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The Development Path of Building Physical Education Resource Platform under the Perspective of Digital Education

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Abstract: Physical exercise is an essential activity in people's daily life. The construction of the physical education resource platform can meet the needs of people's daily physical exercise. However, there are many ways to develop physical education. The traditional physical education resource platform technology is too backward, and the development is not long-term. In order to promote the better development of physical education, this paper studies the development path of physical education resource platform construction in the digital education perspective, follows the modern education theory and law, uses digital teaching resources, and teaches physical education in digital teaching mode in the digital teaching environment. Through the test of platform clicks and learning hours and the test of platform number on digital education physical education resource platform, it is found that: the number of platform clicks and platform learning number of digital physical education resource platform are increasing, and digital physical education resource platform can attract users well to learn physical education knowledge. Conducting on different citizens found that: the physical health index of citizens increased by 6.81%, the satisfaction score of citizens increased by 9.42%, the development path of digital physical education resource platform is better and more loved by people.

1. Introduction

The continuous development of digital education has brought many technologies into people's lives and made their lives colorful. The construction of sports resource platform can meet people's needs for fitness and leisure sports and provide them with more convenient and diversified services, and the integration of digital education city concept into education resource platform can better promote the development of education resource platform.

Many scholars have conducted cooperative research on physical education resources, and Curran C has conducted research on physical education resources and development prospects. The countermeasures of sports resource sharing and how to gradually face the society and the market have been discussed in order to make more rational use of college sports resources [1]. Qi S has

discussed the further development and application of college physical education information resources, covering from the construction and development of databases, the application of multimedia technology to the development and application of IRPECU's hypertext retrieval, homepage information navigation and other related disciplines [2]. Nielsen J has used the literature method and survey method to discuss the development and utilization of physical education resources in rural primary and secondary schools, and has proposed that in the development and utilization of physical education resources in rural primary and secondary schools, the investment in the development of physical education teachers should be increased in secondary schools and infrastructure investment, and the awareness of physical education teachers should be improved [3]. Fischer B has put forward the status quo of physical education resource sharing and the design principles of the sharing resource platform, making physical education a compulsory course for children. Students' physical and mental health is the first priority, and combined with the Internet, the sharing of teaching resources of physical education courses has become the content of physical education courses for students [4]. Petrass L has studied the sharing of sports resources in colleges and universities from the perspective of the standard construction and extensive utilization of teaching resources in colleges and universities. In order to standardize the differences between universities in transmission network, resource mode, application platform, management and service, some new modes among universities are used for real-time sharing [5]. The above research has shown that schools attach great importance to the application of physical education resources, but how to promote the application of educational resources has become a new problem. Smart cities make people's lives more and more convenient. Digital education can be used in physical education, where students watch sports videos and sports teaching animations through the platform to better understand and learn about sports. Da-Wei Cao uses multimedia digital platforms to provide a new direction for the development of physical education in colleges and universities, where digital physical education platforms can fully engage students' initiative [6].Ann MacPhail explores the student-centered relationship between a student-centered approach to digital technology and pre-service teachers' intrinsic motivation, learning climate, and academic achievement, using digital technology to engage in creative content production. Digital technology was found to play an increasing role in educational policy and the new physical education curriculum [7].Liu Huaijin studied the problems in the construction and application of digital teaching resources in regional basic education, using the physical education curriculum as an example, and proposed corresponding countermeasures and recommendations [8].Tanucan, Jem Cloyd M studied the technological knowledge of parish teaching content (TPACK) approach to distance digital instruction, and physical education teachers had an average level of readiness to conduct distance digital instruction in all knowledge areas of TPACK [9].Bodsworth Hannah found a number of pedagogical approaches reported for supporting technology integration and student learning in a physical education context, purposefully integrating digital technology into physical education, and ensuring that technology can help students to learn optimally [10]. The above studies reflect the portability of digital education, but the application of digital education concepts in physical education is less common.

Physical education can promote people's physical and mental health. The construction of the physical education resource platform can enable people to better carry out physical education. This paper has put forward the concept of smart sports in combination with smart cities, using more intelligent equipment to provide people with a platform of physical education resources. Through experiments, it is found that the smart physical education resource platform is more suitable for people to carry out physical exercise, and its development path can go longer.

