjiang, 150090, China, shiming33211@163.com

Corresponding author: Liu Zhirui, liuzhirui2024@163.com

Abstract. In recent years, with the vigorous advocacy of quality education, physical education activities in higher vocational colleges continue to derive. There are many novel teaching methods, and training task teaching is one of them. As the new force of innovation and entrepreneurship in colleges and universities, students play an essential role in promoting and developing projects. A sports entrepreneurship training platform is a new idea for reforming the physical education curriculum, which combines campus competitive sports, group sports, innovation, and entrepreneurship to form a circular teaching platform system. Multimedia teaching is the product of multimedia technology and its application in teaching, and it is a way for multimedia teaching to make full use of the network to spread. This paper aims to analyze and study the physical education practice in colleges and universities based on multimedia networks. The research method of this paper is to establish the model diagram, algorithm formula, and corresponding data diagram to study and analyze it. Through the research of this paper and the analysis of the research results, in the future, college physical education training will have specific development and promotion under the guidance of multimedia networks.

Keywords: Multimedia network; Research on physical education in colleges and universities; Collaborative CAD; Physical education training platform

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1 INTRODUCTION

In college education, network education resources play an essential role, which can make college education not stick to the traditional teaching mode, keep pace with the times, and have unlimited possibilities. In a sense, the network of educational resources of colleges and universities based on multimedia technology can help teachers break through the limitations of previous classroom content in classroom teaching. To some extent, they can break through the time and space

limitations of the classroom by giving lectures in more diversified forms of expression so that their time and space can be extended. Although multimedia and network technology can significantly help education and teaching, they also require higher multimedia and network management requirements. Schools need to innovate teaching ideas not only to improve students' comprehensive quality but also to enhance their innovative and entrepreneurial ability and, at the same time, to ensure a healthy body. Physical education is a course that can release students' nature most among all disciplines, and it is also a vital subject at present. In sports activities, students can strengthen their physique and develop an optimistic attitude and character. Under the condition of multimedia networks, students can not only get a lot of information from various media, explore this nonlinear information in their customary way but also express their views in various media ways. Because of its image and transformation, multimedia makes people who receive education and training more able to concentrate and improve efficiency [5]. CAI system is not only a computer but also a teaching system. For students, it is a learning environment. For teachers, it is a tool for teaching and guiding students to learn. For administrators, it can be used to collect and manage learning data. The components of the CAI system are the CAI teaching environment-computer learning system (hardware system+software system) and CAI teaching software reflecting teaching content and teaching process. The physical health level of college students has been declining yearly in the last 20 years, and the situation is grim. It has been found that college students ignore physical exercise besides irregular work, rest time, and an unreasonable diet. How to arouse students' sports enthusiasm through extracurricular activities has become the primary problem in higher education. The latest development is the emergence of modern information technology represented by multimedia networks and its corresponding teaching and development technology. Multimedia systems, with their advanced technology and powerful functions, have been rapidly developed and applied in teaching, representing the development direction of modern teaching technology [16].

Reasonable innovation of physical education in physical education activities in higher vocational colleges. Learning sports benefits, as a course combining theory with practice, and practice occupies a large proportion, can improve the effectiveness and effectiveness of physical education teaching through training. The task-based teaching method organically integrates practical training, practical operation, practice, and task-based teaching methods and has made outstanding contributions to the innovation and development of physical education. In teaching application, it is of great value to study practical training teaching methods in physical education to better apply practical training task teaching methods in college physical education. Integrating Collaborative CAD presents significant potential for establishing a heightened and impactful educational experience. By blending these visual dimensions, the platform provides a comprehensive method for physical education, merging conventional 2D depictions with the added depth and lifelike qualities offered by 3D imaging. This fusion enhances the educational content and delivers a more captivating and user-friendly platform for students and educators.

This paper uses a variety of research methods to analyze and study it. In the research on multimedia networks, the corresponding model diagram and algorithm formula are established for analysis and study. In the research on physical education training in colleges and universities, several data graphs are established to analyze and understand them.

The innovation of this paper:

1. This paper uses various methods to analyze the research object.
2. the argumentation method is used to study and analyze the research.
3. In this paper, the multimedia network is studied and integrated with college physical education to analyze and study.

