Kurdish Studies
Jan 2023
Volume: 11, No: 01, pp. 387-395
ISSN: 2051-4883 (Print) | ISSN 2051-4891 (Online)
www.KurdishStudies.net

Received: May 2023 Accepted: September 2023
DOI: https://doi.org/10.58262/ks.v11i1.1029

Research on the Role Mechanism and Benefits of Modernized Teaching of Physical Education in Colleges and Universities Empowered by Digital Intelligence Technology

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Abstract

From the perspective of digital intelligence technology in its broad and narrow senses, this paper explains that digital intelligence technology provides an important impetus for change in the modernization of college sports and expresses the human-centered core of modern teaching. It proposes a teaching methodology based on the four pillars of system goals, digital intelligence empowerment, teaching application and classroom subject. By constructing a theoretical framework, it systematically explores how digital intelligence technology empowers the current teaching of college sports, thus revealing its conceptual connotation and mechanism of action. The analysis found that 69% of the students believed that the knowledge they acquired after using digital intelligence technology in theory classes increased. Therefore, digital intelligence technology empowers the modern teaching of college sports, which can effectively promote the development of education informatization.

Keywords: *digital intelligence technology; college physical education; digital intelligence empowerment; conceptual connotation; role mechanism*

Introduction

In the era of digital economy, the innovative application of emerging digital intelligence technologies, such as artificial intelligence, Internet of Things, cloud computing, and fifth-generation mobile communication technologies, has extended to the field of school sports while promoting the realization of leapfrog development in human society (Gorodysky, 2016; huang, 2020). Digital intelligence technology is widely used in efficient sports with its open sharing ability, data communication ability and scene innovation ability, which can effectively solve the implementation dilemma that restricts the modernization of efficient sports, and provide the change power for the modernized teaching of contemporary efficient sports, and its promotion has been concerned and recognized by all walks of life in the society (Yao, 2017). College sports intelligence has become the meaning of application, in the current situation, how to correctly clarify the role of digital intelligence technology to empower the modernization of college sports teaching mechanism, has become an important issue to promote the modernization of college sports change (Guan, 2016).

There is a lack of in-depth and systematic research on the mechanism and practical path of how digital intelligence technology empowers the modernization of school sports (Nolan, Hosam, & Jean, 2022). Unlike the weakness of the traditional teaching method where explanation and demonstration are easy to be separated, the modernized teaching method of physical education empowered by digital intelligence technology well realizes the unity of the two, and ensures that the students can get better information acceptance effect (Cañabate, Martínez, Rodríguez, & Colomer, 2018). Under the traditional college sports teaching mode, the teacher can only teach by explaining and demonstrating, and the learning effect of students is affected by the standard degree of the teacher's action demonstration (Z. Wang & Zheng). The use of digital intelligence technology, through the excellent athlete's action explanation demonstration, so

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that the students form a complete and correct technical concepts, and maintain a good interest in learning (Mason et al., 2022).

Literature (Lu, 2016) discusses the university sports teaching mode, analyzes several major ways in which modern information technology has an impact on university sports. Literature (R. Xu, 2018) calculated the definition, feasibility and application of computer virtual reality technology, and summarized its application in sports teaching in detail. Literature (Zhou, 2016) analyzed the application of multimedia network teaching platform based on cloud computing in college physical education teaching. Literature (Juhe & Zhibin, 2017) suggests that the multimedia computer digital information era has brought significant changes to modern physical education teaching methods. On the basis of a detailed multimedia teaching system, multimedia courseware containing the process of constructing a university physical education teaching model was developed. The results showed that the new courseware facilitates the continuous learning of students. Literature (L. Xu, 2017) shows the effectiveness of the application of multimedia computer-assisted teaching techniques in the evaluation of teaching and learning of physical education classes in universities, and learning the techniques of using multimedia assistive systems through practice can improve the teaching effect. Literature (Yang, 2021) shows that traditional physical education classroom teaching tends to be boring, stereotypical and rigid, and teachers and students cannot make choices between various teaching methods. Integrating the cultivation of spatial and rational thinking into physical education teaching, a questionnaire survey and a field survey were conducted on the understanding of physical education among students, teachers and parents in an elementary school in a certain region of China. Their level of acceptance of the improved physical education teaching model in this study was also statistically analyzed. The results showed that most of the students were able to adapt to the improved physical education teaching model and improved their thinking skills under the model. Literature (Wei, 2021) introduced several college sports teaching models to provide help for college sports teaching. Literature (Makhmudova, Tadjibaev, Kholboevna, & Yuldasheva, 2020) determines the role of information and communication technologies in the formation and realization of modern sports goals, as well as indicators of their quality and effectiveness, theoretically justifies the application of information and communication technologies in the open teaching of physics and mathematics. The current state of physical education and the opportunities offered by information and communication technologies for its improvement are analyzed, a model of an open learning system is developed (Erickson, Thogmartin, Russell, Diffendorfer, & Szymanski, 2014).

