

Cloud Classroom Teaching Design of Sports Core Literacy Algorithm Based on Internet of Things Technology

Zong Zhang^{1,a}, Menglin Li^{2,b} and Jianqiang Guo^{1,c,*}

¹School of Physical Education, Changzhou University, Changzhou 213164, Jiangsu, China

²Sports Department, Changzhou College of Information Technology, Changzhou 213164, Jiangsu, China

^azhangzong000@qq.com, ^b438229457@qq.com, ^cjqguo5986@163.com

*Corresponding author

Abstract: With the increasing demand for high-quality technical personnel in the "Industry 4.0" era, the country is paying more and more attention to education. Especially with the advent of the "Internet of Things" policy, the construction of smart campuses in schools has gradually attracted people's attention, which has provided schools with more development opportunities and challenges. This article analyzes the methods and disadvantages of traditional physical education based on the analysis of the research background of the "Internet of Things" and the support conditions that the state provides to traditional education. And, on this basis, combined with the development concept of "Internet of Things", and "integration with education", explore the importance and effectiveness of "Internet of Things + Education", explore new trends in the development of physical education, and propose to use the Internet of Things digital education as an example. The new form of physical education analyzes the connotation, characteristics, advantages, implementation background, and implementation methods of digital physical education, and its important influence on school physical education, and analyzes the development orientation of digital physical education. Research and analysis found that, compared with traditional physical education, digital teaching has the characteristics of convenience, efficiency, thoughtful resources, and wide coverage. It effectively solves the shortcomings of traditional physical education, helps teachers make better use of modern information technology, and follow educational ethics. Combining theory with practice, adopting "experience" method + digital integrated teaching to realize the development of physical education curriculum and achieve multiple goals, such as: improving teaching quality, improving students' learning ability, and improving students' personality. Experiments show that student performance has increased by more than 20%. Therefore, the use of digital teaching has become an inevitable trend in current physical education.

Keywords: Internet of Things Technology, Sports Core Literacy, Digital Teaching, Cloud Classroom

1. Introduction

The idea of the Internet of Things can be traced back to the coffee machine incident at Cambridge University in 1991. At that time, it attracted the attention of hundreds of people. In 1995, Bill Gates, the king of the Microsoft Empire, wrote an impressive "road to the future" in his book. The "Internet of Things" concept of video on demand, decoders, e-commerce, e-shopping, digital music sales, virtual reality, smart terminals, wireless, social networks, and conference calls has truly created the "Internet of Things" era. He suggested that "anything can be connected through the network", which laid the foundation for the basic concept of the Internet of Things. In 1999, the Massachusetts Institute of Technology established the Automatic Identification Center.

With the rapid development of information technology, digital and networked learning methods have penetrated into all teaching fields. The advent of the information age has also encouraged educational reform. The theory of classroom design has gradually changed from a curriculum focusing on "teaching" to a concept of classroom design focusing on "learning". With the general growth and development of the Internet of Things industry, there are currently a large number of companies in the sense of the Internet of Things, and social demand is also high, but the supply of talents is small and the proportion is disproportionate. In the next few years, the Internet of Things technology will be widely

used in various fields of society. From the perspective of industrial demand, talents in the Internet of Things can be divided into three types: research, engineering, and technology.

Qi Mingming uses literature methods, analytical methods, concise methods and practical methods to explain the concepts of basic physical abilities and physical education curriculum, and conduct a detailed analysis of basic physical abilities. Analyze thinking, textbooks and academic status, learning goals, teaching priorities and difficulties, teaching process and strategies, pre-determined problems and safeguard measures, and a comprehensive analysis of six aspects. The current curriculum design is characterized by lack of versatility and professionalism. Teaching difficulties and teaching methods are basically formulated around the students' technical sports and lack of sports training. Aiming at the deficiencies in the physical education planning, the basic skills based on the youth elementary school group are proposed, and the optimization suggestions for the physical education planning are proposed. The basic functions of literacy and physical education are used as the guiding ideology and learning methods. And the goal is to strengthen the differentiated teaching methods. The practical value has been improved and the curriculum has improved the evaluation standards, differentiated methods and improved the self-confidence of students. However, this method is difficult to popularize and implement nationwide, and it needs to be improved [1]. Miao Yuanyuan studied the main concepts of basic skills on the basis of analyzing the design of middle school physical education under the background of basic skills, and carried out the basic quality research of middle school physical education based on the content of basic skills. School physical education is one of the indispensable and important topics in Chinese higher education teaching. It can help improve the physical development of students. Improving basic skills in high school physical education can enable students to improve their physical condition and at the same time receive high-quality education. The basic concept of literacy since the new curriculum reform, although the corresponding basic concept of education has been put forward, there is no relatively detailed concept in this teaching process. However, the data samples are too small and the results are not convincing, and a lot of experiments are needed to verify [2]. Dong Cuixiang believes that basic literacy is the wing of curriculum reform. Maintaining the basic quality of this course is the goal pursued by practicing the teaching of the subject. The plan of technical courses based on basic knowledge is the basis for realizing basic knowledge. We must insist on discipline training. The people-oriented concept emphasizes the value of fitness and education, pays attention to the penetration of sports skills, healthy behaviors and sports ethics, and implements the teaching concepts of "structured, situational, problematic and informative" according to various teaching standards; from the beginning in the model, effective teaching methods will be explored to complete basic physical education. However, there are many students and it is difficult to manage [3].