2. Digital education resource platform construction

(1) Construction of digital sports development framework

The purpose of the construction of the digital physical education resource platform is to provide a network world that corresponds to the traditional physical world, making the virtual world compatible with the information in the real world one by one. In terms of infrastructure construction, the infrastructure layer is the basis for the implementation of the whole process of smart sports [11], with a creatable foundation, while storing a large amount of information, it must ensure that the data processing is running properly, and its operation must be informed at all levels through technical storage, reception, analysis and decision making, technical support is the key to maintain the operation of the entire process, through the operation to show the results of smart sports, and based on Show to get timely feedback on the existence of problems, smart sports development framework is shown in Figure 1, through this architecture sustainable development of digital sports can be compatible with the development of smart cities.

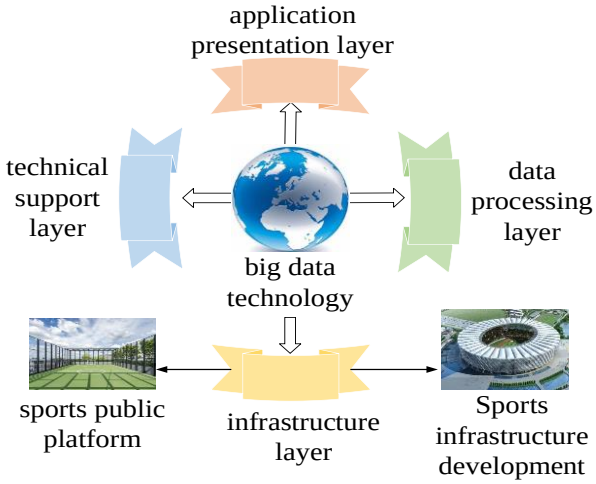


Figure 1: Construction of a framework for digital sports development

(2) Analysis of the development path of digital sports

The concept of digital sports emphasizes three aspects (organization (people-oriented), terminal (technology and equipment) and venue (sports stadium)) [12], and the analysis is carried out for the connection between the three points, in urban development, when people have the demand for physical exercise, firstly, people need stadiums to perform sports, then the digital physical education resource platform can provide people with sports methods and sports skills. Intelligent sports facilities can better help people to exercise, it can be said that without infrastructure as a guarantee, the construction of the platform is a lie, without intelligent equipment, can not provide people with scientific exercise, therefore, in the development of "digital sports", the digitalization of the management and operation of sports venues facilities Therefore, in the development of "digital sports", the network of sports public service information platform, the intelligent design of sports technology and personal products is the key to the whole operation, as shown in Figure 2.

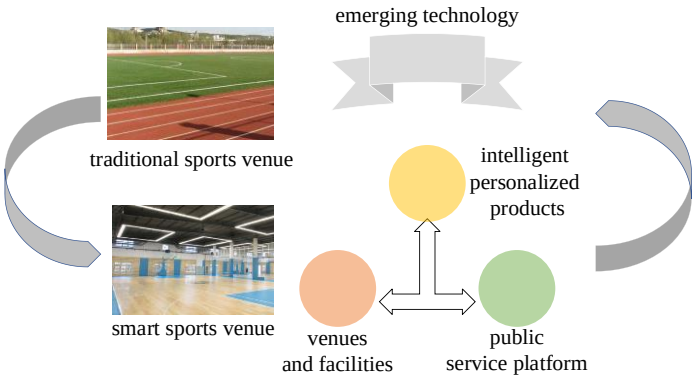


Figure 2: Construction of digital sports development pathways

(3) Characteristics of physical education in the digital context

1) Stereoscopic

Stereoscopic is a characteristic of physical education in a digital environment One of the characteristics of digital education is the multifaceted development of students, and the same is true for physical education. Teaching is no exception. Physical education is closely related to students' lives. The purpose of education is the multifaceted development of students. The interaction between physical education and life is what makes physical education valuable. The value of physical education lies in the interrelated nature of physical education. In the digital environment, IT information technology can present physical education skills in a very three-dimensional way and students can easily master physical education skills. This helps students a lot in teaching physical education.

