Research Article

Analysis of Intelligent Physical Education Teaching Scheme Based on 5G Communication + VR Technology

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In order to improve the physical quality of college students and increase students’ interest and focus on physical education teaching, this study constructs a smart physical education teaching scheme system platform by combining 5G communication + VR technology. Students can download sports teaching videos in the system platform, and then conduct 3D decomposition and playback of sports actions through matching VR glasses, guide and correct students’ body actions from a professional perspective, arouse students’ interest with interesting teaching courses, make them actively study, explore the improvement methods of various sports actions, and realize extracurricular discussion. Through the follow-up analysis of students by questionnaire survey and other methods, it is concluded that the reformed teaching system has a positive impact on students’ physical quality, extracurricular exercise, and entertainment ideology, and comprehensively improved the all-round and healthy development of students’ body and mind.

1. Introduction

With the development of science and technology and the emergence of artificial intelligence and cloud computing technology, people use the concept of wisdom to define the development of these high-tech fields and become the direction of economic and social development. Smart sports is a development model of the combination of sports and information technology. Through scientific and technological means, it enhances the management level and service ability of sports departments, and promotes the information development of physical education.

Highly developed communication means provide a living environment for the development of VR technology and promote the substantive breakthrough of the core technology of VR technology. At the same time, the application of VR technology is also inseparable from the support of 5G. The combination of the two is the inevitable product of reality and the result of mutual achievements.

The combination of 5G communication and VR technology was first applied in the broadcasting of TV programs. HD video and VR technology are the main businesses promoted in 5G market in the future. The application in sports events and training has long been mature and has been gradually introduced into sports education. Information technology is used to develop, integrate, and utilize sports-related data, so as to realize efficient management and service functions.

The research of LV Dawei (2021) shows that the application of communication technology in business has broken the original operation mode, and the paper puts forward that with the national reform of education, colleges and universities have higher and higher requirements for the diversification of physical education, the sharing of information technology and the integration of management and service. In order to introduce 5G technology into the research of physical education in colleges and universities, thus, it is proposed to explore the mode of physical education teaching through mobile communication and analyze the data generated in the teaching process, so as to promote the structural reform of physical education in colleges and universities [1]. Any system needs standards and norms, and physical education is no exception. As a focus of intelligent sports information development in recent years, it provides a reference...
theory and Practice Guide for sports information standards. Starting with the concept of sports technology and management under the concept of smart sports, this paper constructs sports information technology standards and management standards, and explores the information technology standards of smart sports through visual management such as Internet, big data, simulation, and computer technology [2].

LAN Kun (2021) discusses the construction of intelligent education through the combination of mobile communication technology and high-definition video, highlighting the disadvantages of information-based teaching to breaking the conventional teaching, so as to realize the application of distance teaching, simulation skill training, physical fitness evaluation, and other projects in teaching, so as to truly realize intelligent education [3].

From the emergence of the concept of intelligent education to the real realization of this concept, information technology and mobile communication provide a crucial technology and environment. Now the improvement of China's mobile network coverage and high-definition video technology has greatly increased people's practical application of it, broke the conventional rigid teaching model, and improved students' physical quality and physical exercise awareness without teaching. It also improves the enthusiasm of students.

This study analyzes the scheme of wisdom education, and the influencing factors and achievements of the application of 5G communication + VR technology in teaching. L Xian et al. discussed the promotion of multi-network integration in 5G, WiFi 6, and ALoT, and laid the foundation for the construction of a new generation of smart campus [4]. Z. Jing et al. pointed out to deepen the integrated development of information technology and education and teaching, and comprehensively improve the information application level in teaching, scientific research, management, social services, innovation, and entrepreneurship [5].

2. Basic Information of Students and Class Arrangement

2.1. Basic Information of Students. The statistical range is 8352 graduates of a university who are not majoring in physical education and not majoring in physical education in 2020 and 2021. Exclusion: students with congenital limb dysfunction, students with congenital cardiopulmonary functional diseases and congenital cardiopulmonary organic diseases, and students with other congenital physical disorders affecting sports performance.

