

Promotion Strategy of Multimedia Network Teaching Platform in College Physical Education Teaching

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ABSTRACT

At present, the development of distance education is being vigorously promoted all over the world, and the lifelong, globalised and highly efficient nature of education is driving its rapid development in the world. Because there are different ways to achieve this, so, according to the characteristics of physical education discipline, this article on how to promote multimedia network teaching platform in university physical education teaching, using multimedia network teaching platform, to achieve the complementarity of modern teaching and traditional teaching. The article analyses the theory and development background of multimedia network teaching, and analyses its application in university physical education teaching, and gives a detailed introduction to the use and planning of each module. On this basis, it discusses the design principles of the multimedia network teaching platform for physical education majors, and gives an overall framework and model of functional modules. This study has good implications for university physical education teaching practices.

KEYWORDS

Multimedia Web-Based Instruction, Physical Education, Physical Education Web-Based Education, Platform Design

In today's world of economic globalization and rapid development of science and technology, computer information technology, communication technology, internet technology, and visual multimedia technology are changing rapidly, and they have penetrated into our daily life (Dobrica et al., 2023). The emergence and development of new technologies have brought convenience to human life and gradually changed the traditional life of human beings. Due to the rapid development of computer information technology and multimedia network technology, people have entered a new era of knowledge (Slimani et al., 2024). A country's comprehensive national strength and international competitiveness depend on the reform and development of education and the innovation of scientific and technological knowledge. The question of how to use modern science and technology to improve modern education is an eternal problem (Edler et al., 2023).

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By integrating online teaching platforms in colleges and universities effectively with the multimedia resources of sports websites, multimedia online teaching platforms can provide students with a more comprehensive and attractive learning experience. (Li & Liu, 2024). This method realizes the complementary advantages of physical education teaching and promotes a more dynamic and interactive educational environment.

Generally speaking, the application of modern science and technology in education, especially through multimedia network teaching platforms, has great potential for changing traditional teaching methods (Sofi-Karim et al., 2023). This can improve the learning experience and promote the overall progress of a country in the global field.

In physical education (PE) teacher education (PETE), although there are strong theoretical suggestions regarding how to educate PETE graduates to use technology effectively to strengthen teaching and learning, there is a lack of shared knowledge on the pedagogical and technological practices of online teaching and learning in PETE (Gawrisch et al., 2020). To this end, we suggest that a key goal is to combine the multimedia resources of sports websites with the online teaching platforms in the educational environment. This also includes exploring how these resources can supplement and enrich physical education and provide students with a more comprehensive learning experience.

This paper shows and solves the limitations of multimedia network teaching platforms in physical education by summarizing and analyzing how the multimedia network teaching platforms break through traditional physical education in colleges and universities, so that the multimedia nature of the network teaching platform in colleges and universities and the resource information of sports websites can be effectively and reasonably integrated (Li & Liu, 2024). This aims to realize the complementary advantages of sports teaching. This study uses the immediacy, interactivity, and presentation of the multimedia network to allow the majority of in-school and out-of-school sports enthusiasts to be counselled and assisted online. The purpose of this study is to strengthen physical education by using the advantages of multimedia technology and online teaching platforms (Miao et al., 2023), so as to improve educational achievements and provide a more attractive and dynamic learning experience.

Addressing potential problems related to the research topic helps to provide a comprehensive understanding of the study's scope and objectives. One potential problem is the resistance or lack of familiarity among educators with integrating multimedia technology into physical education teaching. Overcoming this hurdle requires addressing training needs and ensuring adequate technical support. While multimedia resources offer opportunities for enriched learning experiences, there may be disparities in access to technology and internet connectivity among students. Ensuring equity in access to resources and addressing digital divides is crucial. The article is intended for educators, researchers, policymakers, and practitioners in the fields of education, technology integration, and physical education. It aims to provide insights, evidence-based recommendations, and practical strategies for leveraging multimedia technology to enhance teaching and learning experiences in college-level physical education programs. The purpose of this study is to answer: What are the barriers to implementing multimedia technology in physical education, and how can these be addressed? What are the perceptions and experiences of educators and students regarding the use of multimedia resources in physical education, and how do these impact learning outcomes?

This study aims to solve several important aspects of the integration of modern education and technology:

1. Improve the educational effect: By exploring the integration of multimedia network teaching platform and physical education, this study aims to improve the effectiveness of educational practice. This includes using modern technology to create a more attractive, interactive, and personalized learning experience for students.
2. Meet the needs of digital aborigines: Today's students, often referred to as digital aborigines, grew up in a world saturated with technology. This study recognizes the importance of integrating multimedia technology into educational practice to meet the needs and expectations of these students.