This paper constructs a modernized teaching model of college physical education based on digital intelligence technology, and explains the significance of applying digital intelligence technology in modernized teaching of college physical education. The application of modernized digital technology teaching in college physical education classes is proposed from four aspects: classroom objectives, digital intelligence empowerment, teaching applications and user terminals. We first analyze the application of digital intelligence technology in physical education theory and practice classes, and find out and clarify the characteristics of the era of physical education teaching in colleges and universities under the application of digital intelligence technology. Then we analyze the problems that exist in the modernized teaching of physical education in colleges and universities. Finally, it is concluded that in the current college sports teaching, the use of digital intelligence technology balances the college sports teaching resources, optimizes the college sports teaching mode, and improves the college sports teaching management level. Ultimately, it can effectively improve the physical education teaching environment in colleges and universities, enhance the quality of physical education teaching in colleges and universities, and scientifically and efficiently educate people.

Modernized Teaching Model of College Sports Based on Digital Intelligence Technology Empowerment

Currently, artificial intelligence technology represented by machine learning has been widely used in the analysis and processing of big data, and the deep integration of digital technology and intelligent technology has become a reality (Bai & Xia, 2019; Tang et al., 2017). Digital and intelligent technology is the abbreviation for the aggregate of all digital and intelligent technologies, and from a broad perspective. At the same time, other related new technologies will also be associated with the development and application and the formation of the technology system. From a narrow perspective, Digital Intelligence Technology is a technology system composed of seven key technologies: Big, Smart, Mobile, Cloud, Things, Zone and 5G.

The above seven technologies together constitute a mutually integrated and mutually reinforcing technological whole. The modernization of college sports is a relatively cutting-edge research field in the field of college sports, and the modernization of college sports is a dynamic transformation process from traditional school sports to modern school sports. Based on the digital intelligence technology to empower the modernization of college sports teaching, this dynamic transformation process involves a comprehensive transformation of all areas and levels of school sports (Yarmoschuk, 2018).

Figure 1 shows the modernized teaching model of college sports based on the empowerment of digital intelligence technology. The modernized teaching model should firstly take the human-centered thinking as the core guidance, and then design its function, the key lies in the coordination and unity of the four aspects of the system goal, digital intelligence empowerment, teaching application and classroom subject. As a unified whole of the teaching system, the need for reasonable goal planning. First, people-oriented, people are the main body of the modernized teaching system of college sports, and human education is the fundamental purpose of the teaching system (Y. Wang, 2017). The second is multiple synergy, teaching system in all kinds of elements presents a complex characteristic of multiple heterogeneity, need to reasonably coordinate the relationship between teachers, students and all kinds of elements of the system, so as to make it symbiotic development (Turek, 2022).