The total number of graduates in 2020 is 4073: 2314 boys and 1759 girls. 2530 undergraduates: graduation age: 21 to 25 years old; the average graduation age was 22.91 years old; 1543 junior college students: graduation age: 21 to 24 years old; the average graduation age was 22.43 years old. There are 4279 graduates in 2021: 2471 boys and 1808 girls. Number of undergraduates 2671: year of graduation: 21 to 26 years old; average graduation age: 23.18 years old. Number of junior college students 1608: graduation age: 21 to 24 years old; average graduation age: 22.36 years old.

2.2. Shift Arrangement. The 2020 students adopt the traditional smart physical education teaching scheme, and the 2021 students adopt the smart physical education teaching scheme introducing 5G and VR technology. Through the implementation of different teaching programs, this paper compares and evaluates the physical quality of the second graduates.

2.3. Teaching Plan and Teaching Method

2.3.1. Teaching Methods for 2020 Students. The traditional physical education teaching scheme is carried out for the students of the 2002 session. The traditional physical education teaching scheme includes analyzing the students' sports technical movements through the eagle eye system, replaying and decomposing the students' body movements, explaining the sports movements from a professional perspective, increasing the students' understanding ability, and putting forward improvement suggestions. Then, after the students watch the eagle eye technology decomposition video, they will discuss in groups and put forward suggestions for the improvement of technical actions for each other.

2.3.2. Teaching Methods for 2021 Students. Based on the teaching methods of the 2020 students, after the introduction of 5G and VR technology, students can use their own tablet mobile phone equipment with VR glasses to download eagle eye decomposition 3D videos of themselves and their classmates in the teaching system, explore the improvement methods of technical actions, and realize extracurricular discussion.

Existing colleges and universities relatively pay attention to the transmission of professional knowledge, often ignoring the improvement of students' physical quality and the education of physical exercise consciousness. The idea of wisdom education is to carry out professional education for students through scientific means, so as to improve the interest of the subject and the enthusiasm of students.

2.4. Statistical Methods. The neural network module adopts polynomial depth Iterative Regression node function, and its basis function is written in formula (1):

\[
y = \sum_{i=1}^{n} \sum_{j=0}^{5} A_i x_i^j.
\]

Among: \(x_i^j\) is the j-th power of the input value of the i-th node in the upper neural network; \(A_i\) is the coefficient to be regressed of the j-th order polynomial; \(n\) is the number of nodes of the upper neural network.

All measurement data are expressed as mean ± standard deviation (\(\bar{x} \pm s\)), \(t\) calibration. The counting data are expressed in (%), chi-square test and analysis of variance are used according to the nature of the data, and the data are analyzed by spss24.0 statistical analysis software.

The \(t\) value and \(p\) value of bivariate \(t\)-check come from the bivariate \(t\)-check process, where \(t\) value is the value of the output result. When \(t > 10.000\), it is considered that there is a statistical difference between the two columns of data, and the greater the \(t\) value, the greater the statistical
difference; $p$ value is the log value of the output result. When $p < 0.05$, it is considered that the result data is within the confidence space. When $p < 0.01$, it is considered that the result data has significant statistical significance. The smaller the $p$ value, the higher the degree of confidence. Subject to the length, only the calculation algorithm of $t$ value (value) is explained here, such as formula (2):

$$t_{\text{Value}} = \frac{\bar{x} - \mu}{S / \sqrt{n - 1}}. \quad (2)$$

Among: $\bar{x}$ is the arithmetic mean of the sample series of entrepreneurship and entrepreneurship education model; $\mu$ is the average value of the sample series of previous entrepreneurial models; $n$ is the number of nodes in this series of entrepreneurship and entrepreneurship education model; $m$ is the number of nodes in the sample sequence of previous entrepreneurial models; $S$ is the standard deviation rate of entrepreneurship and entrepreneurship education sample sequence.