2 RELATED WORK

Practice training in colleges and universities cultivates students' essential qualities and comprehensive professional abilities, integrating students' knowledge, skills, and attitudes. It is mainly realized through comprehensive homework, design, simulation training, practice, and other teaching activities. In practice training, we should consider the law of knowledge, skills, and attitude migration, transformation, and integration. Innovation and entrepreneurship in colleges and universities provide welfare policies and benefits for college students. However, in the actual development stage, the problems of innovation and entrepreneurship in physical education institutions manifest in insufficient cognition, lack of entrepreneurial motivation, lack of entrepreneurial experience and practice, entrepreneurial opportunity and entrepreneurial field, etc. At present, with the development and integration of multimedia computer technology and network communication technology, the CAI teaching environment tends to multimedia networking. In contrast, resource databases, the mainstream of platform and humanization software development, make CAI teaching software change from courseware to integrable ware.

In the research, Chen Y thinks that teaching language skills should include explaining skills, etc., which also conflict with introducing skills and should be eliminated. Teaching skills are not easy to evaluate, so it is suggested that they should not be used as research indicators [2]. Therefore, the above six indicators that do not meet the specifications are excluded: design skills, language skills, teaching evaluation skills, writing on the blackboard skills, contingency skills, and speaking skills. Liu W thinks hypermedia is a kind of external associative memory, and technology helps it organize and acquire information. Hypermedia is the integration of computers and multimedia, which can produce interactive and nonlinear hyper-environments and represent the interactive development direction of multimedia. Sometimes, we directly understand hypermedia as interactive multimedia [11]. Virtual reality is a higher level of multimedia to interactive development, and it is the final development trend of multimedia technology. Zhang Zhan Ling, PengHaiyun, and WanJiguang think that as long as the campus network can be used to apply various multimedia teaching facilities and information systems, the teaching effect of multiple subjects can be improved [19]. However, high operation, maintenance, and management requirements exist because the campus network environment is highly complex. Once multimedia network management is neglected, the stability and security of the campus network will be difficult to guarantee, and the application of various multimedia teaching facilities and information systems in education and teaching will inevitably be directly affected. Modi J N put forward the microteaching training mode and the "psychological-behavioral" mode of teaching skills training, which were advanced training modes at that time, provided a theoretical basis for the training of teaching skills, and could be used for reference in the training of physical education teaching skills [12]. Zhi-Jian L. I. and Tian B. put forward the concept of an intelligent hypermedia teaching system. The so-called intelligent hypermedia is an intelligent information processing technology formed by combining artificial intelligence technology with hypermedia's information organization and management. In the intelligent hypermedia teaching system, the ICAI module can use the friendly interface provided by hypermedia to stimulate students' learning interests and motivation. At the same time, it can also use hypermedia to give the students illustrated information [20]. Xia L, School W B requested to study. Such passive learning is not conducive to students' development. The network teaching platform is a modern teaching means and an important carrier in physical education classroom teaching. It can fully reflect students' dominant position in the physical education classroom, significantly improve their interest in physical education, and exercise their strong physique [17]. D Wang proposed targeted solutions. For the problem of data loss, we can set up a particular backup server and, at the same time, take the backup server as the center to back up all application systems and information uploaded to the server platform in a centralized way to ensure that all kinds of essential data can be quickly recovered after being lost [14].

3 MULTIMEDIA NETWORK RESEARCH

3.1 Multimedia Network System and Teaching Research and Analysis

Although the emergence and application of multimedia in teaching has not been long, due to its powerful functions, many users have developed and applied it rapidly, leading to various teaching modes based on multimedia networks. It is the inevitable result of the development of interactive multimedia network teaching. Generally speaking, multimedia is only the combination of various media, which is the linear combination and display of different visual and auditory components, and its interactivity is poor, so it isn't easy to meet the needs of complex teaching interaction in the teaching process [15],[9]. With the deepening of multimedia network teaching, multimedia will inevitably develop in an interactive and nonlinear direction, and its direct initial result is the emergence of hypermedia and virtual reality technology. On the one hand, the application of multimedia network technology in school education has provided great help for education and teaching; on the other hand, it has also brought about the campus network security problem, which can not be ignored. The campus environment must be open and not too strict in management. All kinds of network viruses are beginning to spread widely. Although, in most cases, the internal network can effectively prevent network viruses, the application of multimedia and network technology in schools needs to be based on relevant information systems or multimedia teaching software, and these information systems and software often have loopholes. In the research, the corresponding model diagrams are established to analyze and study them, as shown in Figure 1 and Figure 2.