3. Improve access to resources: This study aims to combine the multimedia resources of sports websites with online teaching platforms and expand access to various educational materials and resources. This can enrich the learning experience and provide students with diversified perspectives and contents related to sports (Lu, 2023).
4. Promoting lifelong learning: By providing online consultation and help for sports lovers, this research helps to promote lifelong learning opportunities. This goes beyond the traditional classroom environment and supports individuals to pursue their interests and passions outside formal education.
5. Promoting educational innovation: This study promotes educational innovation by exploring new methods of teaching with technology. By breaking through the limitations of traditional physical education methods, educators are encouraged to embrace change and adapt to the changing needs of students and society (Calderón & MacPhail, 2023).
6. Promoting national competitiveness: This study emphasizes the importance of education and technological innovation to improve a country's competitiveness on the global stage. By improving educational practice and achievements, it helps to cultivate skilled labor and improve the country's position in the global knowledge economy.

Generally speaking, this research has the potential to promote positive changes in education, technology integration, and lifelong learning and ultimately benefit individuals, educational institutions, and all of society.

This paper discusses how to promote multimedia network teaching platforms in college physical education teaching and hence realize the complementarity between modern teaching and traditional teaching. It analyzes the theory and development background of multimedia network teaching, analyzes its application in college physical education teaching, and introduces the use and planning of each module in detail. On this basis, the design principles of multimedia network teaching platforms for physical education majors are discussed, and the overall framework and functional module model are given. This study aims to enlighten college physical education teaching practice.

LITERATURE REVIEW

Makasaranondh et al. (2010) wrote: Using the method of network survey, the current situation of the construction of modern network courses for physical education majors in China was analyzed. The analysis pointed out that “the construction of network courses for physical education majors is still in its infancy, and the number of network courses offered is relatively small, and the construction of network courses is obviously distributed regionally” (Montiel-Ruiz et al., 2023, p. [X]). It also pointed out that the websites of various colleges and universities are rich in learning resources, but they are not organically combined with the course contents, and the overall design level of web pages and the evaluation and feedback links for problems need to be improved. Lu ([date]) used the questionnaire survey method to investigate the backbone teachers of multimedia technology in physical education in 57 colleges and universities in 27 provinces (Zhang & Chen, 2022). It was found that the use of multimedia network platforms for the translation teaching of English majors is far less than that of other subjects in colleges and universities. It is pointed out that it is necessary to improve teachers' knowledge and mastery of multimedia network teaching methods and strengthen the application and construction of multimedia network teaching in physical education on campus (Dou, 2023).

Yue (2022) uses the methods of literature, survey, comparison, and expert consultation to elaborate on the basic characteristics of network teaching and the significance of network teaching in higher education sports. In the article, it was found that the development of multimedia network teaching will change the traditional system centered on athletics, and the teaching work will be more interesting and of practical value. The direction of physical education teaching will be towards the direction of integration and technology and will be people-oriented (Lan, 2023).

Ren (2024) explores the advantages and disadvantages of traditional sports teaching methods and elaborates on multimedia network teaching under the sports teaching methods. Li and Wang (2021) analyzed in detail the technical application of multimedia network teaching in physical education through modern computer technology: computer-assisted instructional technology (CAI), webpage production technology, three-dimensional animation and virtual reality technology, and streaming media technology. They also point out some advantages and shortcomings of modern constraints of network teaching in the application of physical education. Zuo and Aquino (2023) proved that the integration of computer-aided instruction (CAI) had a positive impact on cognitive understanding, memory retention, and the bridge between physical education theory and practical knowledge. The challenges included limited technical proficiency, insufficient training, access to reliable technology, time constraints, and difficulties in content customization. The identified challenges highlighted the need for targeted intervention measures. The proposed strategy provides a comprehensive plan for the effective use of CAI and creates a supportive and technically equipped learning environment. By analyzing the experimental data, Li and Liu (2023) conclude that, compared with other learning methods, deep learning has stronger advantages in the application research of multimedia data processing technology. Multimedia data processing technology is obviously superior to data mining technology and data compression technology. At the same time, multimedia technology has been widely used in various fields.

Means et al. (2013) conducted a comprehensive meta-analysis of research on online learning across different educational settings. The study analyzed data from over 1,000 empirical studies and found that students in online learning environments performed better, on average, than those in traditional face-to-face instruction. Additionally, the analysis revealed that blended learning approaches, which combine online and face-to-face instruction, tend to yield the most significant learning gains. Multimedia components, such as videos, interactive simulations, and virtual experiments, were frequently cited as contributing factors to the effectiveness of online learning platforms. A meta-analysis conducted by Tamim et al. (2011) examined the impact of technology integration, including multimedia tools, in K-12 education. The study synthesized findings from 92 research articles and concluded that technology integration positively influences student achievement across various subjects and grade levels. Specifically, multimedia tools were found to enhance student engagement, motivation, and understanding of complex concepts, leading to improved learning outcomes.