The algorithm of arithmetic mean in formula (1) is shown in formula (3)

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i. \quad (3)$$

Among: $i$ is the traversal pointer; $m$ is the number of nodes in the sample sequence of previous entrepreneurial models; $x_i$ is the $i$th input value in the sequence. The meaning of mathematical symbols is the same as above.

The algorithm of standard deviation rate in formula (1) is shown in formula (4)

$$S = \frac{1}{n - 1} \sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2}. \quad (4)$$

3. Statistical Results of Students’ Physical Fitness Survey

Record the physical fitness of all students in 2020 and 2021, such as vital capacity, sitting forward flexion, heart rate increase rate, and body fat rate after exercise, and process the recorded results with the mean value regardless of gender. The obtained data are shown in Table 1.

From the data in Table 1, it can be seen that the physical fitness index data of 2020 students who adopt the traditional intelligent physical education teaching scheme are significantly different from those of 2021 students who adopt 5G and VR technology intelligent physical education teaching scheme ($p < 0.05$). The vital capacity of students who adopt 5G and VR technology intelligent physical education teaching scheme is 932 ml higher than that of traditional intelligent physical education, with a relative increase of 26.4%. The forward flexion height of sitting body was 9.2 cm, which increased by 56.10%. The heart rate increase rate decreased by 55.73%, and the body fat rate also decreased by 50.54%. According to the data in Table 1, Figure 1 is as follows:

![Figure 1: Comparison of physical fitness of students with different intelligent physical education teaching schemes.](image-url)

<table>
<thead>
<tr>
<th>Group</th>
<th>Vital capacity (ml)</th>
<th>Sitting body flexion (cm)</th>
<th>Heart rate increase rate (%)</th>
<th>Body fat ratio (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional teaching group</td>
<td>3536</td>
<td>16.4</td>
<td>56.7</td>
<td>18.6</td>
</tr>
<tr>
<td>5G and VR technology teaching group</td>
<td>4468</td>
<td>25.6</td>
<td>31.6</td>
<td>9.4</td>
</tr>
<tr>
<td>$t$ value</td>
<td>2.364</td>
<td>2.387</td>
<td>2.163</td>
<td>2.014</td>
</tr>
<tr>
<td>$p$ value</td>
<td>0.016</td>
<td>0.014</td>
<td>0.009</td>
<td>0.008</td>
</tr>
</tbody>
</table>
in the figure, it can be explained that the physical quality of students who adopt 5G and VR technology smart sports teaching schemes is better than that of students who adopt traditional smart sports teaching.

At the same time, the students of 2020 and 2021 were investigated for their physical health, and the number of students suffering from obesity, sinus cardiac dysfunction, pulmonary insufficiency, anxiety, and depression was counted. The students were statistically analyzed, and the data in Table 2 were obtained.

According to the data in Table 2, it can be seen that the prevalence of obesity, sinus cardiac dysfunction, pulmonary insufficiency, anxiety, and depression of students in 5G and VR technology intelligent physical education teaching scheme is much lower than that in traditional intelligent physical education teaching scheme. In the 1000 m endurance run, standing long jump, solid ball throw, and pull-up of boys are statistically analyzed, and the data in Table 2 were obtained.

According to gender, the results of 1000 meter endurance run, standing long jump, solid ball throw, and pull-up of boys are statistically analyzed, and the data in Table 3 are obtained.

In Figure 2, we can draw the following conclusions: the exercise efficiency of students who adopt 5G and VR technology intelligent physical education teaching scheme will be higher than that of students who adopt traditional intelligent physical education teaching, and the number of people suffering from obesity, sinus cardiac dysfunction, pulmonary insufficiency, anxiety, and depression will be greatly reduced. This shows that for the implementation of 5G and VR technology intelligent physical education teaching scheme, physical education teaching for students is beneficial to the development of students’ physical and mental health.

### 4. Statistical Results of Students’ Physical Education Achievements

Review and count the sports achievements of students in 2020 and 2021, and statistically analyze the statistical data. Through these data, we can also compare the advantages and disadvantages of 5G and VR technology intelligent sports teaching scheme and traditional intelligent sports teaching scheme.