2) Simulation

Simulation is another characteristic of physical education in a digital context. Teachers need to fully understand the physical condition of their students in order to better implement their teaching methods. Nowadays, secondary school students have varying levels of physical condition, and the lack of physical education equipment in many schools makes it difficult for teachers to implement physical education. By using information technology to guide students to visually watch sports videos, teachers can effectively improve students' ability to comprehend movements

(4) The significance of physical education in the digital context

1) Expanding resources and optimizing structure

In the traditional physical education teaching method, the teacher's explanation is the focus, and students only play the role of "receiver", the teacher's explanation is the students' learning, which to a certain extent stifles the students' independent inquiry, which is not conducive to the long-term development of students. Long-term teaching in this way will cause students to lose interest in physical education classes, which will also affect their motivation to exercise. Teachers can use many resources of digital information technology to optimize the structure of physical education teaching.

2) Enhance interaction and improve methods

All students face certain problems in the process of learning physical education, and if these problems are not solved effectively, they cause a certain degree of psychological stress to the students, especially to those who are in relatively poor physical condition. This is especially true for students who are in relatively poor physical condition. Communication between teachers and students is essential to address these issues. With the help of information technology, teachers can be aware of and communicate with students in a timely manner so that they can quickly adjust their teaching goals. Teachers can use information technology to understand students' psychological

problems in physical education, communicate with them, and quickly adjust teaching goals and methods to improve teaching effectiveness.

3. Decision Tree Requirement Discovery Algorithm

The decision tree algorithm is a process of decomposing samples by arranging a series of tree-like rules. This paper uses decision trees to evaluate the similarity of user images and query the needs of users [13].

The user image similarity evaluation is learned by calculating and judging the similarity between a given user image model and the user image model in the database. The user's current training image is called initial user training, denoted as UC_1. The existing training user pictures in the database are recorded as UC_2. By making a decision tree and performing node operations, the similarity of user pictures is obtained. The formula is as follows:

$$\mathrm{sim}(U,U^{'}) = \sum_{x=1}^{n} w_y \cdot simP_x(U,U^{'}) \tag{1}$$

$simP_x(U,U^{'})$ represents the node U and the corresponding node $U^{'}$, analogous to the xth attribute. w_x represents the weighted value of the attribute, and the object attribute refers to the element whose attribute value is another attribute. Category attribute means that attribute value is composed of categories of domain classification [14]. The attribute value can be represented by one or more values, so it is divided into multi-valued attributes and single-valued attributes, which correspond to different similarity calculation methods.

Character attributes are represented by HP. Numerical properties are represented by MP. Object properties are represented by NP. Class attributes are represented by DP. The calculation formula of character attribute similarity is:

$$simP_{(HP)}(hp_1,hp_2) = \begin{cases} 1 \mid hp_1 \cdot value = hp_2 \cdot value \\ 0 \mid other \end{cases} \tag{2}$$

The formula for calculating the similarity of single-valued numerical attributes is:

$$simP_{(MP)}(mp_1,mp_2) = \frac{\left\| mp_1 \right| - \left| mp_1 - mp_2 \right\|}{\left| mp_1 \right|} \tag{3}$$

The calculation formula of attribute similarity of single-valued object is:

$$sim_{(NP)}((np_1,np_2) = \sum_{x=1}^{i} w_y \cdot simP_x(np_1,np_2) \tag{4}$$

The formula for calculating the similarity of single-valued category attributes is:

$$simP_{(DP)}(dp_1,dp_2) = \frac{MAXL - \left| P(dp_1,dp_2) \right|}{MAXL} \tag{5}$$

$$sim(s,PS) = \max(sim_s(s,s_x) \mid s_x \in PS) \tag{6}$$

Using |PS| to represent the number of elements in a set, the formula for calculating the similarity between two sets is:

$$sim_{ps}(PS_1,PS_2) = \frac{(\sum_{S \in PS_1} sim(s,PS_2) + \sum_{S \in PS_2} sim(s,PS_1))}{\left| PS_1 \right| + \left| PS_2 \right|} \tag{7}$$

It needs to know the existence of platform user needs. It is necessary to analyze the needs of sports resources when users carry out learning activities on the platform. Through the resource demand representative model, the relationship between users and learning resources can be known to ensure that users can find corresponding resources in the online learning process. The discovery of resource requests can reduce unnecessary information in the process of users querying problems. At the same time, educational resource requests can be systematically represented to facilitate further research on technologies such as resource-driven teaching [15]. Therefore, the user's demand is represented by three dimensions: demand conditions, processing rules, and selection rules, and the user's resource demand is expressed as UR={QC,EF,OR}.