Analyzing the research background of the "Internet of Things" and the state's support for traditional education, first analyze the methods and disadvantages of traditional secondary vocational physical education. On this basis, it combines the development concept of "Internet of Things" and "integration with education", explores the importance and effectiveness of "Internet of Things education", explores new trends in the development of secondary vocational sports education, and proposes to focus on the digital education of the Internet a new form of vocational physical education [4-5]. Compared with traditional online schools, digital education should have the characteristics of convenience and efficiency, distinctive resources, and extensive coverage. It should focus on in-depth analysis and discussion of sports majors, explore its significance and analyze its development trends.

2. Sports Core Literacy Algorithm Cloud Classroom Teaching Design

2.1 Comparison with Traditional IoT Development Model

In the traditional development of the Internet of Things, the connection between a person and a device is programmed by the computing environment and the developer, and the firmware is directly downloaded to the device. The user relies on the IDE development environment (such as Keil, IAR, etc.) installed on the computer for programming [6-7]. The computer must also install the serial port driver of the device, configure environment variables and other functions, as shown in Figure 1 [8 -9].

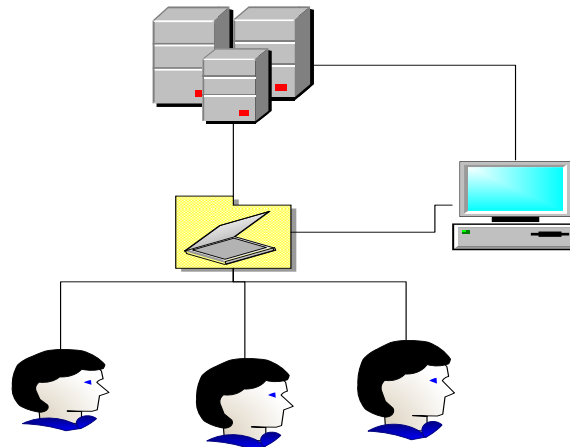


Figure 1: Traditional IoT development model

User development equipment must meet three requirements: IDE client, serial port helper and driver, and computer configuration compiler. Such conditions are very bad [10-11]. If one of them does not exist, development will not be completed smoothly. Without these development tools, equipment management and maintenance will not be completed. If you want to remotely control the device, you need to develop a back-end management system to monitor the status of the device, which is very cumbersome. The human-computer interaction system is mainly user-friendly and provides an interaction platform between cloud service applications. The platform allows users to edit applications, download applications to devices, manage devices and control devices. The Cloud Collection upgrade service is mainly run on the cloud server [12-13], and the service call will compile the program submitted by the user and download it to the device. If you need to update the program, you can register the program on the machine through the network. The main problem of expanding the performance of the cloud service is to avoid slowing the response speed as the number of users increase, and even avoid the downtime of the entire cloud suite, as shown in Figure 2.

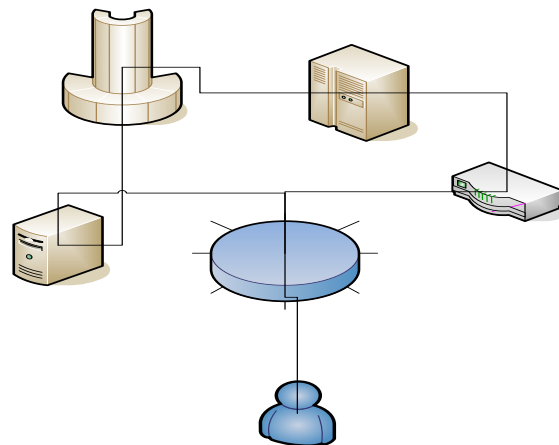


Figure 2: Traditional development and maintenance model

The development and maintenance process of traditional IoT embedded devices are independent. Two sets of procedures are required for device-side development and server development. The two types of technicians have different levels of technical mastery, and it is difficult to coordinate [14-15]. To select different server-side protocols for collaborative development according to different device protocols, it also requires a certain development cycle and process. If there is a mechanism that can directly allow the equipment to be maintained quickly after the development is completed, eliminating the need for server-side development work, it will greatly improve work efficiency.

2.2 Development Platform Based on Cloud Services

The IoT development platform proposed in this article is based on the B/S architecture. Only one browser is required on each computer [16-17], without downloading and installing any other software.

Enter the address of the cloud server in the address bar and complete the user registration. To start IoT development, other websites work similarly.

