

# Analysis of innovative strategies based on digital physical education -- taking orienteering teaching in universities as an example

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**Abstract:** This paper uses the methods of induction and analysis to sort out the problems existing in the teaching of orienteering courses in colleges and universities, and puts forward a “three-type” digital physical education teaching mode relying on the development and integration of digital teaching resources, the application of digital teaching means and the construction of digital sports scenes.

**Key words:** digitization; Physical education teaching; orienteering

## I. Introduction

In recent years, the state has vigorously supported the reform of campus physical education and promoted the research and development and upgrading of digital technology. In October 2021, the State General Administration of Sport issued the “14th Five-Year Plan for Physical Education Development”, which pointed out that the construction of sports informatization should be accelerated and new technologies should be applied to promote the reform of digital sports. It supports the innovative application of new technologies such as big data, blockchain, Internet of Things, cloud computing and artificial intelligence in the field of sports. Therefore, this paper tries to put forward a set of efficient and systematic digital sports teaching mode from the perspective of orienteering teaching, and explore the ideas and directions of realizing digital sports, so as to promote the development of orienteering teaching in colleges and universities.

## II. The existing problems of orienteering teaching mode in colleges and universities

According to the investigation and research, there are still many problems in the teaching of orienteering in many domestic colleges and universities: first, the course independence and applicability are poor, the teaching method is relatively simple, the practical operation is too competitive, the teaching link is not interesting, the teaching content is abstract and boring; In the course setting, course objectives, course content, more concentrated in the theoretical teaching level, less practice. Second, the teachers are weak and poorly equipped, which is mainly reflected in the low level and teaching experience of teachers. Most teachers are not fully equipped with the ability to identify maps, draw, select teaching venues, design routes and use directional professional equipment. Third, the teaching system is not perfect and is still in the exploratory stage, mainly because there are few schools participating in the orientation course in China. Most orientation courses are still in a state of spontaneous growth, and there is no unified teaching materials, teaching syllabi, teaching plans, etc. Fourth, it is difficult to monitor teaching activities, and the methods of skill assessment and evaluation are unreasonable. In the process of practice, it is impossible to accurately grasp the location of students, the use of skills and exercise intensity, and the assessment and evaluation methods are not comprehensive, mainly based on the comprehensive evaluation of students' physical fitness and graph reading ability, but lack of evaluation on the fluency of the point-finding process, route selection and other factors. The fifth is the lack of investment in curriculum funds, mainly because the school does not pay high attention to the lack of enough funds to buy formal teaching equipment (such as electronic punch equipment, mechanical punch, marking flag, north pointer, standard campus map, etc.). Sixth, the teaching site is limited, the lack of complex and changeable terrain with rich features. Because students are familiar with the campus environment, to a certain extent, weaken their ability to use the map and the north pointer, in terms of difficulty level, can not meet the requirements of the actual teaching, reduce the real experience of orienteering. To sum up, the orienteering teaching method in colleges and universities needs to be improved. This paper will combine the reality of orienteering teaching to further explore and deepen the new path of the reform of orienteering teaching method.

## III. Based on the digital physical education innovation strategy

### 1. Develop and integrate digital physical education teaching resources

To develop and integrate the digital teaching resources required for directional courses, the most basic teaching materials can be obtained by means of network collection and book procurement, and processed according to the course objectives and the actual needs of teaching design to produce appropriate resources, and then classify and manage them at different levels, and establish a digital resource center. On the one hand, the types of digital teaching resources can be classified according to the nature of materials, which can be text, such as instructional design, courseware, teaching materials, etc.; Picture class, such as teaching schematic, orientation map, map legend, etc.; Audio, such as music rich in rhythm and rhythm; Video, such as orienteering course running, the use of the north pointer, the use of equipment, orienteering competition and other teaching micro-videos. On the other hand, it can be classified according to the physical level or technical level or difficulty level, which can be classified as primary, intermediate, advanced or according to different technical elements, such as demarcating maps, folding maps, turning maps, mapping and so on. In this way, students can choose the appropriate content to learn according to their own level. The use of digital curriculum teaching resources has greatly reduced the teaching burden of teachers, allowing teachers to focus more time and energy on guiding and correcting students' wrong actions, and promoting students' personalized

and independent development. Of course, the development and integration of the resources is not overnight, need long-term accumulation, improvement and improvement, it is a long-term process.