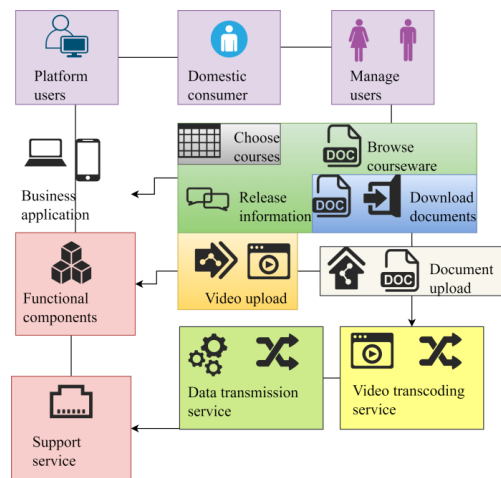


Figure 1: System model diagram.

In the era of big data, the value of all kinds of network information resources has become higher and higher, and they have been widely used in school education and teaching. Especially after the application of multimedia technology in teaching, all kinds of network resources have become essential materials for multimedia teaching design, and the overall teaching level of schools has been significantly improved. Stable operation of campus network, implementation of multimedia teaching, etc., and then gradually change the traditional application concept of multimedia and network technology, and increase the emphasis on multimedia network management and campus network security prevention [10],[18] In the research, the corresponding data tables are established to study and analyze them, such as Table 1 and Table 2.

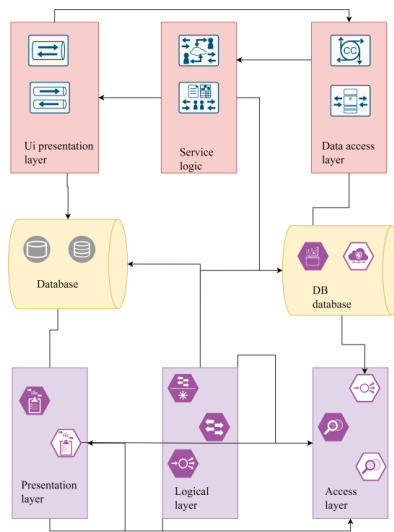


Figure 2: Model Diagram of three-layer framework platform.

<i>Cause</i>	<i>Name</i>	<i>Weight</i>
<i>F1</i>	<i>Study</i>	<i>0.53</i>
<i>F2</i>	<i>Analyse</i>	<i>0.42</i>
<i>F3</i>	<i>Medium</i>	<i>0.74</i>

Table 1: Data Sheet of multimedia analysis research.

<i>Training time</i>	<i>The corresponding time of the experimental group</i>	<i>Corresponding time of the control group</i>
	<i>Student1</i>	<i>Student2</i>
<i>7-9</i>	<i>26.9</i>	<i>56.3</i>
<i>9-11</i>	<i>21.8</i>	<i>132.4</i>
<i>11-13</i>	<i>22.9</i>	<i>53.2</i>
<i>13-15</i>	<i>21.1</i>	<i>126.4</i>

Table 2: Comparative study between the physical education platform based on multimedia network and the traditional physical education platform.

Simply put, the so-called multimedia technology is systematic in that the computer comprehensively processes various media information such as words, sounds, and images in real time. It takes the computer as the center, integrates voice, image processing technology, and audio-visual technology, and realizes the storage, transmission, processing, transformation, and retrieval of different media information by computer through the processes of analog-to-digital conversion, data compression, and decompression of audio and video signals. Multimedia classrooms, micro-classrooms, virtual classrooms, simulation labs, online labs, virtual labs, and even open, wide-area, or local online schools and virtual schools across regions, graphics, cultures, disciplines, etc., all their information is open.