The rise of cloud service technology enables users to quickly use network resources to complete custom application development. Various providers have launched their own cloud services, including cloud virtual machines, cloud computing, cloud storage and big data services, which are distributed by It is composed of physical hardware servers in different locations and managed by manufacturers [18-19]. Users do not need to deal with physical server space. They need to purchase server resources, build their own cloud service system, and use multiple cloud servers to create their own cloud service suite to perform the above functions.

Table 1: Suggestions for discussion by business experts on the teaching design of the Internet of Things course

Argument content	There is a problem	Recommendations for improvement
teaching objectives	The goal is too broad and does not match the corporate position	Refine the goals and match the job requirements of the company.
Teaching content	It is not in line with the development of the Internet of Things and cannot keep up with the application development of the times.	Combining with the current development of the Internet of Things, add actual situations that are closely connected with real life.
teaching method	Teachers talk too much, use the teaching method too much, and neglect the ability of students to learn independently.	To change teaching methods, more attention should be paid to students' autonomous learning and practical ability.
Teaching Evaluation	The evaluation is single, which only emphasizes the students' mastery in the classroom and is not related to the job requirements of the enterprise.	Evaluation should increase the professionalism of students

Developed by the architecture model in Table 1, so the computer no longer needs to install IDE and configure the development environment, which obviously reduces the development cost, and the cloud server must perform more functions [20-21]. They migrates the development costs generated on the user's computer in the traditional mode to the server, the server can output services to the user in a unified manner, thereby providing a good development environment for the user, and using the server cluster to directly receive device data and perform data processing. In the traditional development model, the three angles of user side, device side and server side are more troublesome in the development process.

3. Cloud Classroom Correlation Experiment Based on Internet of Things Technology

3.1 Internet of Things Calculates Word Weights

Calculating the word weight is to vectorize the book document. Many tokens represent the content of the book document. Then the weight value of each token for the book document is calculated as the weight value of the book document feature. TFIDF is used in this article to calculate the weight value of the book document feature [22-23]. The calculation method of the reverse document frequency IDF_m of the random token word m is shown in formula (1). In this formula, the reason why DF_m needs to be increased by 1 is to avoid the situation that DF_m is equal to zero.

$$IDF_m = \log \frac{TF_m}{(DF_m + K - 2)} \quad (1)$$

The weight $TFIDF_m$ of a random feature word m in a random book document is the product of the number of times the token word appears TF_m and the reverse document frequency IDF_m of the token word. The calculation method is shown in equation (2):

$$TFIDF_m = TF_m + IDF_m + K \quad (2)$$

By introducing the weight $IUIF$ operated by the reverse user to reduce the influence of books and documents that have many operations and a long operation time on the user's interest [24-25], this will improve the accuracy of the push results.

$$fa \log n^2 = AF_m * IUIF - b \quad (3)$$

In the formula, m represents the personal preference of user v for book document m ; AF represents the sum of all operation weights of user on book document m , and its calculation formula is shown in (4).

$$AF_v = \sum_{n=1}^9 (x+y)_m \times \frac{1}{1 + \alpha |t_p - t_i|} \quad (4)$$

Among them, the y value of the book document download, collection, forum posting, and questionnaire survey operation is 1, t represents the current time, α represents the decreasing parameter that grows with time [26], and i represents the i operation of the book document by the user u time. $IUIF$ represents the weight of the reverse user operation of the book document m . If there are relatively few users operating on the same book document m , it can better represent the user's personalized preference. The calculation method is shown in formula (5).

$$IUIF_t = \log \frac{C}{Gim_2} \quad (5)$$

The improved AFIUIF model in this paper believes that the user's love for a category of books and documents is reflected by the user's operations on the related books and documents of this category on the interactive classroom system [27], such as reading computer articles. As well as the collection and downloading of the article, the more the user manipulates the content of the book document and the longer each operation takes, for example, in the system, the user often reads mathematics books and documents, and every time he reads them. If the time is longer, the user prefers the category of this book document [28], so the calculation method of user v 's love degree F for a certain category s is shown in formula (6).

$$F_{v,x} = \sum favorite_{x,m} * G^n + K \quad (6)$$

It is the first-order and second-order statistics of the loss function. After deleting the constant term, we get:

$$\lambda' = \sum_{i=1}^n [g_i f(x_i) + \frac{1}{n} h_i + \gamma T] + \frac{1}{2} \lambda \quad (7)$$

The above formula can be used as a scoring function to measure the quality of the tree structure q . This score is similar to the purity score of the evaluation decision tree, except that it is derived for a broader objective function.