QC represents the set of query conditions for teaching resources, and the elements in the set represent different demand conditions, which are expressed in the form of vectors, so the query condition matrix is:

$$\begin{bmatrix} Q_1(q_{11}, q_{12}, \ldots\ \ldots, q_{1j}) \\ Q_2(q_{21}, q_{22}, \ldots\ \ldots, q_{2j}) \\ \ldots\ldots \\ Q_i(q_{i1}, q_{i2}, \ldots\ \ldots, q_{ij}) \end{bmatrix}, \quad i > 0, j > 0 \tag{8}$$

When a platform user requests teaching resources, the teaching resources required by the user are a collection of learning resources that match the QC request status. The learning resource set corresponding to each request state is the intersection of the resource sets corresponding to each vector. Therefore, if MU(Q) is used to represent the learning resource set corresponding to the demand condition, and mk(q) is used to represent the teaching resource set corresponding to each demand condition, then the platform's teaching resource user question can be expressed as:

$$MK(QC) = \bigcup_{x=1}^{i}(MK(Q_x)) = \bigcup_{x=1}^{i}(\bigcap_{y=1}^{j} mk(q_x)), i > 0, j > 0 \tag{9}$$

EF represents a set of rules for filtering and processing request conditions. The set of learning resources obtained according to the request conditions must be further processed to filter out unnecessary learning resources [16]. The training resource set compared with the filtering rules is denoted as mk(ef), and the package set is denoted as MU(EF). Then the large data set can be expressed as:

$$MK(EF) = \bigcup_{x=1}^{i}(mk(ef_i)), m > 0 \tag{10}$$

OR indicates the result ordering rule for educational resource requirements. The results of questioning and tracking of the learning resource set are measured by the pre-set weight distribution rules, and the learning resource questions are sorted according to the weight results, shown as $W = (W_1, W_2, \ldots\ldots W_3)$. The result set of teaching resources generated after the query review is shown as $MK = (MK_1, MK_2, \ldots\ldots MKW_j)$ and the final result of the big data query is:

$$W(MK) = (\coprod_{x=1}^{i} W_x(MK_1), \coprod_{x=1}^{i} W_i(MK_2), \ldots, \coprod_{x=1}^{i} W_i(MK_j)), m > 0, n > 0 \tag{11}$$

The following processes are constructed from different elements:

$$\begin{Bmatrix} courses \\ object \\ mission \end{Bmatrix} \xrightarrow{yields} QC \tag{12}$$

Each character element in the set is represented as an $object = < J^{object} > : \{Media, Category, Sub-Obj, O\,\mathrm{Re}\,lation\}$. Each character element forms a query state, which also evaluates whether the similarity is greater than SIM. Finally, according to a set of source-based sets QC_O obtained from the learning object, the final set of teaching resource requirements is:

$$MK_{QC} = QC_p \cup QC_T \cup QC_O \tag{13}$$

According to the platform user User and learning role Role in the user portrait, the screening rule EF for teaching resource requirements is constructed. The specific content of the definition rule is as follows:

$$\begin{Bmatrix} designer \\ role \end{Bmatrix} \xrightarrow{maps} EF \tag{14}$$

According to the user role element model of the user portrait, if the role of the platform user is not related to the current teaching resource demand user portrait, the teaching resource demand would be deleted. Using the role elements to evaluate the similarity, the final set of teaching resource requirements is as follows[17]:

$$MK = MK_{QC} - MK_{EF} \tag{15}$$

According to the learning process courses, learning object, learning task mission and learning role part in the user portrait elements, the EF screening rules for generating resource requirements, the similarity of user images and the selection weight are calculated [18-19]. The specific contents of the definition rules are as follows:

$$\begin{Bmatrix} part \\ mission \\ courses \\ object \end{Bmatrix} \xrightarrow{maps} OR \tag{16}$$