COMPONENTS OF MULTIMEDIA NETWORK TEACHING IN HIGHER EDUCATION SPORTS

As mentioned in the previous definition of college physical education, physical education is an educational process, and like other courses, it is a two-way activity of education and learning (Murtagh et al., 2023). It is a purposeful, planned, and organized process of education, upbringing, and development under the guidance of a teacher, mainly through the acquisition of indirect knowledge. However, physical education is also very different from other disciplines, because it is based on the psychological activities of teachers and students and the transfer and mastery of knowledge, skills, and technology through physical activities (Cronin et al., 2023). Using this feature, multimedia computer networks can make full use of the advantages of a large number of multimedia educational information resources, make physical education activities change from traditional education mode to online education mode, and gradually establish a complete multimedia network education platform. On this basis, an online sports education model based on virtual reality is proposed (Sun & Yuan, 2024).

Physical Education Teaching Objectives

Educational activities, whether conducted online or in a traditional environment, must have clear goals. The purpose of teaching is to achieve specific educational achievements consistent with the national education policy and the overall goal of school sports. At this stage, the focus is on teaching

students knowledge related to physical education, health care, and sports technology and skills. The purpose of doing this is to improve students' physical qualities, improve their health, develop physical skills, and establish good moral qualities.

Incorporating these aspects into education will not only promote students' overall health but also achieve a broader goal of strengthening multimedia online education (Ramzan et al., 2023). By integrating physical education and health-related concepts into an online learning environment, educators can promote the overall development of students and promote comprehensive education methods.

Network Technology Infrastructure

In the field of multimedia web-based education, it is crucial to establish a solid foundation of network technology. This foundation is affected by various factors, such as the Internet (Yan & Liu, 2023), wide area networks, local area networks, university campus networks, the performance of different hardware facilities, and the efficiency of information transfer. By using these factors to create a favorable environment, multimedia network education can provide better advantages than traditional physical education (Xing & Qi, 2023).

Multimedia education can provide various forms of physical education teaching methods by integrating network technology, especially with the characteristics of learning mode. This helps to implement innovative teaching methods and provide attractive educational content through digital platform (Xing & Qi, 2023). In addition, it also promotes interactive learning experiences, personalized teaching, and seamless dissemination of information in geographically dispersed locations.

Generally speaking, the integration of multimedia and network technology in education provides new possibilities for strengthening the learning process and provides a dynamic platform for educators and learners to collaborate, share knowledge, and participate in interactive educational activities.

Relationships Between “Human” and “Machine” Roles

In multimedia network sports teaching, the relationship is between the two main subjects of *human* and *machine*: *Human* is teachers and students and the *machine* is the multimedia equipment and network equipment (Cui, 2023). The human refers to the interaction between teachers and students and teachers and the network. The machine refers to multimedia equipment and network equipment, while *person* refers to the interaction between teachers and students and between teachers and networks. In this case, teacher-computer-student constitutes a special educational relationship, and a new type of education and teacher-student relationship is established between teachers and students through the Internet. Compared with the previous education mode (face-to-face education and learning between teachers and students), the key point is that there is no complete face-to-face communication between teachers and students, but the teacher uses the Internet to transmit the knowledge he or she tries to impart, and students can use this platform to learn the knowledge published by teachers on the Internet (Sofi-Karim et al., 2023). In addition, because different regions, different schools, and different PE teachers have their own knowledge and feel the same knowledge, they can put their knowledge and experience on the Internet so that they can have more choices in their own research, thus helping them better understand and master their own knowledge.

METHODS: APPLICATION OF MODERN SCIENCE AND TECHNOLOGY IN MULTIMEDIA NETWORK TEACHING PLATFORM

CAI Technology

CAI refers to a variety of teaching and learning activities using computers. It is a means of discussing the content with students, arranging the teaching process, and conducting instructional training through dialogue (Lubis & Fithriani, 2023).

CAI provides a great, personalized learning environment for most students. With the integrated application of multimedia, hypertext, artificial intelligence, and knowledge base, it solves the drawbacks of traditional teaching methods which are single and one-sided. The use of CAI can save a lot of time, improve the quality of teaching, enhance the effectiveness of teaching, and achieve the best teaching purpose. The system includes the following:

Hardware Systems

This paper describes a computer network technology based on multimedia technology and analyzes it. The system consists of a central processor (controller and operator), memory, input devices and output devices. Common input devices include disk drives, optical disc drives, tape drives, digital cameras, scanners, video capture cards, sound cards, musical instrument digital interface (MIDI) synthesizers, microphones, modems/demodulators and network adapters, keyboards, mice, pen inputs, and so on. Common output devices include disk drives, optical disc recorders, tape drives, printers, film recorders, high-definition projectors, monitors, sound cards and amplifiers and speakers, MIDI synthesizers, modulation/demodulation, and network adapters.