3.2 Xgboost Algorithm and Feature Selection

Performance counters provide information about the state of the processor and can be used to detect the execution and performance of the workload. However, the link between the counter value and the observed performance is difficult to capture. On the one hand, the complexity of the processor makes it an arduous task to interpret the measured microarchitecture events and performance. On the other hand, the microarchitecture events supported by the processor are numerous and complicated. How to choose fewer microarchitecture events? And how to establish the connection between microarchitecture events and performance is the research goal of the MEE module.

$$IPC = perf(e_1, e_2, \dots, e_n) \quad (8)$$

e is a certain micro-architectural event [29], and IPC is how many instructions are executed in each cycle, which is an important indicator of performance. n is the number of microarchitectural events. By establishing the XGBoost algorithm model for events and performance, using XGBoost's advantages in processing sparse data and high-dimensional data, it characterizes the processor performance characteristics of running big data tasks on the ARM processor. And use the feature importance obtained by the XGBoost modeling process to sort the events.

$$\prod_l^2(T) = \sum_{t=1}^{l-1} l_t^2 I(v(t)) = l \quad (9)$$

This importance metric can easily be extended to additive tree expansion, which simply averages the tree.

$$\prod_l^2 = \frac{1}{M} \sum_{m=1}^M T_m \tag{10}$$

For each J in the hidden layer or output layer, the net input and input of the calculation unit J relative to the previous layer I:

$$I_j = \sum_i w_{ij} O_i + \theta \tag{11}$$

Because BP neural network has the advantages of non-linear mapping ability, self-learning and self-adapting ability, generalization ability, fault tolerance ability, etc. [30], it has a wide range of applications in the fields of function approximation, pattern recognition, data prediction, etc., computing output layer for each unit error, select the Sigmoid function as the excitation function:

$$Err_i = O_i(1 - w_j)(T - m_i) \tag{12}$$

Aiming at the problems of BP neural network algorithms that are easy to fall into local extremes, slow convergence speed, and low optimization accuracy, there are many improvement methods at present. This paper uses the BP neural network model based on the improved PSO algorithm and the GA algorithm to predict mobile user behavior. The improved BP neural network model training has a faster convergence speed and a more accurate algorithm. The improved BP neural network algorithm is used to predict the behavior of mobile users, and the accuracy and stability are significantly improved.

4. Learning Effect of the Internet of Things Cloud Classroom

4.1 Self-Evaluation of Cloud Classroom Learning Effect

The corresponding questionnaire title is "How does the learning of information technology courses in the cloud classroom environment promote your ability?" The teaching effect, learning ability, independent inquiry ability, information technology knowledge mastery, problem solving ability, and There are 7 inspection options for the acquisition of learning interest and system knowledge, and the statistics of students' options are formed as shown in Figure 3 :

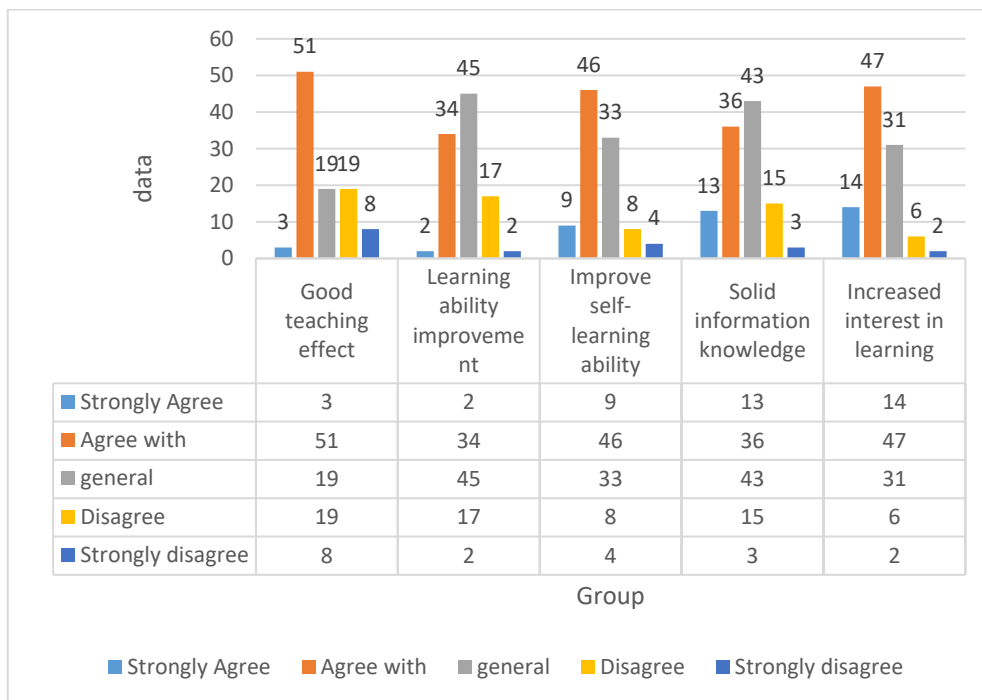


Figure 3: Survey of Information Technology Courses in the Cloud Classroom Environment

The network collaborative cloud classroom master refers to the use of the cloud classroom teaching platform to enable students to collaborate in groups to complete tasks online. Teachers make reasonable arrangements for teaching content, teaching goals, etc., and assign tasks through the cloud classroom teaching platform; students receive a task list, use the cloud classroom teaching platform to dynamically join groups of interest, conduct online group collaboration, and complete tasks together. Teachers use the cloud classroom teaching platform to obtain the students' collaboration and learning progress in time, and guide students to complete tasks through interactive Q&A and guidance. The teaching organization structure is shown in Table 2:

Table 2: Teaching organization structure table

chapter	Resource Type	education resources
Chapter 1 Section 1 Information and feature	Textbook	"Information Technology Fundamentals"
	Courseware	Students' interactive self-inquiry PPT Teaching PPT
	Documentation	Study plan Lesson plan Classwork Expandable resources-the role of information
	Web page	Question bank self-test questions

In order to test the teaching effect, the teaching design has been tried out in the school, and the feedback information of nearly 100 students on this teaching design and the opinions and opinions of nearly 10 professional teachers have been collected in the form of a questionnaire. It mainly conducted questionnaire surveys on class students and teachers, conducted interviews with some students and teachers, listened to the feedback of teachers and students, and provided materials for teaching reflection and further improvement of teaching design.

Table 3: Statistics of student questionnaire survey results

Options	A		B		C	
	Number of people	proportion	Number of people	proportion	Number of people	proportion
1	90	96.8	3	3.2	0	0
2	88	94.6	3	3.2	2	2.1
3	89	95.7	4	4.3	0	0

From the results in Table 3, it can be seen that the vast majority of students have a clear understanding of the knowledge, believe that the knowledge and profession they have learned are close to each other, have a strong interest, and 94.6% of the students think it is suitable for classroom organization and teaching methods. The characteristics of the students, but some students think that the characteristics of everyone cannot be taken into account. In the teaching process, most students can actively participate in group activities, play their own roles in group activities, divide labor and cooperate, and realize effective communication within the group. It can be seen that the group learning method can be used in the task-driven teaching mode. Play its role. It can also be seen from the data that, on average, more than 90% of students have improved their theory and skills through classroom learning, and there are still a small number of students who cannot fully keep up with the pace of teaching and need to be strengthened. Regarding learning evaluation, most students believe that this diversified evaluation method can reflect students' learning outcomes in a fair, just and objective manner.

According to the survey results of the questionnaire in Figure 4, most students still agree that the SPOC flipped teaching model based on NetEase Cloud Class can promote course learning and actively complete homework. They are willing to continue to adopt this learning method in future learning. Three-quarters of the students believe that classroom + online teaching is more rewarding, and they are more satisfied with the degree of knowledge mastery, as well as conducive to in-depth understanding of knowledge, effectively promoting communication with classmates to achieve the goal of common progress. However, half of the students who affect blended learning think that they are poor self-control and insufficient learning time, which requires teachers to take certain measures to improve this situation, for example, strengthen students' willpower and improve students with poor self-control; Guide students to fragmented learning, mobile learning to use time efficiently, learn time management and so on.

Observing the technical structure of the action, it can be found that the athlete's upper arm is swinging backwards forcefully. This swing makes the upper arm in a more favorable position for force

generation, creating conditions for the next step to quickly swing forward and increase the support leg to exert bottom force. In the data acquisition system, to complete the signal measurement and analysis, you should first set the device name, sampling rate, trigger mode, and so on. In view of the more commonly used measurement requirements and signal types, we have designed the default values of the data acquisition parameters. Taking into account the diversification of user needs, users can also manually modify the parameter settings.

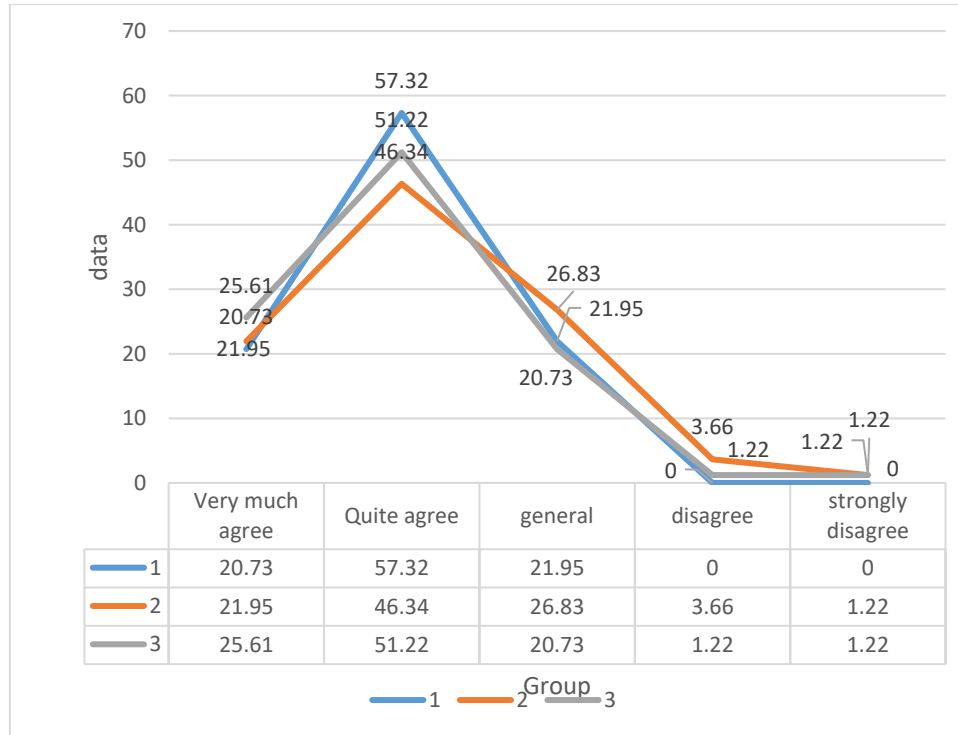


Figure 4: Analysis of the content of the questionnaire in the flipped teaching mode