The permutation weights represent:

$$w = w_P \cdot sim_P + w_M \cdot sim_M + w_C \cdot sim_C + w_O \cdot sim_O \tag{17}$$

The query vector for the task is:

$$\overrightarrow{QC_t} = \{TCategary, Ttime, TScription, Sub-TScription, TRlation\} \tag{18}$$

The query vector based on the learning object is:

$$\overrightarrow{QC_O} = \{Media, Category, Sub-Obj, ORlation\} \tag{19}$$

The query vector based on the learning process is:

$$\overrightarrow{QC_P} = \{Sub-\mathrm{Pr}\,o, POutput, P\,\mathrm{Re}\,source, PCime, EPvent, P\,\mathrm{Re}\,lation\} \tag{20}$$

The filter vector based on user attributes is:

$$\overrightarrow{EF_D} = \{UEL, Urecord, USearch, UFavorite, UEvaluated\} \tag{21}$$

The filtering vector based on the learned role is:

$$\overrightarrow{EF_R} = \{Class, TRlation, RPosition, R\,\mathrm{Re}\,lation, Role - Class\} \quad (22)$$

The sorted vector is:

$$\overrightarrow{OR} = \{sim_R, sim_T, sim_P, sim_O\} \quad (23)$$

4. The impact of digital education on physical education

(1) Experimental process

The digital physical education resource platform was released, and a 6-week experimental test was conducted with the traditional physical education resource platform, and the test content was the platform click and learning hours test and the platform number test. At the same time, 20 citizens were randomly selected to participate in the experimental test in a certain place and divided into four groups, group 1 and group 2 were the control group, and group 3 and group 4 were the experimental group. Among them, the control group performed physical exercise according to the traditional physical education resource platform, and the experimental group performed exercise according to the digital physical education resource platform, and the test time was 6 months. After the test, the physical health index test and satisfaction index test were conducted on the citizens of the experimental group and the control group, and after the test, the differences in the experimental results between the two groups were observed and analyzed.

(2) Experimental data

All the citizens participating in the test do physical exercise at the same time every day. In order to avoid errors, the number of the elderly and children in each group is the same. The specific data of the citizens in the control group are shown in Table 1, and the specific data of the citizens in the experimental group are shown in Table 2.

Table 1: Specific data of citizens in the control group

		age	gender	daily exercise time
Group 1	1	9	male	1.5 hours
	2	11	Female	1.5 hours
	3	8	male	1.5 hours
	4	36	male	1.5 hours
	5	41	Female	1.5 hours
Group 2	6	38	male	1.5 hours
	7	40	male	1.5 hours
	8	69	Female	1.5 hours
	9	70	male	1.5 hours
	10	71	Female	1.5 hours

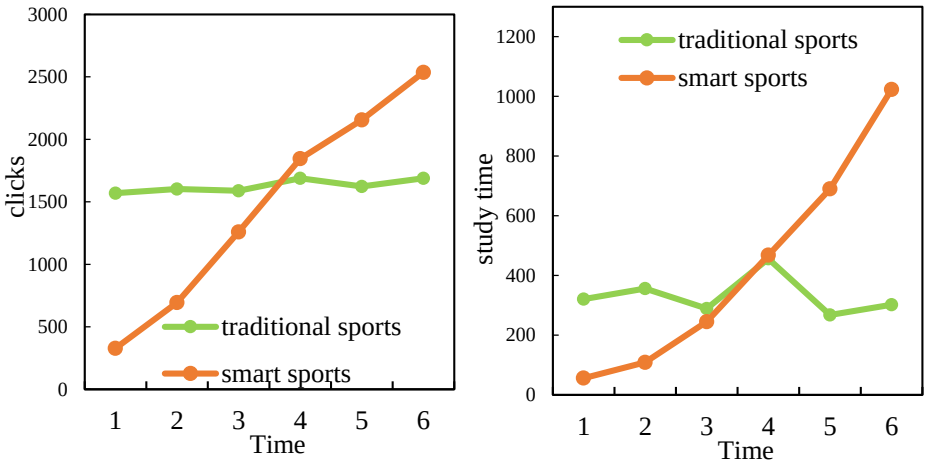
Table 2: Specific data of citizens in the experimental group