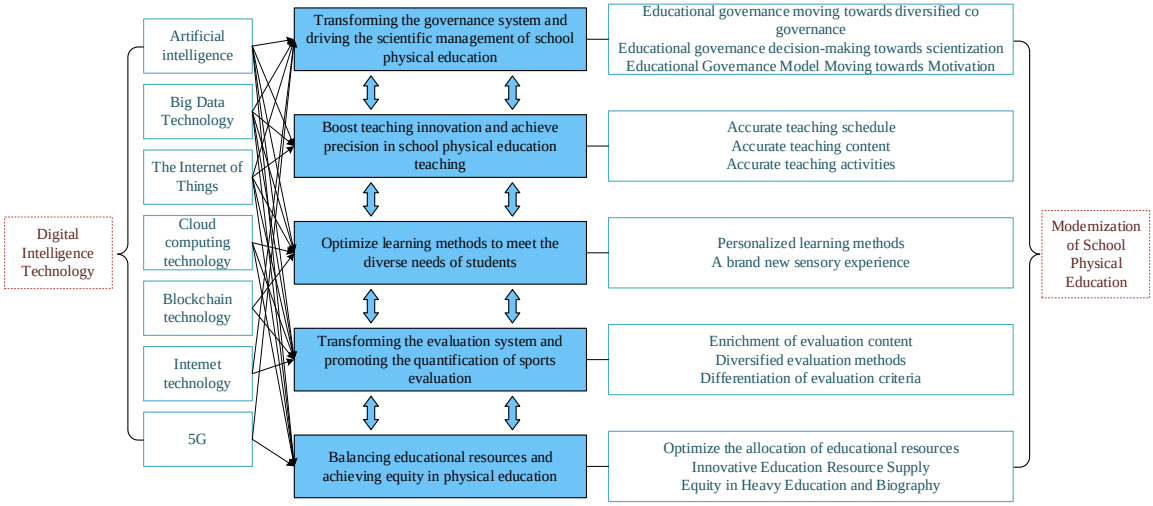

Figure 1: Modernized teaching model for college sports

The mechanism of modernization of sports in colleges and universities empowered by digital intelligence technology

Basic framework

The concept of empowerment is derived from the theory of empowerment, which is also translated as the theory of empowerment and the theory of stimulating empowerment, and its meaning of giving energy to individuals and organizations so as to enhance their ability to achieve the goals they are pursuing. The dialectical relationship between digital technology empowerment and modernization of college sports can be positioned as the former is a means or a way and the latter is an end. Empowerment of school sports through digital technology as a means to achieve the realization of the end of modernization of college sports (Yan & Zhang, 2017). The implementation process of modernization of college sports is very difficult, and the modernization of college sports is composed of many elements in the process of physical education practice, and each part can be used as a support and carrier through digital intelligence technology (Alssaid, Ismail, & Hashim, 2016; Chalii, 2017). Digital intelligence technology empowers the modernization of college sports, which refers to the role of new digital intelligence technology such as big data and artificial intelligence technology in the governance of college sports, teacher teaching, student learning, teaching evaluation, and educational resources. It empowers the scientific governance of school sports, precise teaching, diversified learning, quantitative evaluation, and fair education, and comprehensively promotes the modernization of college sports. Figure 2 shows the mechanism framework of modernization of physical education empowered by digital intelligence technology, which empowers to change the governance system,

promote teaching innovation, optimize learning methods, transform the evaluation system, and balance educational resources. It can drive the scientific governance of physical education, realize the precision of physical education teaching, meet the diversified needs of students, promote the quantitative evaluation of physical education, and realize the fairness of physical education. At present, the school sports governance system is not perfect, and the education governance capacity has yet to be strengthened, which cannot match the expectation of modernizing school sports empowered by digital intelligence technology. Therefore, it is necessary to further improve the school sports governance system and accelerate the formation of a modernized smart governance pattern of school sports through digital intelligence technology.

Digital intelligence technology can promote the efficiency of collaborative governance, provide a strong technical guarantee for regulating the collaborative governance of multiple subjects, and then lead to the refinement of the governance of school sports in various fields. Through the use of digital intelligence technology can optimize the synergistic norms between the main subjects of school sports governance, promote the integration of the digital infrastructure of school sports at the level of network access permits and technical processing standards, and regulate the fine governance of multiple subjects in school sports. For example, with the help of digital intelligence technology, we can realize the sharing of information among multiple subjects and various management departments, direct dialogue, consultation and common governance, so that different subjects can fully express their respective positions, views and interests and concerns. Improve the degree of matching of the right to allocate school sports resources, and ultimately form a smart governance pattern in which the government, school, market and society work together.