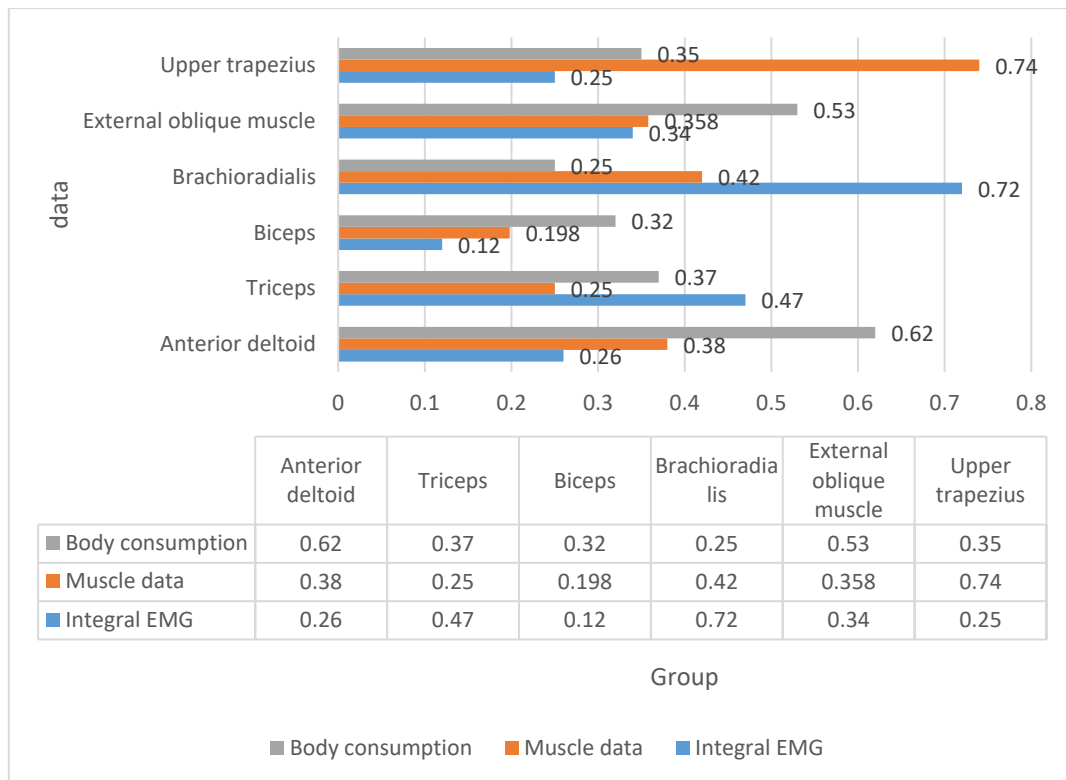


Figure 5: The integral EMG value of each muscle of the athlete in the last step of the jump serve and run-up

We can derive from Figure 5 that the jump-off buffer stage of the jump serve is the stage from the moment the jumping leg hits the ground to the maximum buffer moment of the knee joint of the jumping leg. Its main task is to actively complete the retreat of the muscles, store the elastic potential energy and provide for the subsequent leg extension. Make effective preparations. At this stage, the lower limbs have to withstand the greater impact of the ground, while the body maintains balance, and the arms actively swing back to create the best working conditions for the subsequent kicking and stretching movements. Possible reasons for these results: The daily exercise load of the shoulder-elbow joint flexors of non-specialized personnel is greater than that of the shoulder-elbow joint extensors, resulting in the training effect of the extensors being better than the flexors; the muscles are more suitable for low-frequency vibration training in the short term. Significant effects are seen inside. It can be seen that the effect of vibration training is still very significant, but it is not suitable for changing the vibration frequency in a short period of time. It takes a period of adaptation to achieve the optimal effect. These research results are all researches on the relationship between vibration training on shoulder and elbow joint upper limb muscle strength and vibration frequency, laying a foundation for further applying appropriate vibration strength training to the public level and improving the overall quality of citizens.

4.2 Dynamic Adaptive Load Balancing of the Internet of Things

Using Mininet to build a simulated 6-node server cluster, and assuming that each storage node has the same processing capacity, assuming that each server can handle up to 10,000 concurrent requests, the processing time of each request is 1 second, for the above server cluster Using 35,000 concurrent requests for access, using the traditional WRR load balancing strategy and the improved adaptive WRR dynamic load balancing algorithm to test the load distribution capability, and the load balancing diagram in Figure 6 is obtained.