3.2 Research on Multimedia Network Algorithm

With the rapid increase of networked social media, the rapid expansion of multimedia data, and the increasingly rich interactive information between people. There are mature and effective theories and methods in the research of similarity in sentences, semantic similarity, and text classification. In the whole graph network, the meeting probability of randomly walking from node A to node B is calculated, which is the similarity of the pair of nodes (a, b). At the same time, the latter adopts the symmetric walk method. Calculate the probability that nodes A and B will meet randomly when they start simultaneously. However, these calculation methods only apply to information networks with single data and do not consider the problem that the importance of the associated information between different types of nodes in multimedia information networks is different. The attribute information is converted into node correlation information for calculation, improving node similarity accuracy [3],[8]. Generally speaking, traditional calculation of video file similarity in multimedia information networks is used. The throughput of a network is its effective bit rate or bandwidth, or the throughput is the bit rate of the physical link of the network minus the internal overhead brought by various transmission technologies. In the network of packet block transmission, the data stream of streaming media will be divided into discrete data blocks, and each block will be transmitted one by one in sequence. If the network can transmit all these data blocks in the same execution time, each can reach the destination after the same delay. In the research, the corresponding algorithm formulas are established to analyze and understand them, such as formulas (1) and (2), (3), and (4) plus (5).

$$sim(u, v) = 1, if u = v \quad (1)$$

$$P_{E_i}^K = \begin{cases} \frac{[{}^r E_i]^\alpha [{}^n E_i]^\beta}{\sum_{E \in R} [{}^r E_i]^\alpha [{}^n E_i]^\beta} \\ 0 \end{cases} \quad (2)$$

According to the principle of high pheromone trace concentration and high probability on the path, the path is selected in the path set according to the probability as shown in formula (2).

$$\gamma_{ec(a,c)} \overline{vwa_c^x} \cdot \gamma\theta(a, c) \cdot sin(u, v) \quad (3)$$

$$S_{v+1}(u, c) = C \cdot \sum_{v \in r} \sum_{xc} \gamma_\ell \quad (4)$$

$$S_0(u, v) = \begin{cases} 1 & if u \neq v \\ 2 & if u \equiv v \end{cases} \quad (5)$$

In the formula, $sim(u, v)$ represents the concept of nodes meeting at a specific node. From node u to its associated node v , the probability of this step is recorded as gamma probability of this step is recorded as $\gamma_{ec(a,c)} \overline{vwa_c^x}$. Then calculate the weight proportion $\gamma\theta(a, c)$ of $\sum_{v \in r} \sum_{xc} \gamma_\ell$ in all the associated edges of $S_0(u, v)$. The total probability of node $if u \neq v$ is $u \equiv v$. The same is valid for node $S_{v+1}(u, c)$. Therefore, starting from nodes u and v , the total probability of going to the first step. Streaming media technology aims at the real-time transmission of multimedia data, which significantly determines its transmission for a long time. In this process, the status of the Internet will change at any time, which will cause the quality of the stream received by users to drop or cut off. Network-based control involves every node and element that makes up the network, from network links and protocols to routers, switches, servers, etc. Because different node types influence the video similarity calculation results differently, the subsequent results are also different. In the research, the corresponding algorithm formulas are established to analyze it, such as formulas (6) and (7) and (8) and (9) plus (10).

$$sim(u, v) = 0, if aal(v) = \Phi \quad (6)$$

$$SIM(u, v) = \gamma_{\phi(j,v)} \cdot sim(i, j) \quad (7)$$

$$\overline{\omega v_i^u} = \frac{\omega_{i,u}}{\sum_{va \in I(u)} \omega_{a,u}} \quad (8)$$

$$\sum_{vi \in I(u)} \gamma_{\phi(i,u)} \cdot \overline{\omega v_i^u} = 1 \quad (9)$$

$$\forall u, v \in G, \lim_{k \rightarrow \infty} S_k(u, v) = sim(u, v) \quad (10)$$