According to gender, the results of 1000 meter endurance run, standing long jump, solid ball throw, and pull-up of boys are statistically analyzed, and the data in Table 3 are obtained.

From the comparison data of physical performance of all boys in 2020 and 2021 in Table 3, it can be seen that the students who adopt 5G and VR technology intelligent physical education teaching scheme have better physical performance in 1000 m endurance running, standing long jump, solid ball throwing, and pull-up than those who adopt traditional intelligent physical education teaching scheme. In the 1000

<table>
<thead>
<tr>
<th>Group</th>
<th>Obesity rate (%)</th>
<th>Sinus dysfunction rate (%)</th>
<th>Pulmonary insufficiency rate (%)</th>
<th>Anxiety disorder rate (%)</th>
<th>Depression rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional teaching group</td>
<td>43.58</td>
<td>32.17</td>
<td>30.25</td>
<td>41.68</td>
<td>36.01</td>
</tr>
<tr>
<td>5G and VR technology teaching group</td>
<td>18.37</td>
<td>20.32</td>
<td>19.68</td>
<td>21.94</td>
<td>17.37</td>
</tr>
<tr>
<td>(t) value</td>
<td>0.369</td>
<td>0.657</td>
<td>0.468</td>
<td>0.582</td>
<td>0.461</td>
</tr>
<tr>
<td>(p) value</td>
<td>0.004</td>
<td>0.008</td>
<td>0.006</td>
<td>0.007</td>
<td>0.005</td>
</tr>
</tbody>
</table>

**Figure 2**: Comparison of obesity, sinus cardiac dysfunction, pulmonary insufficiency, anxiety, and depression among students with different teaching schemes.
meter endurance race, the time spent by students using 5G and VR technology intelligent physical education teaching scheme is 1.05 min less than that of students using traditional intelligent physical education teaching scheme. The distance of standing long jump is 1.71 m longer than that of traditional intelligent physical education. The throwing distance of solid ball should be 1.89 M away. The number of pull-ups should be 7.37 times more, according to Table 3, as shown in Figure 3.

As can be seen from Figure 3, the long-distance running ability of students who adopt 5G and VR technology intelligent physical education teaching scheme is stronger than that of students who adopt traditional intelligent physical education teaching scheme. It can also be said that the sports cells are relatively developed and the control of sports events is relatively simple.

According to gender, the results of 800-meter endurance run, standing long jump, solid ball throw, and sit ups of all girls in 2020 and 2021 are statistically analyzed, and the data in Table 4 are obtained.

According to the data in Table 4, it can be seen that there are similarities with boys’ sports scores. The sports ability and endurance of students using 5G and VR technology intelligent sports teaching scheme are better than those using traditional intelligent sports teaching scheme, which shows that using 5G and VR technology intelligent sports teaching scheme can promote the development of students’ sports cells and enhance their sports ability, According to the data in Table 4, see Figure 4.

It can also be clearly seen in Figure 4 that the sports scores of students who implement 5G and VR technology intelligent sports teaching scheme are better than those who adopt traditional intelligent sports teaching scheme, which shows that 5G and VR technology intelligent sports teaching scheme can be vigorously promoted and used, which is beneficial to students’ health.

5. Results of Questionnaire Survey on Students’ Sports Awareness

Through the retrospective investigation of students in 2020 and 2021, the number of absenteeism in physical education, the number of people with extracurricular exercise intention, and the number of people participating in sports-related interest associations are counted and analyzed according to the counted number, and the data in Table 5 are obtained.

It can be seen from the data in Table 5 that the students who adopt 5G and VR technology intelligent physical education teaching scheme have higher awareness and interest in sports than those who adopt traditional intelligent physical education teaching scheme, so the number of students absent from physical education class is greatly reduced. According to the data in Table 5, see Figure 5.