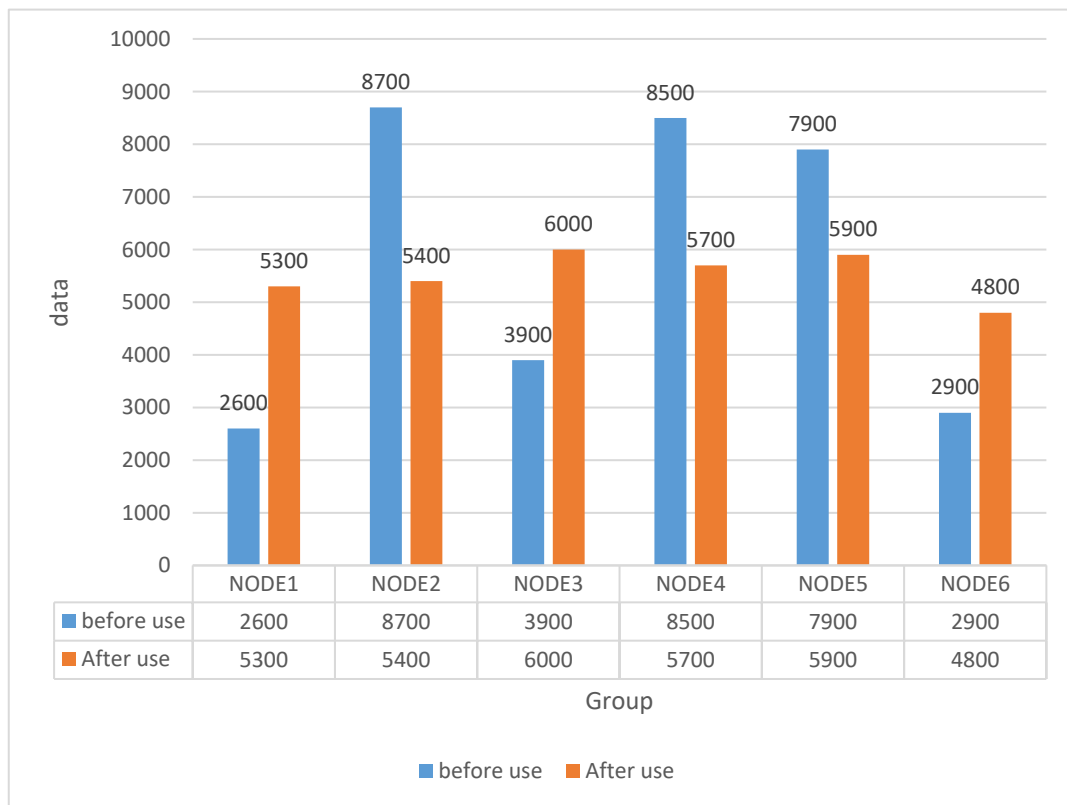


Figure 6: Load capacity diagram of server cluster before and after using adaptive WRR

It can be found that the load of each server after use is more even, making it harder for each server to reach the upper load limit, improving the system's ability to handle high concurrency, and improving the system's fault tolerance and stability.

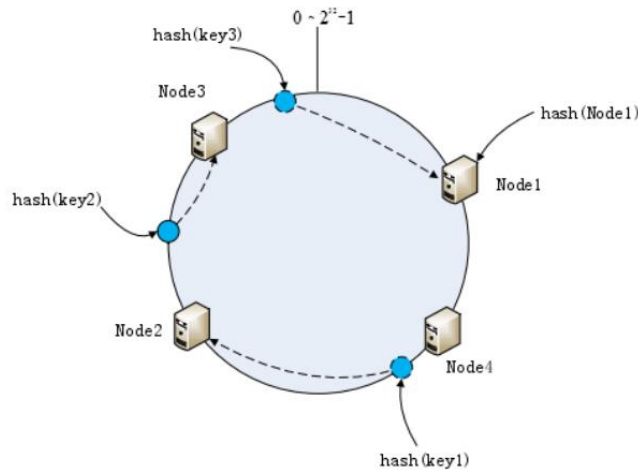


Figure 7: Delete node Node (The picture comes from <https://image.baidu.com/>)

As shown in Figure 7, through the hash function, the IP address or MAC address of the server is used as a key, mapped to the circle in the figure, the server is located at this position, and the data key that needs to be cached is also passed the same keywords are mapped to the circle. It is stipulated that if the data mapping location is the same as the server location, it can be stored in the server at that location. If it happens to not be mapped to a server node, then in clockwise order, look for the nearest server storage. The data storage location is shown in the figure. It is represented by dotted lines.

If the server node 2 in the server ring goes down, the data in node 2 is stored in node 3, and the data stored in other nodes remains unchanged. In the consistent hash algorithm, the failure of a server will not cause a huge change in the mapping relationship between all data and the server, but will only affect the next server that can be reached in clockwise order.