Functional formation function Vertex B represents the file nodes in the gris gamma, directed edges $geifaal(v)$ represents the correlation between nnode and node v . $sim(u, v)$ refers to the weight on the edge of the directed edge $\gamma_{\phi(j,v)}$. $sim(i, j)$ represents the node type set and has a mapping function for function: $\overline{\omega} \vartheta_i^u$, for each $\frac{\omega l, u}{\sum_{\forall a \in I(u)} \omega a, u}$, there is $\gamma_{\phi(i, u)}$. $\overline{\omega} \vartheta_i^u$ represents the edge correlation type set, and there is a mapping function $\forall u, v \in G$. For each edge $\lim_{k \rightarrow \infty} S_k(u, v)$, there is $sim(u, v)$. When too many packets are in the network or a part of the network, the network's performance begins to decline. This situation is called congestion. The complex problem of control is distributed to each layer through hierarchical control, and the layers are independent of each other, and the lower layer provides transparent services to the upper layer. Secondly, parameter negotiation and information transmission among the layers can increase or decrease the control levels according to the needs. Finally, the coordination among the layers forms a complete distributed control model [4]. Rate control predicts the current available bandwidth according to the running state of the network and adjusts the streaming media transmission rate according to the predicted value to match the available bandwidth. The main work is to predict bandwidth and adjust streaming media rates. Each layer is transmitted through a channel, and the receiving end determines the number of receivers according to the network conditions. At the same time, each layer's sender also determines its sending rate according to the network conditions.

4 RESEARCH ON PHYSICAL EDUCATION TRAINING PLATFORM IN COLLEGES AND UNIVERSITIES

4.1 Research and Analysis of Physical Training in Colleges and Universities

The teaching application of traditional theoretical courses can refer to students' achievements, but due to the particularity of physical education, the teaching application of physical education courses must be carried out through investigation and research. The task-based teaching method highlights the dual teaching effects of practical teaching methods and task-based teaching methods and integrates them, thus evolving into practical task-based teaching methods. The information collected from the students' investigation and research is not only the most comprehensive but also the most accurate information. The object of education is the students, and the student's teaching experience determines the success or failure of the application of practical task teaching methods in teaching [6]. The task-based teaching method is the organic integration of practical and task-based teaching. It integrates the two methods, draws on each other's strong points, pays more attention to practice, training, operation, and tasks, conforms to the curriculum characteristics and actual teaching needs of physical education in higher vocational colleges, and can skillfully distribute teaching contents to specific links to highlight students' autonomy in physical education classes. The practical task teaching method in physical education in higher vocational colleges is a subversion of the traditional teaching form. It completely changes the traditional teacher's explanation, students' line-up and teacher's exercise, and students' imitation. Teachers leave students more time for independent study and cooperative inquiry and take the task as the driving force to quickly master sports skills, improve learning efficiency, and strengthen the training effect. In the research, the corresponding data graphs are established to analyze them, as shown in Figure 3, Figure 4, and Figure 5.

The data graph shows that about 43.63% of college physical training research involves data analysis and processing. Contemporary cognitive psychology studies show that the acquisition of any information can only be achieved through the subject's different levels of physiological and psychological transformation of the input information.

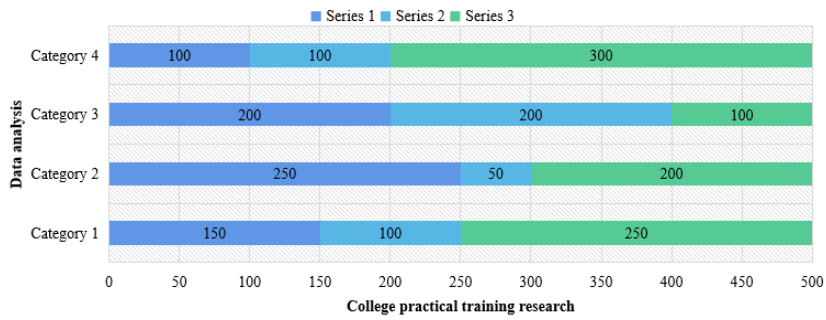


Figure 3: Analysis of practical training research in colleges and universities.

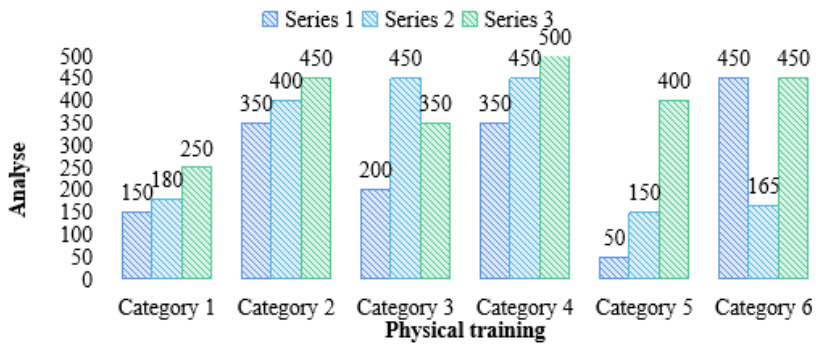


Figure 4: Data map of sports training research and analysis.