As can be seen from Figure 5, the use of 5G and VR technology smart sports teaching scheme can improve students’ interest in participating in sports and improve their awareness of participating in sports, which shows that 5G and

### Table 3: Comparison of boys’ 1000 meter, standing long jump, solid ball throwing, and pull-up sports results.

<table>
<thead>
<tr>
<th>Group</th>
<th>1000 m (min)</th>
<th>Standing long jump (m)</th>
<th>Solid ball throw (m)</th>
<th>Pull-up (times)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional teaching group</td>
<td>4.32</td>
<td>2.04</td>
<td>8.48</td>
<td>6.54</td>
</tr>
<tr>
<td>5G and VR technology teaching group</td>
<td>3.27</td>
<td>2.75</td>
<td>10.37</td>
<td>13.91</td>
</tr>
<tr>
<td>t value</td>
<td>3.627</td>
<td>3.215</td>
<td>6.249</td>
<td>1.034</td>
</tr>
<tr>
<td>p value</td>
<td>0.021</td>
<td>0.018</td>
<td>0.027</td>
<td>0.009</td>
</tr>
</tbody>
</table>

**Figure 3: Comparison of students’ physical performance with different intelligent physical education teaching schemes.**
VR technology smart sports teaching scheme is a very interesting and worth trying smart sports teaching scheme.

6. Discussion on the Application Effect of Intelligent Physical Education Teaching Scheme

China’s teaching system is mainly exam-oriented education, and the assessment of students is mostly based on the score system, and the proportion of physical education scores in the entrance examination at each stage is small. Therefore, the school does not pay enough attention to physical education, resulting in the decline of students’ comprehensive physical quality, and the age of myopia is getting older and younger, and the degree increases rapidly.

Since 2014, when the Ministry of Education proposed to educate students in knowledge, it is necessary to strengthen the requirements for students’ physical education. Major colleges and universities have responded to the call, increased the diversification of physical education and used modern chemical scientific means for teaching, improved students’ enthusiasm, took exercise as an interest training, and formed a good sense of exercise, so as to better promote the development of wisdom education.

The development of mobile communication technology has enabled 5G network to be applied in more fields. As the most advanced technology in the field of information technology infrastructure in China, many industries have broken through barriers and ushered in new opportunities for industry development. In this paper, the construction of stadiums and gymnasiums through 5G technology and the construction and application of smart stadiums and gymnasiums are used to increase people’s interest in physical exercise [6].

Science and technology development leads the innovative development of the industry. As the education industry is the birthplace of knowledge and information, it is also the main application base of advanced technology. Based on the characteristics of 5G communication technology and the application of VR HD video in physical education teaching business, this paper puts forward a new teaching scheme, constructs a detailed design scheme from the perspective of wisdom education, and introduces the application prospect of this scheme [7].

The process of modernization makes the former physical work paid into mental work. The education received by students is knowledge education, which is greater than everything. Therefore, both teachers and students ignore the physical quality education. This has caused the physical quality of modern young people not to meet the standard, so physical education has become an aspect in urgent need of reform. The emergence of smart physical education combines teaching with information technology, and adds 5G communication + VR high-definition video. Students can use their own tablet mobile device with VR glasses to download eagle eye decomposition 3D video of themselves and their peers in the teaching system. They can not only study in class, but also spend their leisure time after class, take exercise as an interest, and develop a good sense of exercise.

Table 4: Comparison of girls’ 800 m, standing long jump, solid ball investment, and sit ups.