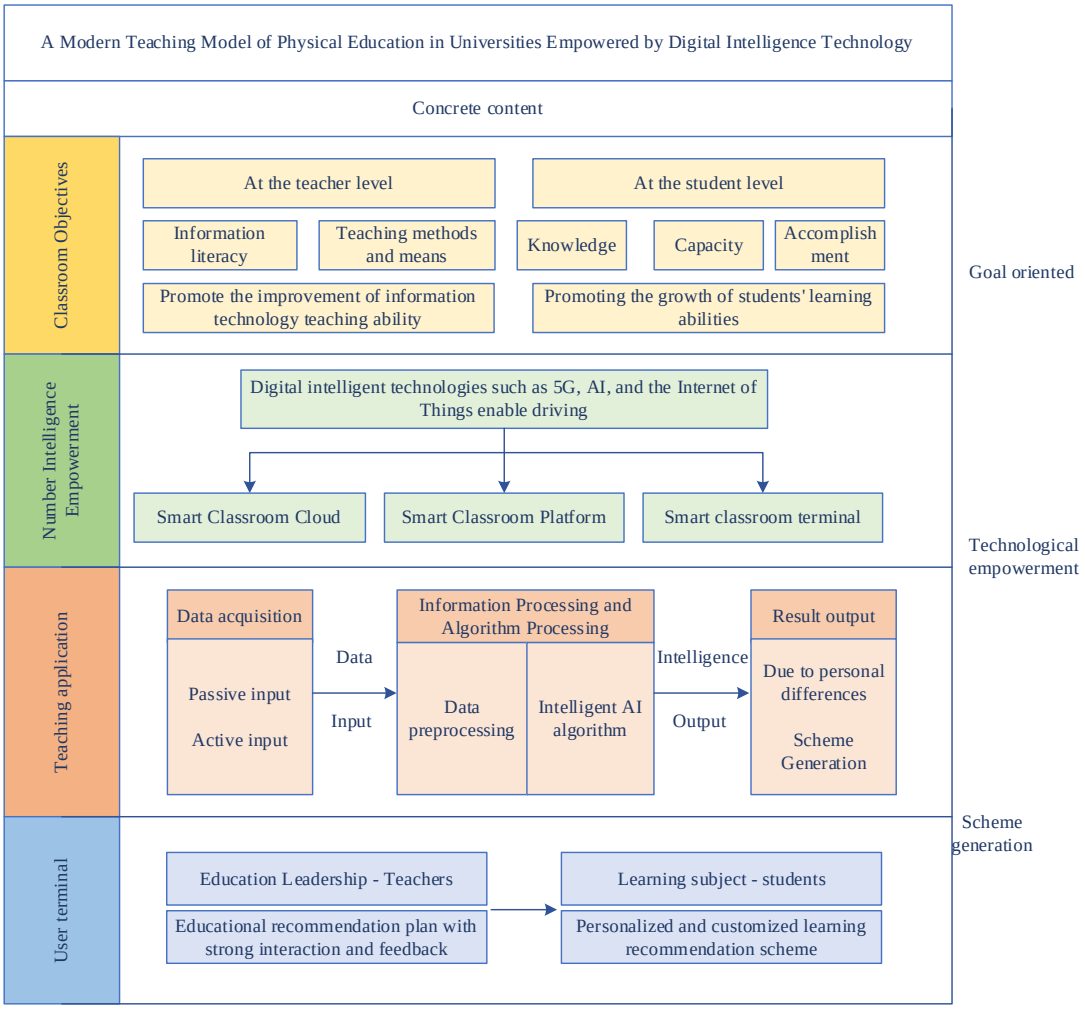

Figure 2: Mechanistic framework for the role of digital intelligence technology enablement

Core structure

With the help of digital intelligence technology, the modernized teaching mode of college sports has brought

great help to both teachers and students. For teachers, modern teaching can help analyze students' learning status, support teaching decision-making and regulation, and create diverse and highly interactive classroom situations. For students, modernized teaching can provide personalized learning services, which can help students improve their learning efficiency, expand their knowledge base and cultivate key abilities. Standing in the perspective of the mathematical core depth of digital intelligence technology and modernized teaching integration, easy access to data resources and other features, the mathematical core and modern classroom features correspond to the depth of the value of the application of digital intelligence technology in mathematics teaching.

Figure 3 shows the structure of digital intelligence technology and digital core, with the help of digital intelligence technology, it realizes the interweaving of multiple scenarios of reality and fiction, and guides students to abstract sports problems in multiple scenarios. Digital intelligence technology enters the field of physical education teaching as a special element, and highlights the important tool attributes by creating rich physical education teaching situations. With the help of virtual reality technology, digital twin, interaction technology, environment sensing technology and other digital intelligence technology, as well as wearable devices, a virtualized physical education teaching scene is constructed with high transmission rate and low latency. Embedding the sports teaching content seamlessly into the virtualized school sports scene, the virtual teaching environment created based on digital intelligence technology can overcome the impact of traditional teaching due to field facilities and various objective factors.