Software Systems

The system includes an operating system, various courseware, a test database, teaching management system, and corresponding development and support systems. It can be seen that the focus of CAI teaching in colleges and universities at this stage should be on teaching plans, question banks, teaching management, and so on. Due to the scientific and technological development of computer hardware and mass manufacturing, the cost of hardware is gradually decreasing, making the hardware of computer-aided teaching more and more solid. At the same time, the development of different types of courseware and its supporting software is becoming more and more urgent. Therefore, it is necessary to open up all kinds of high-quality courseware and apply it to the classroom, and at the same time conduct in-depth research on its laws, so that the functions and advantages of computer-aided education can be utilized better, thus promoting its own sustainable development; this is something that everyone in every educational field must do. Adopting such a new way of education is the direction towards which educators should strive.

Using multimedia technology, teaching design can be carried out in physical education class. CAI has the characteristics of integrating various media materials such as text, pictures, animation, and sound. At the same time, it can also enhance the intensity of stimulation and strengthen people's psychological experience, so as to achieve the purpose of improving the effectiveness and teaching effect of classroom teaching. CAI courseware is suitable for personalized education, which puts students in the dominant position and has no time and space restrictions; this is why it is applied to sports multimedia network teaching platform (Kies, 2023).

Web Production Techniques

Web page making technology is the key to realize the visualization of multimedia network teaching platforms. Nowadays, there are many kinds of web page making software, each with its own characteristics. Here are some commonly used web page making software:

Frontpage Software

FrontPage was a popular web design software developed by Microsoft. While it's no longer actively developed or supported, it was known for its user-friendly interface and ease of use, making it accessible for individuals with varying levels of technical expertise (Huovinen, 2024). Given its straightforward nature, FrontPage could be a viable tool for maintenance managers and physical education teachers in colleges and universities to create and maintain physical education teaching websites. Its intuitive design and functionalities could enable them to develop informative and interactive web pages without requiring extensive coding knowledge.

However, it's worth noting that as technology has evolved, there are now many modern web design tools and platforms available that offer more advanced features and capabilities than FrontPage. Platforms like WordPress, Wix, and Squarespace provide user-friendly interfaces, customizable templates, and a range of plugins and integrations that can enhance the functionality and aesthetics of educational websites (Esteban, 2023).

While FrontPage can still be used for basic web design tasks, exploring newer web design tools might offer colleges and universities more flexibility and creative freedom in developing their multimedia network teaching platforms and physical education websites.

Dreamweaver Software

Dreamweaver supports a wide range of web technologies, including ActiveX, JavaScript, Java, Flash, and Shockwave. This versatility enables developers to incorporate various multimedia elements and interactive features into their curriculum content. Dreamweaver enables the integration of dynamic data sources, such as databases or web services, into curriculum content. This capability allows for the creation of interactive exercises, quizzes, and real-time updates, enhancing engagement and interactivity. Overall, Dreamweaver's comprehensive feature set and intuitive interface make it well-suited for realizing dynamic and interactive curriculum content in physical education. Whether creating multimedia presentations, interactive learning modules, or responsive websites, Dreamweaver provides the tools necessary to bring educational content to life.

Flash Software

Adobe Flash (formerly Macromedia Flash) was widely used for creating interactive web content, including animations, games, and multimedia presentations (Antonius et al., 2023). Flash allowed developers to incorporate vector graphics, bitmap images, sound effects, and interactivity into web pages, making it a versatile tool for various applications, including physical education teaching. Flash allows for the creation of interactive web pages where users can input information and trigger responses. In the context of physical education, interactive Flash content could include quizzes, interactive exercises, or virtual simulations of sports activities, providing hands-on learning experiences for students. While Flash was once a dominant technology for web-based multimedia content, its usage has declined in recent years due to compatibility issues, security concerns, and the emergence of alternative technologies like HTML5, CSS3, and JavaScript (Gor, 2023). However, the principles of interactive multimedia content creation and engagement that Flash exemplified are still relevant, and modern tools and techniques can achieve similar effects while addressing the limitations of Flash.