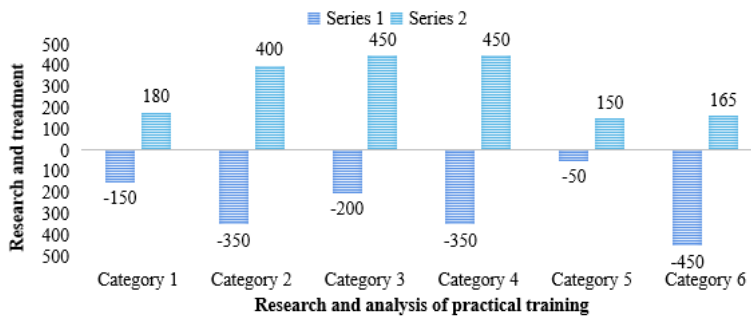


Figure 5: Data map of training research analysis and processing.

First of all, we should accept the external signal, transform the physical energy of the signal itself into the nerve impulse of the primary sensory organ, and transmit it to the brain center to have a perceptual effect on the external signal. First of all, we should be aware of the existence of the signal, feel the signal, and log in. Secondly, it is necessary to decompose and confirm the

transmission media and understand the meaning of the information carried by the media according to the existing knowledge structure. In the teaching process of physical education in higher vocational colleges, because physical education itself has a strong practicality, teachers should pay more attention to students' practical training process in physical exercise when applying practical task teaching methods, carrying out physical education activities according to the specific syllabus, school conditions, hardware facilities, students' actual physical foundation, learning ability, and learning needs, and pay attention to every detail and process of students' physical activities, to improve students' health through continuous practical training. The construction of the training platform mainly includes four modules: professional technology, marketing planning, operation and management, and assessment [13],[1]. In the design process of the platform, four modules are taken into account, providing shared space for groups with different professional directions and sports levels, mobilizing all resources compatible with the four modules of the school, and forming the integration and sharing of resources. In the complex campus network environment, facing all kinds of network security problems, schools also need to establish a perfect network security management system as soon as possible, provide clear guidance and norms for multimedia network management, and realize effective responses to network security problems such as hacker attacks and network viruses. As far as the specific teaching situation of college teachers is concerned, teachers' knowledge is solidified. At the same time, the knowledge in books tends to solidify, leading to teachers' unchangeable teaching process and challenges to innovate. However, through the Internet, teachers can learn all kinds of new knowledge and the most cutting-edge knowledge in their courses. Therefore, when browsing or watching related videos, teachers should save or download them and present the texts and videos to students through multimedia technology so that students can have a deeper understanding of related courses and learn related knowledge, constantly improve their professional level and ability, and promote their further development.

4.2 Research and Analysis of College Physical Training Based on Multimedia Network

With the continuous development of modern information technology, multimedia technology has been popularized in primary and secondary schools, and now it has become a common teaching method. Multimedia technology can innovate traditional classroom teaching, break the restrictions of books, blackboards, and chalk, make the teaching contents appear more colorful, and improve students' learning. The application of the task-based teaching method in physical education should start with the adjustment of teaching form, changing the traditional physical education teaching form of "students marching in line, teachers preaching" and "students visiting and teaching drills" into one in which teachers only introduce and preach the key skills for no more than five minutes. The rest of the time is for students to watch high-level international and domestic videos and explore their time. In self-exploration, students can discover the secrets of movements and skills. In the practice task teaching mode, physical education teachers in higher vocational colleges should pay attention to the task as well as the practice process of students. Before carrying out physical education activities, teachers need to clarify the training tasks, formulate reasonable and appropriate training tasks for students, and encourage students to be more active in physical education training. Moreover, when they finish the training tasks, they can fully experience the satisfaction of success and feel a sense of accomplishment. In the construction process of a circular sports training platform of "competition-group-entrepreneurship," platform project, platform module, and module objectives and tasks are the foundation of platform operation. The platform project determines the direction, and the platform module refines the objectives, and module objectives and tasks further differentiate the objectives. Collect, feedback, and summarize information, supervise, and optimize the training process. Through all-around monitoring of platform activities, we can find all kinds of problems in the platform's running process in time, discuss the most effective solutions in the platform's regular meetings, and form a phased