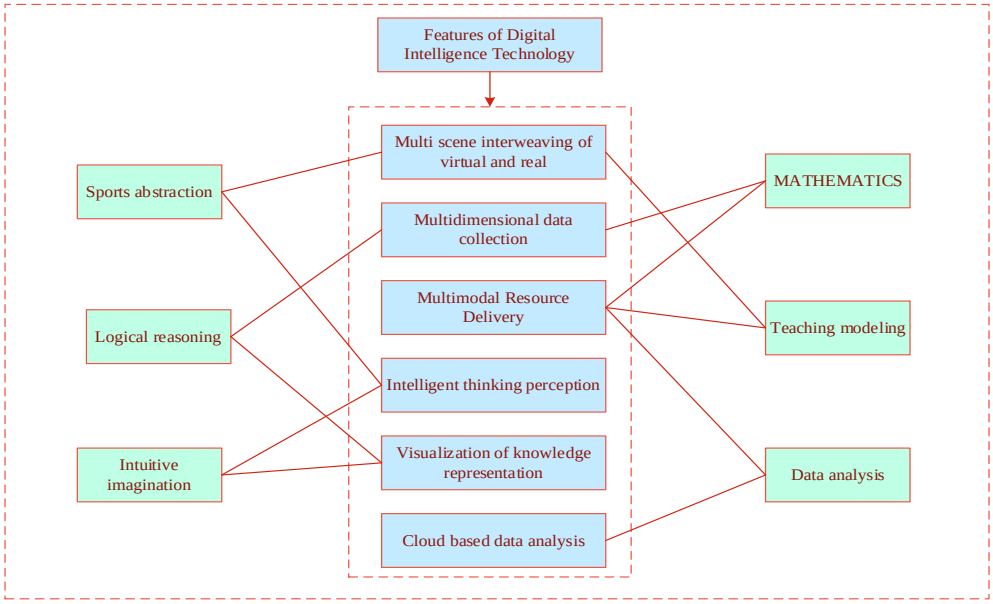

Figure 3 Structure of Digital Intelligence Technology and Digital Core

Analysis of the mechanism of the role and benefits of modernized teaching of sports in colleges and universities

Analysis of applications

The research object of this paper is a college sports school, which investigates and researches the mechanism and benefits of the role of digital intelligence technology-enabled modern educational technology in college sports teaching. Statistical software is used to organize and count the data obtained from the survey to analyze the current status of application in college sports teaching from the data level. First of all, the survey on the use of digital intelligence technology for modernized teaching by college physical education teachers, Table 1 shows the application of digital intelligence technology in modernized teaching by college physical education teachers. As can be seen from the total, in the theory class, 80% of physical education teachers said they often use it, 14% of physical education teachers said they occasionally use it, and only 4 teachers said they don't use it. Whereas, in practical classes, only 36% of the teachers reported frequent use, 40% reported occasional use and 24% reported no use. Therefore, it can be seen that in the current modernized physical education teaching in colleges and universities, most college and university physical education

teachers prefer to apply digital intelligence technology in theoretical classes and use it less in practical classes. Digital intelligence technology has brought unprecedented opportunities for school physical education change, but the current lack of digital literacy of school physical education teachers and students has seriously constrained the progress of digital technology and the high-quality development of physical education. The digital literacy assessment of teachers and students shows that the current cultivation of students' digital literacy still has the problems of insufficient attention, insufficient systematization, and prominent lagging, and students' digital literacy needs to be improved. Some physical education teachers' application of digital tools and resources is more superficial, their teaching concepts need to be changed, and their application level needs to be improved. Therefore, it is necessary to review the goals of school sports parenting and improve the digital literacy of school sports teachers and students.