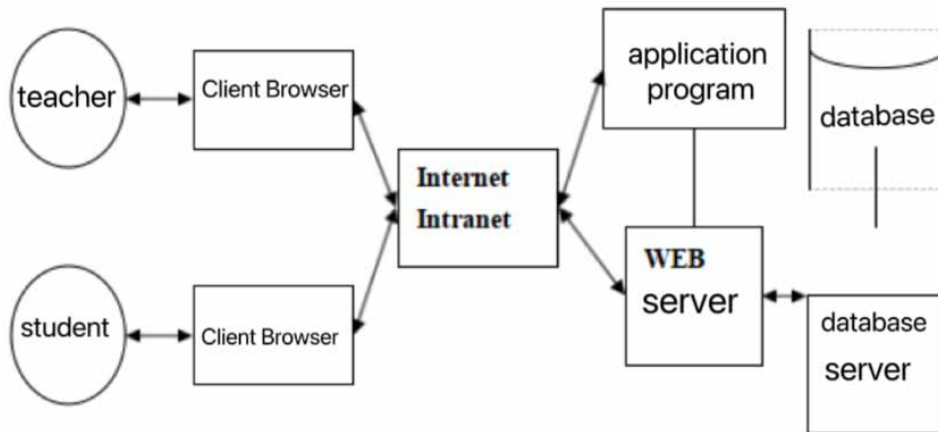
RESULTS: PROMOTION OF MULTIMEDIA NETWORK TEACHING PLATFORM IN PHYSICAL EDUCATION TEACHING IN COLLEGES AND UNIVERSITIES

Basic Structure and Working Principle

The multimedia network teaching platform adopts the latest browser/server (B/S) structure; its structure is shown in Figure 1. The characteristics of this structure are as follows: the environment applied by the client is a standardized and common web browser, and all the applications are stored on the Web server and can be downloaded directly when needed; it is easier to manage and maintain because the client does not need any special software, and when upgrading the network application, it is only necessary to update the software in the server. This structure has good scalability and openness, and the B/S structure adopts the standard transmission control protocol/internet protocol (TCP/IP) communication protocol. The school can expand the system at any time according to its own development needs.

The working mechanism of the system is that teachers and students can use their own browsers to access the multimedia web-based teaching platform, while students can connect their personal

Figure 1. Structure of Multimedia Network Teaching Platform



computer devices to a server where they can learn about physical education content, search for information about physical education resources, communicate in a timely manner between teachers and students, and upload personal data. Administrators of the multimedia web-based teaching platform and university physical education teachers are able to use their browsers to upgrade and maintain the content stored on the server, upload the latest physical education resource information to the server, and also conduct online question and answer sessions with their students to give them counselling on physical education and sports. The system consists of two parts, the Web and the database. The Web server stores the various applications of the system and implements the customer's application. When it accepts the customer's request and converts it into a database request, it interacts with the database server, and the result of the interaction is downloaded as a web page into the browser so that the user can see the result of the request. The database server stores the database and management programs required by the system, processes the database according to the requests sent by the Web server, and then transmits the processed data to the Web server.

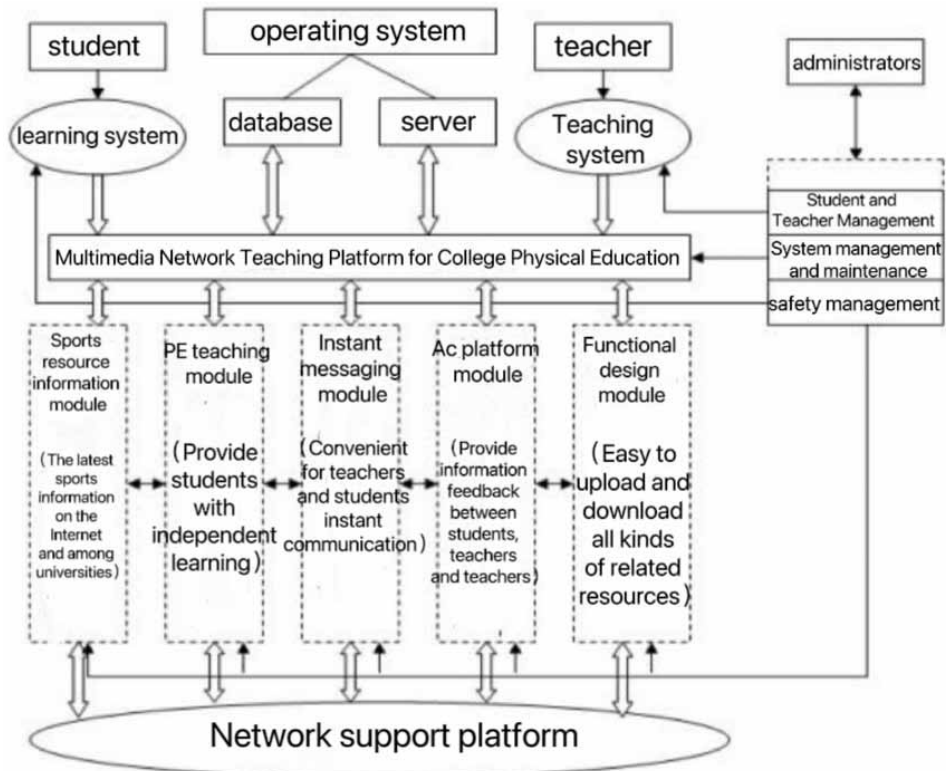
Supporting Environment Structure

The promotion of multimedia network teaching platform in college physical education teaching cannot be separated from the construction of platform environment. According to the Technical Specification for Modern Distance Education Teaching Support System and Modern Distance Education Resources Construction, this paper puts forward the supporting environment structure diagram of the multimedia network teaching platform for physical education in colleges and universities, as shown in Figure 2.