From the data graph, it can be seen that physical training in colleges and universities has a correlation with multimedia networks, and the influence is as high as 68.35%. In the process of P.E. classroom teaching in colleges and universities, students are the subjects who need to be taught knowledge, but also the subjects who need to develop actively. Every student is independent, has the potential to know the unknown, and is also a practitioner to satisfy his curiosity. Therefore, every P.E. teacher needs to understand the personality characteristics of each student fully. Moreover, in study and life, he should know the students more comprehensively and comprehensively to guide students' P.E. study. In college physical education classroom teaching, there are still many outstanding problems in the application of multimedia information technology. If we want to improve the quality of college physical education classrooms and promote students' growth faster and better, we must take measures to solve these outstanding problems. Make efficient Internet information technology fully integrated with physical education teachers' classrooms and improve students' learning quality to the greatest extent. Physical education teachers in colleges and universities need to change themselves in the era of rapid development of the Internet. Understand the application of multimedia information technology deeply, master its development background skillfully, and improve the importance of multimedia in the classroom by flexibly applying multimedia to show classroom teaching content and effectively improve students' awareness of physical education learning. As college physical education teachers, we need to analyze the traditional teaching methods of physical education first to achieve effective innovation and change. Students can present a more colorful physical education classroom by making full use of the science and technology of online sports education and integrating sports theoretical knowledge and practical activities. The traditional teaching mode is teacher-centered, which, to a great extent, imprisons students' personalities and limits their development space. As far as multimedia network teaching is concerned, the implementer of teaching is no longer the owner and imparting knowledge in traditional education but a designer who can master all kinds of knowledge and media skillfully and tailor the learning system environment for learners. More physical education teachers in colleges and universities can play freely and create space for new classroom teaching methods. Teachers can also learn about their shortcomings in teaching so as to make improvements in future teaching according to the suggestions put forward by students. Not only that, the physical education teaching mode in many colleges and universities has changed from the previous simplification to the present diversity and modernization, which also requires physical education teachers to keep pace with the times and not stay in the past, and to make higher demands on themselves according to the latest form, which is not only responsible for students but also for their profession as teachers.

5 CONCLUSIONS

All in all, the physical education curriculum has made a breakthrough under the development of the new curriculum reform. Making full use of Internet information, combining it with the teaching curriculum to optimize the course development stage, and constantly enriching the teaching classroom also enables students to have a high interest in physical education, develop good sports habits, and thus have a strong physique. Although the traditional teaching mode is influenced by many factors, such as teachers' knowledge level, teaching ability, and students' responsiveness, its teaching effect is uneven, but it is an indisputable fact that this teaching mode has trained a large number of talents for the country. With the deepening of multimedia network teaching, the direct result of multimedia's interactive and nonlinear development is the introduction of hypermedia and virtual reality technology. Based on cognitive science and thinking science, integrating artificial intelligence thoughts and technologies into CAI can make CAI more humanized and provide a heuristic learning environment for students to learn individually, which is the objective requirement of multimedia network teaching. In physical education teaching in higher vocational colleges, teachers' application of practical task teaching method not only conforms to

the characteristics of physical education teaching but also meets the needs of higher vocational students with physical skills. Implementing a practical training task teaching method in college physical education classes has achieved good results. Results from both theoretical research and empirical analysis have proved this point. In the empirical study, we found a problem in implementing practical task-based teaching methods; some poor students tend to centralize with backward results. Although the total average results show that practical task-based teaching has been significantly improved, the tendency of centralization with backward results of these poor students cannot be ignored. The network teaching resources developed based on multimedia technology in the classrooms of colleges and universities have attracted much attention, and all sectors of society also value them. This is not only in line with the development trend of the education industry but also the inevitable outcome of integrating the education industry and information technology. Only by using these network resources can teachers and students face up to the selection process, neither blindly using them nor being partial. They should constantly sum up the experience in practice and improve how network resources are used to teach better and learn.

Shi Ming, <https://orcid.org/0009-0006-9046-7297>

Liu Zhirui, <https://orcid.org/0009-0001-2695-1491>

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Research on the cultivation of ice and snow leading enterprises in Heilongjiang Province.

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