<table>
<thead>
<tr>
<th>Group</th>
<th>800 m (min)</th>
<th>Standing long jump (m)</th>
<th>Solid ball throw (m)</th>
<th>Sit ups (times)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional teaching group</td>
<td>4.02</td>
<td>2.06</td>
<td>7.25</td>
<td>25.37</td>
</tr>
<tr>
<td>5G and VR technology teaching group</td>
<td>3.12</td>
<td>1.64</td>
<td>5.21</td>
<td>40.68</td>
</tr>
<tr>
<td>( t ) value</td>
<td>7.638</td>
<td>7.264</td>
<td>5.201</td>
<td>1.037</td>
</tr>
<tr>
<td>( p ) value</td>
<td>0.023</td>
<td>0.021</td>
<td>0.016</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Figure 4: Comparison chart of girls’ physical performance under different teaching methods.
I can also discuss the improvement methods of technical action with my classmates and realize extracurricular discussion, so as to improve physical quality and healthy physique. In order to truly realize the comprehensive innovation of physical education teaching mode in colleges and universities, it is necessary to actively introduce new ideas and new modes based on the application of new technologies, and comprehensively broaden the space of physical education teaching in [8]. Li Yihui carried out smart physical education teaching experiment by using the data platform provided by the “Smart Sports Classroom” project, smart equipment, and learning and training courses, and explored the basic mode based on “Smart Physical Education Classroom” based with the current high school physical education courses [9].

Yuancheng et al. (2021) to strengthen the application and implementation of modern information technology in sports, to strengthen the supervision of the intelligent sports industry, to overcome the problems existing in the development of intelligent sports, is the integrated development of intelligent sports and traditional sports path [10]. Through the construction and research of big data analysis of intelligent campus in higher vocational colleges, it can improve the function of intelligent campus, give full play to the functions of intelligent campus in teaching, research, and student management, and promote the development of colleges and universities scientifically and effectively [11]. Li Shuaishuai et al. (2021) to deeply optimize the innovation supply and demand development of intelligent sports; technology and talent level: to expand the data capacity of intelligent sports and industry, university, research and application talents [12].

7. Summary

With the continuous improvement of people’s living standards, the slogan of national fitness has been put forward. Life lies in sports. Scientific physical exercise can achieve physical enhancement through the development of sports. In particular, the development of mobile communication technology has added high-tech means to physical exercise, made sports more artificial intelligence, increased the nature of entertainment, and improved physical quality.

The younger generation is the fresh blood of social development, and their physical and physical quality education is the top priority. Therefore, paying attention to students’ physical health has set off the reform of the education system, and the emergence of intelligent physical education has enriched the physical education classroom of college students. Aiming at the current intelligent physical education, this study introduces 5G communication + VR high-definition video high-tech means. Students can download the eagle eye decomposition 3D video in the pedagogy system through the existing mobile communication equipment and VR glasses, so as to achieve fitness exercise anytime and anywhere, so as to combine interest and exercise, improve students’ exercise awareness, and create a healthy body at the

<table>
<thead>
<tr>
<th>Group</th>
<th>Absence rate of physical education (%)</th>
<th>Awareness of extracurricular exercise (%)</th>
<th>Participation rate of sports interest associations (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional teaching group</td>
<td>38.34</td>
<td>21.69</td>
<td>16.38</td>
</tr>
<tr>
<td>5G and VR technology teaching group</td>
<td>10.21</td>
<td>43.47</td>
<td>46.56</td>
</tr>
<tr>
<td>7 value</td>
<td>1.364</td>
<td>1.103</td>
<td>1.214</td>
</tr>
<tr>
<td>p value</td>
<td>0.013</td>
<td>0.008</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Table 5: Comparison of students’ physical education absence rate, extracurricular exercise intention, sports interest, and community participation rate.
same time. As students’ awareness of physical exercise is still in the state of leisure and entertainment, and a complete system has not been formed, there is still much room for development in the future. Let us work together to create a project integrating sports and entertainment.

The data of this study shows that the intelligent physical education teaching scheme using 5G communication + VR technology can improve students’ physical performance and physical quality. However, due to the small number of samples used in this experiment, the experimental results are not universal. Therefore, the number of experimental samples will be increased and the research technology will be optimized to make it the most suitable physical education teaching scheme for contemporary students.

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Conflicts of Interest

There is no potential conflict of interest in the paper, and the author has seen the manuscript and approved to submit to your journal. The author confirms that the content of the manuscript has not been published or submitted for publication elsewhere.

References