In the described system, there could be various forms of contact with external stakeholders such as sports clubs, training grounds, coaches, and sports equipment suppliers. Here's how each of these stakeholders might interact with the system:

1. Sports clubs could collaborate with the system by providing access to their training materials, resources, or expertise. They may offer specialized training programs or events that could be integrated into the platform's offerings. The platform could also allow sports clubs to recruit talent or promote their activities to students interested in joining.
2. Training grounds or facilities could partner with the system to provide access to their facilities or offer virtual tours for students. They could also provide insights into specific training techniques or programs that students can access through the platform. Additionally, the system could facilitate bookings or reservations for training sessions at these facilities.

Figure 2. Structure of the Support Environment of The Multimedia Network Teaching Platform for Sports in Higher Education



3. Coaches could contribute to the platform by offering their expertise through online coaching sessions, instructional videos, or written content. They could also engage with students through live Q&A sessions or forums, providing guidance and feedback on physical education topics. Coaches may also use the platform to recruit students for training programs or events they organize.
4. Suppliers of sports equipment could partner with the system to offer their products directly to students or educational institutions. The platform could feature an online marketplace where students can purchase sports equipment recommended by their teachers or coaches. Suppliers could also sponsor content on the platform or provide discounts to users.

Overall, the system can serve as a hub for connecting students, educators, and external stakeholders in the realm of physical education. By facilitating communication, collaboration, and access to resources, it enhances the learning experience and fosters partnerships within the sports community.

DISCUSSION

Preparation and Introduction

Multimedia network platforms are a convenient platform to reproduce physical education teaching in vivid form, which provides a good learning experience for college students. For example, in the preschool stage, teachers log in to the system to obtain permission and upload physical education teaching resources and

courseware on the physical education teaching platform to realize the sharing of physical education teaching resources. These basic teaching resources not only facilitate physical education teaching in colleges and universities, but also release teachers' enthusiasm and relieve teaching pressure to the maximum extent. At this stage, PE teachers can use instant messaging modules to send dynamic teaching courseware to college students. After obtaining physical education teaching resources, college students can choose their own time to finish their study, making the learning more satisfactory and fully displaying the effect of content introduction. The process of teaching preparation and introduction before class enables students to grasp the key points of physical education teaching fully, which can achieve twice the results with half the effort.

Specific Practice and Guidance in the Classroom

As university students have already had a preliminary understanding of the contents of physical education teaching on a multimedia network platform in the early stage, they focus on the communication and discussion of the contents of physical education teaching in the classroom, focusing on the key points more clearly. Through the communication platform, communication between students and teachers can be carried out online. Compared with the traditional boring PE classroom content, the students' experience will be strengthened by the teaching resources delivered through the online platform before the class. Further guidance around the content during the PE teaching process can usually achieve twice the effect with half the effort. The teaching practice based on a multimedia network platform makes the content more vivid, which helps the students to understand the connotation at a deeper level. Similarly, the optimization of physical education teaching content can fully mobilize the students' enthusiasm for learning and guide them to cultivate a scientific habit of physical exercise gradually.

Post-Course Scientific Evaluation and Optimization

The functional design module of the multimedia network platform has the functions of downloading and uploading. These functions enable students to access teaching resources conveniently and study independently. After being provided with login permission, students can download learning-related materials so that they can review the content and deepen their understanding after class. Students can download teaching resources and complete independent learning after obtaining login privileges. Of course, the convenience of the platform is crucial to the scientific evaluation and optimization of the content of physical education teaching after class. At the end of physical education teaching, teachers and students can communicate effectively with each other about physical education learning experience and scientific learning methods through the multiple functions provided by the communication platform module. Teachers can give reasonable and feasible learning suggestions based on students' classroom performance and final evaluation, so that the goals of scientific evaluation and optimization can be achieved after the class. Based on the feedback of the evaluation results, the teachers will optimize the use of the multimedia network platform in the PE classroom of colleges and universities, so as to ensure the effectiveness of PE teaching in colleges and universities.

By using the functions of multimedia network platform, educators can create an environment to promote active learning, cooperation and continuous improvement of physical education teaching practice.