Table 1: Application of numerical intelligence techniques in physical education

Utilization	Theory course		Practical courses	
	Number of people	Percentage	Number of people	Percentage
Often	60	80%	25	36%
Occasional use	9	14%	30	40%
Not used	4	6%	18	24%

The modernized teaching of sports empowered by digital intelligence technology is characterized by the openness and interactivity of teaching methods, the global and diverse nature of educational resources, and the flexibility and efficiency of teaching forms, which cannot be achieved by traditional sports teaching. Table 2 shows the situation of students' utilization of the Numerical Intelligence Network for learning, and it can be seen that students make full use of the network for learning, and the proportion of students who frequently utilize it is 65%, and only 15% of students said they do not utilize it. At present, the digital literacy of physical education teachers should be strengthened from the perspective of teachers. On the one hand, based on the requirements of education industry standards to improve the overall perspective and strategic thinking of physical education teachers in all aspects, and to further improve the ability of teachers to carry out physical education teaching and practical activities using digital technology and digital teaching platform. On the other hand, multi-level research and training activities for physical education teachers have been carried out to strengthen the training exchanges and practical exercises of all kinds of personnel in the physical education system, so as to enhance the ability of physical education teachers to use digital thinking to solve the problems and challenges in the management of physical education. Accelerate the in-depth integration of physical education subject literacy and digital information literacy, and cultivate the digital literacy of teachers and students with the two-way assistance of technology and teaching.

Table 2: Students' Use of Online Learning

Content	Frequent utilization	Occasional utilization	Not utilized
Using the Internet to Communicate with Teachers and Classmates	47%	31%	22%
Utilizing Network Resources for Learning	65%	20%	15%

Application Attitude Analysis

College physical education teaching is divided into theoretical classes, practical classes, theory-cum-practice classes, for different types of physical education classes, teachers use different teaching methods, which can often stimulate students' interest in sports and improve the quality of teaching. Figure 4 shows the teachers' attitudes towards the application of digital intelligence in modernized teaching of physical education. Most of the teachers of theoretical courses feel that it is necessary to apply digital intelligence in modernized teaching of physical education, and 50% of them think that it is very necessary. In theory-cum-practice courses, 70% of the teachers felt that the application of digital intelligence technology tools in teaching is very necessary. For students, due to the fact that physical education courses generally have too few hours and more content to learn, physical education teachers are unable to finish the courses within the limited time. The network teaching resources empowered by the digital intelligence technology can well solve such problems, and students can carry out self-study and remedial education outside the classroom through the network teaching resources platform.

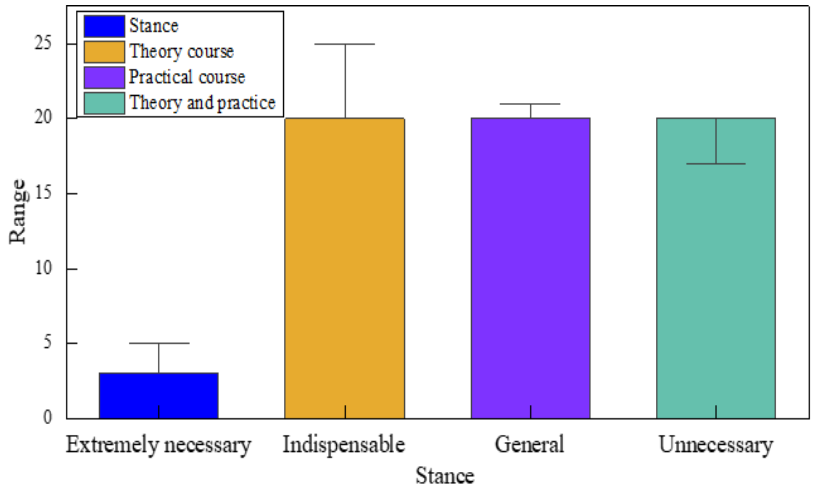

Figure 4: Attitude towards the Application of Digital Intelligence Technology in Teaching

Teachers think that the impact of digital intelligence technology empowerment on teaching is shown in Figure 5, teachers think that the impact of digital intelligence technology empowerment in physical education teaching in the theoretical class is very influential 28%, and there is no impact of 15%. While in the practical classes the impact is great in 8% and no impact in 47%. It can be seen that the impact of modernized teaching of physical education in colleges and universities empowered by digital intelligence technology is much more than the impact in practical classes. In the process of teaching, they still only focus on students' performance, can't fundamentally find out the inadequacy of teaching, and lack of innovation. At the same time, they only focus on the interpretation of the content of the textbook and do not understand the advantages of network teaching resources. In addition, physical education teachers believe that physical education is simply teaching students a skill, unlike other theoretical subjects, without the use of digital intelligence technology. However, with the gradual integration of digital intelligence technology into physical education teaching in colleges and universities, it promotes the formation of network teaching resource platforms, which largely alleviates the imbalance of educational resources. In this way, teachers and students from all regions can use the network teaching resource platform to learn the resources of excellent teachers from all over the country.