## 2. The application of digital teaching means

The application of digital teaching means can solve the problems that physical education teachers spend too much time and energy in the pre-course work (such as preparing teaching AIDS and arranging venues, etc.), difficult to monitor the process of teaching activities, and incomplete evaluation. In actual teaching, the use of 5G, intelligent perception, Internet of Things and other digital technologies to upgrade and transform the existing physical education facilities, from many aspects to achieve the evaluation of teaching effects, such as smart wearable devices, mobile applications, wechat mini programs, human-computer interactive machine, virtual reality digital technology, etc., mainly in the following aspects: First, digital monitoring feedback application. At present, smart phones, sports bracelets or anklets and other devices have GPS positioning, track recording, heart rate monitoring and other functions. During and after exercise, students can get feedback of exercise track, exercise intensity, heart rate, energy consumption and other information through these devices. The gap between them can be found out through comparative analysis of data such as segmented time, total time and pace. Teachers can also analyze students' problems in practice (such as route selection, etc.) according to students' movement track and other data, and actively guide students to make adjustments to help students improve motor skills, so as to effectively enhance students' participation and sense of experience. Second, digital punch system and equipment, such as Ono orienteering APP, orienteering APP, and wechat mini program "NAOGO", "Beidou Eyes", etc. These mobile applications have the functions of registration for competitions or activities, scanning code punch or positioning punch, score, time, ranking, etc. It provides strong support and help for the orienteering course teaching, and solves the problem that the orienteering course is affected by the lack of formal orienteering equipment. Of course, this kind of system needs to be equipped with fixed point mark facilities (usually two-dimensional code or various fixed point marks) that can provide students with visit records during practice or assessment. Usually, before the teaching work is carried out in each semester, according to the needs of physical education courses, teachers can arrange fixed point markers that meet a teaching cycle at one time, and there is no need to repeat the same work in each class, or even need to arrange clock points. That is, teachers can use software to operate and set the fixed point in actual teaching. Let the students reach the designated range to position the clock (which has higher requirements for network signal and accurate positioning), so as to improve the efficiency of teaching organization and management. The third is the digital human-computer interaction machine, which is a display application terminal, usually equipped with display screens, teaching tablets, smart wearable devices or mobile communication devices, micro printers, data entry systems, etc. It has the integrated functions of orientation starting station, terminal station, score statistics office, etc. In the actual teaching application, it supports students to choose the appropriate events or activities on the display screen and the difficulty level of the line for practical experience. It is a teaching process in which students operate independently, complete orientation activities independently, and actively participate in orientation courses. At the same time, it can also provide more convenient teaching design, teaching practice, teaching management, dynamic position monitoring and other services, and display digital information such as sports data, teaching audio, images, micro-lessons and videos at any time. Of course, this needs to prepare teaching handouts, multimedia and other courseware in advance on the digital human-computer interaction integrated machine, make all kinds of maps and lines used by students in practice, set up a good punch card system and so on. Fourth, digital virtual reality technology. This is a digital technology based on 5G communication network, integrating 3D holographic image technology to effectively support real-time VR, AR, MR and distance learning presentation services. These digital technologies, combined with other intelligent facilities, promote the realization of digital sports scenes, so that students can learn in a full-scene virtual environment across time and space, and truly experience the fun of orienteering courses, while also solving the problem of limited campus space.

## 3. Construction of digital sports scenes

The digital sports scene integrates 5G, AI, VR/AR/MR, 3D holographic images, iot sensors, big data and other digital technologies to upgrade the real physical environment into a visual teaching environment that integrates virtual and real, providing students with immersive and personalized sports scenes. In this scene, students can use VR, AR and other smart wearable devices, smart treadmill, and protection devices to better enjoy physical exercise and improve skills, while in the virtual environment to apply what they learn, mainly in the following aspects: First, students can feel the simulated city and natural environment, terrain, climate, sound and other atmosphere. At the same time, according to the needs of students, to achieve free and flexible scene switching -- from the campus to the park, the field of the digital environment "personal" experience "real" orienteering, enjoy the immersive "visual sense". Second, students can watch, simulate and practice various orienteering skills in it, such as demarcating map, map and ground comparison, attack point, crossing, the use of the north pointer, etc. At the same time, through monitoring and feedback means, real-time follow-up of students' dynamic learning process, so that students can understand their own sports performance and make adjustments. Third, the scene can simulate the "real" competition environment, so that students can compete with virtual opponents, and cultivate students' ability to analyze opponents, use various techniques and tactics, decision-making ability and adaptability. The fourth is to analyze the data collected by the monitoring feedback facility, which can greatly avoid the risks that students may encounter in the course of orienteering, so as to reduce the probability of course teaching accidents. At the same time, such a scene also opens up the space of the real teaching environment. Based on the above content, in the digital era, many colleges and universities have basically met the conditions for the construction of such digital physical education teaching scene, only need to introduce relevant technologies, Can create such as Unity 3D engine platform Go orienteering, O-navi and other Android applications and Steam platform Virtual-O and other PC applications of orienteering Virtual scene.

#### IV. Conclusion

The exploration of digital physical education needs to be carried out for a long time, can not stagnate, can not be accomplished overnight. In the teaching practice, teachers still need to constantly reflect and sum up experience, use modern scientific and technological means to assist teaching, improve teachers' teaching ability and digital skill level, try every means to improve students' participation enthusiasm, adopt more abundant teaching methods, so as to improve the overall teaching effect.

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