	age	gender	daily exercise time	age
Group 3	12	Female	1.5 hours	12
	11	Female	1.5 hours	11
	10	male	1.5 hours	10
	41	male	1.5 hours	41
	39	Female	1.5 hours	39
Group 4	37	male	1.5 hours	37
	42	male	1.5 hours	42
	74	Female	1.5 hours	74
	71	male	1.5 hours	71
	72	Female	1.5 hours	72

5. Development Path of Smart Sports

(1) Test of platform clicks and learning time

The digital physical education resource platform was published online, and a 6-week click count was conducted in the background to compare it with the traditional physical education resource platform online and observe the difference in the change of click count between the two, and the results are shown in Figure 3.



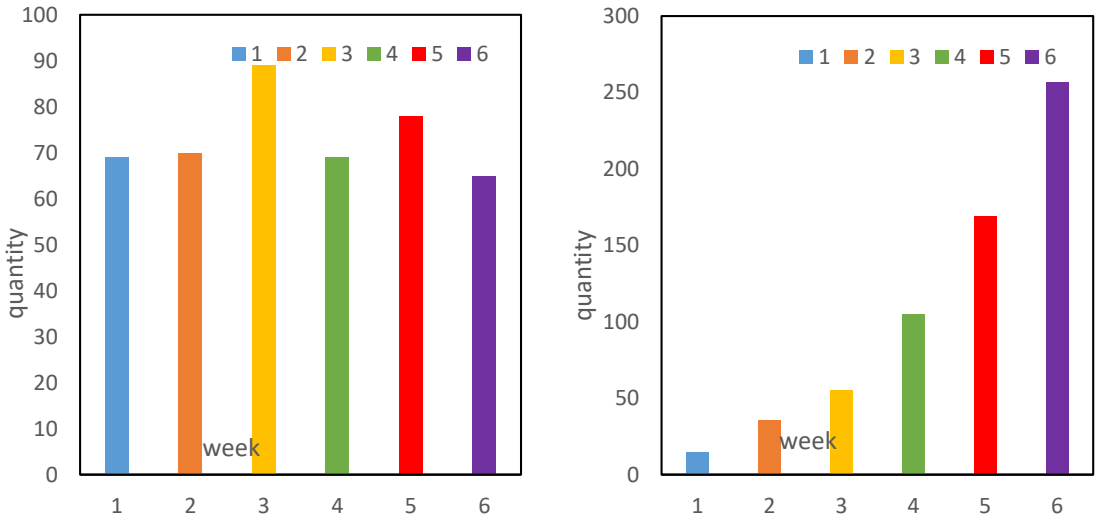
A: Clicks test results **B:** The result of the study duration test

Figure 3: Platform clicks and learning duration test

In Figure 3, Figure A shows the experimental results of platform click volume test, and Figure B shows the results of learning hours test. In Figure A, the user click volume of traditional physical education resource platform basically maintains between 1500 and 1800, with no obvious rising trend, while the click volume of digital physical education resource platform is steadily rising, from 328 to 2536, which is lower than that of traditional physical education resource platform in the first three weeks The number of clicks is higher than that of the traditional physical education resource platform from the fourth week, and the development situation is better than that of the traditional physical education resource platform. In Fig. B, the learning hours of users of traditional physical education resource platform keep changing, increasing and decreasing, including the longest learning hours of 456 minutes in the 4th week, and the learning hours of users of digital physical education resource platform keep increasing, with 56 increasing to 1023, and the learning hours are higher than those of traditional physical education resource platform from the 4th week. In summary, the digital physical education resource platform has a better development path and is more popular.

(3) Platform number test

The number of people on the two platforms was statistically tested to test the difference in the number of weekly learning and exercise between the two platforms. Test statistics only record users whose study time is greater than 10 minutes. Users less than 10 minutes are not recorded and counted, and the results are shown in Figure 4.