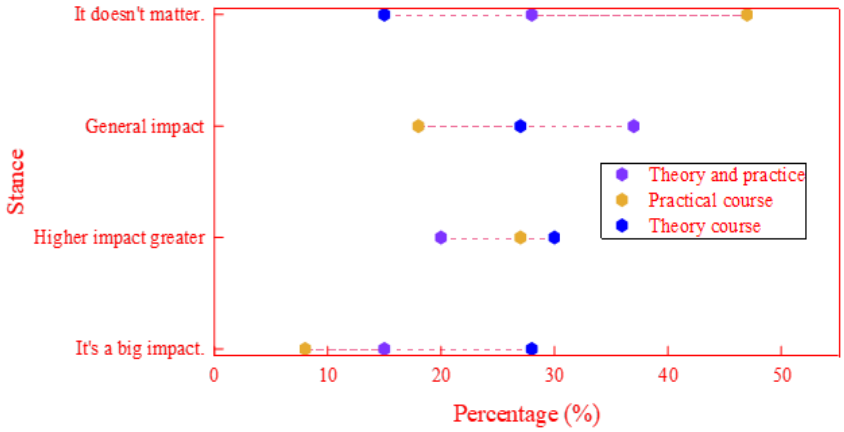

Figure 5: The impact of digital intelligence technology on modern sports teaching

Analysis of the benefits of physical education

With the help of digital intelligence technology empowerment, an integrated intelligent system can be established between students' physical exercise and after-school physical education homework testing, giving full play to the platform's functions of information intuition, analysis intelligence, and scenario fusion, and creating favorable conditions for students' full participation in physical exercise and after-school homework testing. The impact of the benefits of modernized teaching of sports in colleges and universities empowered by digital intelligence technology on students is shown in Table 3, which shows that after modernized teaching of sports in colleges and universities empowered by digital intelligence technology, the

greatest impact in both theoretical and practical classes is that the students' knowledge has been enlarged. Accounting for 69% and 60% respectively, the students' learning process in the theoretical classes to enhance the response, the increase in the performance of the problem is more obvious accounted for 42%, the theoretical and practical classes in the application to enhance the interest in learning and self-study ability is not obvious. With the help of big data technology to realize the intelligent transformation of school sports governance and supervision, the school sports supervision information is effectively integrated and consolidated. The breach of trust of school sports governance subjects is archived and recorded, and the process of school sports governance and supervision can be traced and the problems can be monitored, so as to form an intelligent governance and supervision system. Finally, the use of digital intelligence technology to improve the school sports collaborative governance system.

Table 3: Impact of Digital Intelligence Technology on Students' Benefits

Course type	**Theory**		**Practical courses**	
Investigation content	N	%	N	%
Increased interest in learning	153	25%	153	27%
The range of knowledge mastered has increased	385	69%	335	60%
The response has increased, and there have been more problems	251	42%	165	29%
Improved self-learning ability	109	20%	133	25%

Conclusion

This paper is based on the digital intelligence technology to empower the modern teaching of sports in colleges and universities, to take students as the center, to improve the teaching efficiency, to increase the digital teaching mode, to realize the effective combination of modern teaching methods and digital intelligence technology, so as to improve the efficiency of sports teaching in colleges and universities. Based on this, this paper analyzes the situation of college physical education teachers' use of digital intelligence technology for modernized teaching. 80% of physical education teachers said that they often use it in theoretical classes, and only 36% of teachers said that they often use it in practical classes. An analysis of the impact of the benefits of modernized teaching and learning in college sports empowered by digital intelligence technology on students showed that 69% and 60% of students in theory and practical classes, respectively, reported that their knowledge acquisition had increased. Therefore, it is an inevitable trend that modernized teaching of college sports empowered by digital intelligence technology, and high-quality sports teaching can help students' physical and mental health development, so that students can grow up to be comprehensive talents in line with the development needs of modern society.

Funding

This research was supported by the Research Project on Party Building and Ideological and Political Work in Shanghai Private Colleges and Universities: Integration of Ideological and Political Education into Physical Education Teaching Content Construction and Path Innovation in Private Colleges and Universities (M2023YB42).

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