Potentially Challenging

For students who lack reliable Internet access or appropriate equipment, access to multimedia platforms may be limited. This digital divide will aggravate existing educational inequality and put students from underserved communities or low-income families at a disadvantage. Ensuring equitable access to multimedia resources is crucial when promoting inclusive education. The variety of formats and methods of multimedia content brings challenges to the evaluation of students' learning and the effectiveness of multimedia platforms. Traditional evaluation methods may not fully reflect the complexity of learning promoted by multimedia resources. Educators must formulate innovative assessment strategies to meet the multimedia learning objectives and effectively measure advanced cognitive skills. To meet these challenges, educators, instructional designers, technicians, and policy

makers need to cooperate to design an inclusive, sustainable and effective multimedia learning environment. By overcoming these limitations, institutions can take advantage of the transformative potential of multimedia platforms to enhance the teaching experience of all stakeholders.

CONCLUSION

Through the comprehensive analysis of the working mechanism of physical education teaching platform systems, it can be clearly seen that multimedia teaching platforms based on networks have brought great benefits to both teachers and students. The management function of these platforms enables educators and administrators to manage content effectively, upload resources and conduct online courses. This not only simplifies the teaching process but also creates a collaborative learning environment where students can get personalized guidance and support from teachers. The research results highlight the potential of network-based teaching platforms to completely change the provision of physical education and provide innovative solutions for improving learning results and promoting students' participation. In China, there are obvious regional differences in the construction of multimedia network teaching platforms. In some less developed places, the number of multimedia network teaching platforms for physical education in universities is obviously much lower. The popularity of multimedia online education platforms evidences the solution to this problem and highlights the advantages of network sharing of various multimedia online education platforms, which can well alleviate this situation. As technology progresses, further research and development in this field is expected to change the educational pattern and enable educators to provide high-quality teaching in the digital age. At the same time, due to the continuous development of artificial intelligence and data analysis technology, more innovations and applications will emerge in this field.

DATA AVAILABILITY

The figures and tables used to support the findings of this study are included in the article.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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REFERENCES

- Antonius, N., Sianturi, C. F., & Tamba, R. H. (2023). Pemanfaatan media pembelajaran interaktif Adobe Flash. *Jurnal Pengabdian Kepada Masyarakat, 1*(2), 1–12.
- Calderón, A., & MacPhail, A. (2023). Seizing the opportunity to redesign physical education teacher education: Blending paradigms to create transformative experiences in teacher education. *Sport Education and Society, 28*(2), 159–172. doi:10.1080/13573322.2021.1997981
- Cronin, L., Greenfield, R., & Maher, A. (2023). A qualitative investigation of teachers' experiences of life skills development in physical education. *Qualitative Research in Sport, Exercise and Health, 15*(6), 789–804. doi:10.1080/2159676X.2023.2222774
- Cui, Q. (2023). Multimedia teaching for applied linguistic smart education system. *International Journal of Human-Computer Interaction, 39*(1), 272–281. doi:10.1080/10447318.2022.2122111
- Dobrica, V., Duško, L., & Lj, V. S. (2023). Use of information technologies in higher education from the aspect of management. *International Journal of Cognitive Research in Science. Engineering and Education, 11*(1), 143–151.
- Dou, Y. (2023). Badminton teaching mode in network teaching platform under multimedia environment. [IJWLTT]. *International Journal of Web-Based Learning and Teaching Technologies, 18*(2), 1–18. doi:10.4018/IJWLTT.319967
- Edler, J., Blind, K., Kroll, H., & Schubert, T. (2023). Technology sovereignty as an emerging frame for innovation policy: Defining rationales, ends and means. *Research Policy, 52*(6), 104765. doi:10.1016/j.respol.2023.104765
- Esteban, A. P. (2023). *Web engineering and e-commerce: Bridging technology and business in the Philippines*. Nueva Ecija University of Science and Technology.
- Gawrisch, D. P., Richards, K. A. R., & Killian, C. M. (2020). Integrating technology in physical education teacher education: A socialization perspective. *Quest, 72*(3), 260–277. doi:10.1080/00336297.2019.1685554
- Gor, V. (2023). *Creating responsive websites using HTML5 and CSS3: A perfect reference for web designers*. Apress. doi:10.1007/978-1-4842-9783-4
- Huovinen, L. (2024). Assessing Usability of Large Language Models in Education.
- Kies, C. C. (2023). Blended learning approach in the BED (foundation phase teaching) programme: strengths and challenges.
- Lan, S. (2023). The reform of physical education in colleges and universities under the background of physical education integration. *International Journal of New Developments in Education, 5*(26). Advance online publication. doi:10.25236/IJNDE.2023.052611
- Li, G., & Liu, J. (2024). Improving physical education through innovative multimedia learning platform and data-driven instruction. *Soft Computing, 28*(2), 1567–1584. doi:10.1007/s00500-023-09436-7
- Li, G., & Liu, W. (2023). Multimedia data processing technology and application based on deep learning. *Advances in Multimedia, 2023*, 1–15. doi:10.1155/2023/4184425
- Li, W., & Wang, X. (2021). Construction of modularized English teaching platform for multimedia wireless network based on NS2 simulation software. *Mobile Information Systems, 2021*, 1–10. doi:10.1155/2021/1430512
- Lu, H. F. (2023). Statistical learning in sports education: A case study on improving quantitative analysis skills through project-based learning. *Journal of Hospitality, Leisure, Sport and Tourism Education, 32*, 100417. doi:10.1016/j.jhlste.2023.100417
- Lubis, N. H., & Fithriani, R. (2023). Investigating vocational high school teachers' challenges in integrating Computer Assisted Instruction (CAI) into EFL classes. *Jurnal Paedagogy, 10*(3), 809–819. doi:10.33394/jp.v10i3.7731
- Makasaranondh, W., Maj, S. P., & Veal, D. (2010). An integrated multimedia based platform for teaching network security. *IJCSNS International Journal of Computer Science and Network Security, 10*(12), 1–4.

- Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record, 115*(3), 1–47. doi:10.1177/016146811311500307
- Miao, F., Zhang, Q., & Yang, K. (2023). Application of diversified teaching strategies in the intelligent physical education platform: Enhancing course interactivity and engagement. *International Journal of Education and Humanities, 10*(1), 229–233. doi:10.54097/ijeh.v10i1.11141
- Montiel-Ruiz, F. J., Sánchez-Vera, M. D. M., & Solano-Fernández, I. M. (2023). Social networks and gamification in physical education: A case study. *Contemporary Educational Technology, 15*(1), ep401. Advance online publication. doi:10.30935/cedtech/12660
- Murtagh, E. M., Calderón, A., Scanlon, D., & MacPhail, A. (2023). Online teaching and learning in physical education teacher education: A mixed studies review of literature. *European Physical Education Review, 29*(3), 369–388. doi:10.1177/1356336X231155793
- Ramzan, M., Javaid, Z. K., & Fatima, M. (2023). Empowering ESL students: Harnessing the potential of social media to enhance academic motivation in higher education. *Global Digital & Print Media Review, 6*(2), 224–237. doi:10.31703/gdpmr.2023(VI-II).15
- Ren, Y. (2014). The application of multimedia and modern network for college sports curriculum teaching. In *Proceedings of the 2014 IEEE Workshop on Advanced Research and Technology in Industry Applications (WARTIA)* (pp. 651-653). IEEE. doi:10.1109/WARTIA.2014.6976346
- Slimani, K., Khoulji, S., Mortreau, A., & Kerkeb, M. L. (2024). From tradition to innovation: The telecommunications metamorphosis with AI and advanced technologies. *Journal of Autonomous Intelligence, 7*(1). Advance online publication. doi:10.32629/jai.v7i1.1099
- Sofi-Karim, M., Bali, A. O., & Rached, K. (2023). Online education via media platforms and applications as an innovative teaching method. *Education and Information Technologies, 28*(1), 507–523. doi:10.1007/s10639-022-11188-0 PMID:35791317
- Sun, Y., & Yuan, Z. (2024). A virtual gym in your pocket: The influence of augmented reality exercise app characteristics on user's continuance intention. *Virtual Reality (Waltham Cross), 28*(1), 1–20. doi:10.1007/s10055-024-00959-4
- Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning: A second-order meta-analysis and validation study. *Review of Educational Research, 81*(1), 4–28. doi:10.3102/0034654310393361
- Xing, Z., & Qi, Y. (2023). Development of creativity in physical education teachers using interactive technologies: Involvement and collaboration. *Education and Information Technologies, 28*(5), 5763–5777. doi:10.1007/s10639-022-11422-9 PMID:36373051
- Yan, S., & Liu, J. (2023). Design of a college english smart teaching platform based on big multimedia data technology. [IJWLTT]. *International Journal of Web-Based Learning and Teaching Technologies, 18*(2), 1–13. doi:10.4018/IJWLTT.330676
- Yue, Q. (2022). Construction of English-assisted teaching mode based on multimedia technique in network environment. *Wireless Communications and Mobile Computing, 2022*, 1–9. Advance online publication. doi:10.1155/2022/8960104
- Zhang, M., & Chen, S. (2022). Modeling dichotomous technology use among university EFL teachers in China: The roles of TPACK, affective and evaluative attitudes towards technology. *Cogent Education, 9*(1), 2013396. doi:10.1080/2331186X.2021.2013396
- Zuo, T., & Aquino, J. (2023). The influence of computer aided instruction (CAI) on students learning performance in physical education. *The Quest: Journal of Multidisciplinary Research and Development, 2*(3). Advance online publication. doi:10.60008/thequest.v2i3.120

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