A: Traditional physical education resource platform **B:** Smart Physical Education Resource Platform

Figure 4: Platform population test

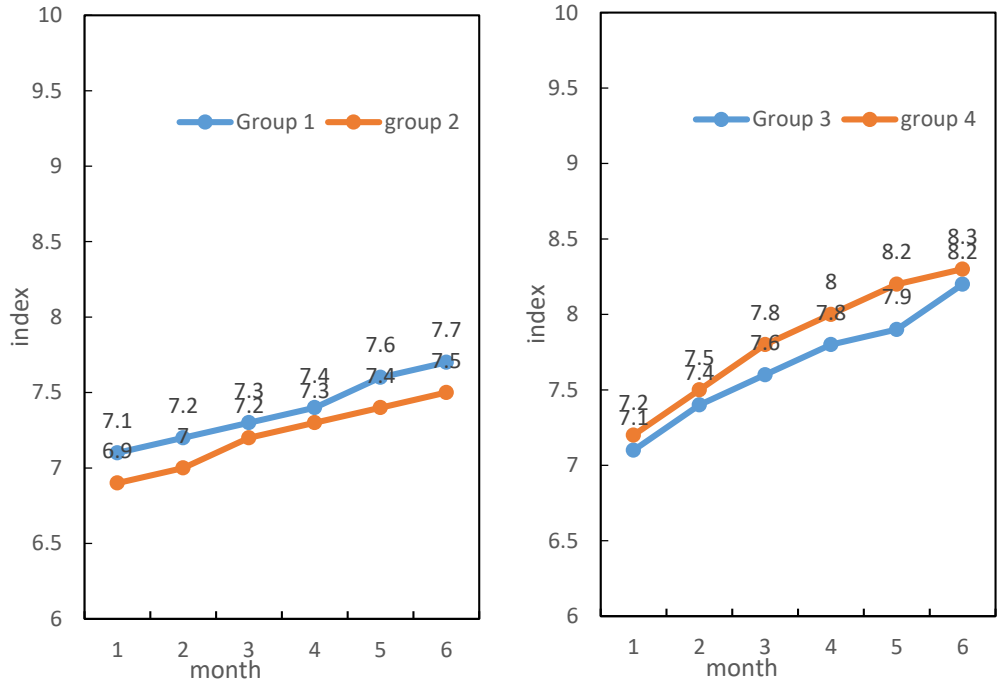
In Figure 4, Figure A shows the statistical results of the number of people on the traditional physical education resource platform, and Figure B shows the statistical results of the number of people on the digital physical education resource platform. In Figure A, the number of people on the platform fluctuates little effect every week and is more stable, and the maximum number of people on the platform is 89 in the 3rd week, and the minimum number of people is 65 in the 6th week. In these 6 weeks of conducting the test, the number of people on the traditional physical education resource platform does not change significantly trend of growth and poor development effect. In Figure B, it is obvious to observe that the number of digital physical education resource platform grows rapidly from 15 to 257, and after 6 weeks of experimental testing, it increased by 242, among which the number of the platform showed a doubling in the 2nd and 4th weeks, and in the first three weeks, the number of the digital physical education resource platform was lower than the number of the traditional physical education resource platform, and in the 4th, 5th, and 6th weeks The number of digital physical education resources platform is higher than the number of traditional physical education resources platform.

(3) Physical health index test

During the experimental test conducted by the experimental group and the control group, the physical health indexes of each group after physical learning and exercise were counted to observe the difference of the digital physical education resource platform compared with the traditional physical education resource platform on the physical health of people, and the statistical results were the average physical health index results of each group, and the results are shown in Figure 5.

In Figure 5, Figure A is the experimental test result of the control group, and Figure B is the experimental test result of the experimental group. The growth rate of the citizens' health indicators in the experimental group is higher than that in the control group. In Figure A, the health index of citizens in Group 1 increases from 7.1 to 7.7, an increase of 0.6. The rate of increase is 8.45%. The health index of citizens in Group 2 increases from 6.9 to 7.5, an increase of 0.6. The increase rate is 8.69%. The average health index of citizens who use traditional physical education resource platforms for physical training increases by 8.57%. In Figure B, the health index of citizens in group 3 increases from 7.1 to 8.2, an increase of 1.1. The rate of increase is 15.49%. The health index of citizens in Group 4 increases from 7.2 to 8.3, an increase of 1.1. The rate of increase is 15.27%. The average increase of health indicators of citizens who use digital physical education resource platform for physical training is 15.38%. In summary, the digital physical education

resource platform is more suitable for citizens to perform physical exercise than the traditional physical education resource platform, and the citizens' physical health indicators increased by 6.81%.



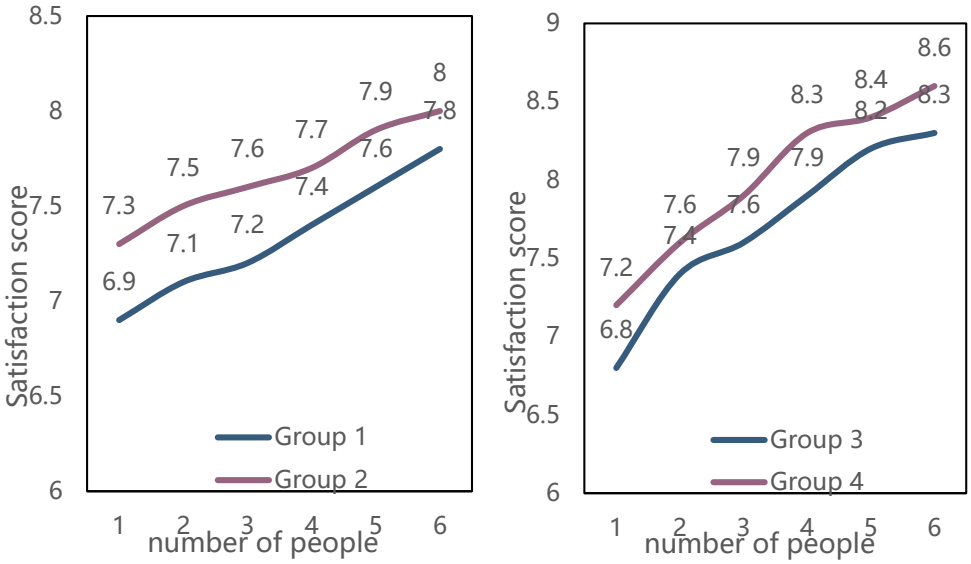
A: The test results of the control group **B:** Test results of the experimental group

Figure 5: Physical health indicator test

(4) Satisfaction index test

The 20 citizens who participated in this test were asked to rate the satisfaction of the physical education resource platform used in the test out of 10, to test which is more satisfying to the citizens between the digital physical education resource platform and the traditional physical education resource platform, and the results are shown in Figure 6.

In Figure 6, Figure A is the experimental test result of the control group. Figure B shows the experimental test results of the experimental group. The growth rate of the citizen satisfaction score of the experimental group is higher than that of the control group. In Figure A, the citizen satisfaction score for Group 1 has increased from 6.9 to 7.8, an increase of 0.9. The increase rate of satisfaction has been 13.04%. The Citizen Satisfaction Score for Group 2 has increased from 7.3 to 8, an increase of 0.7. The rate of increase in satisfaction has been 9.58%. The average health index of citizens who used traditional physical education resource platforms for physical training has increased by 11.31%. In Figure B, the physical fitness index of group 3 has increased from 6.8 to 8.3. up 1.5. The rate of increase is already 22.06%. The physical fitness index of group 4 has increased from 7.2 to 8.6 and has risen by 1.4. The rate of increase is already 19.4%. The average increase in health indicators of citizens who used the digital physical education resource platform for physical training was 20.73%. In summary, the digital physical education resource platform is more popular and preferred by the citizens than the traditional physical education resource platform, with a 9.42% increase in citizen satisfaction rating.



A: The test results of the control group **B:** Test results of the experimental group

Figure 6: Satisfaction indicator test

6. Conclusion

With the development of the times, traditional physical education can no longer meet the needs of people's daily life. The physical education resource platform in the field of digital education in this paper can provide physical education resources for people of different ages and help people to carry out reasonable physical exercise, and the intelligent exercise situation can better attract people's attention and increase their interest in physical exercise.

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