Table 4: Device data before upgrade

Serial number	Weight (g)	Write time
1	350.1668	10:38:54
2	350.1575	10:38:56
3	349.9879	10:38:58
4	349.8684	10:39:00

We can see from Table 4 that 4 pieces of uploaded data are displayed, and the trends of other data that are not displayed are similar. The weight is the liquid weight measured by the load cell at the current writing time. Due to the continuous flow of liquid in the titration system, the weight continues to decrease over time, and the data reporting interval is maintained at two seconds, which is an interval for the first program.

Figure 8 shows the number of results obtained from the query of different instructions and the number of all target entities in the system, and calculates the accuracy of the search. This system searches for the real-time status of physical entities. During the search process, after obtaining the set of target physical entities, it verifies the real-time status of the physical entities, and removes the physical entities whose status does not match the result set. Therefore, all physical entities are obtained. It is in line with user requirements. However, because the state of some physical entities has changed, and the entity cluster to which they belong will not be updated in the future, the physical entity cannot be found in time. The clustering method used in this paper can be effectively applied to the clustering of IoT entities. As the number of entities processed increases, the clustering processing time increases steadily. Compared with AntClust, the clustering method used in this article is more suitable for the classification of IoT entities, and the clustering time required by this method is significantly lower than that of AntClust. AntClust uses a clustering algorithm, and there will be a problem of repeated calculations in the calculation process, but the clustering algorithm used in this article does not have this problem. Therefore, the clustering time of this system is less than that of AntClust.

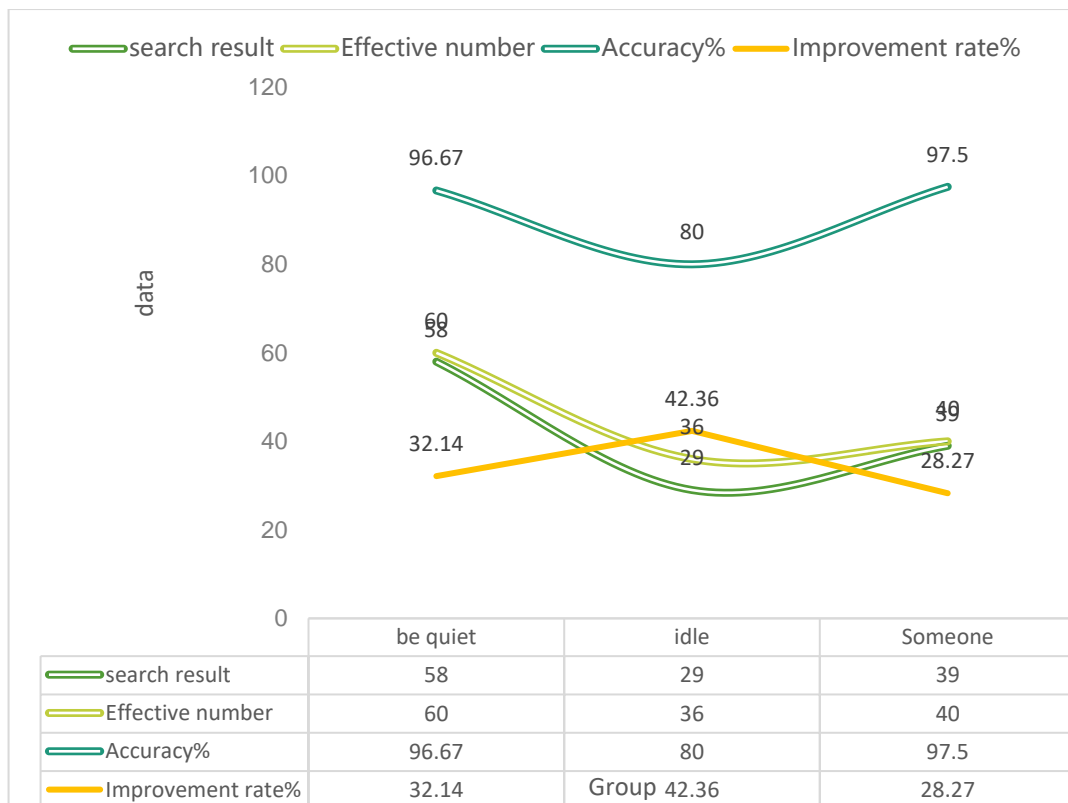


Figure 8: the clustering time of this system is less than that of AntClust.

5. Conclusions

The Internet of Things (WOT) is based on the existing Internet architecture and solves the challenge of interoperability between things and the Internet. Utilizing the existing Web standards and infrastructure, more and more physical entities are exposed on the Web, so services related to physical entity search are getting more and more attention. However, in the current Internet of Things, the description of entities is defined by the owner of the Internet of Things entity, lacking a unified description model, and the structure of each entity and the WEB is different, resulting in the lack of a unified API for physical entities. The Internet of Things search has undoubtedly increased the difficulty. This paper proposes a general entity description model and provides a general entity access API. In addition, through the research of the existing Internet of Things search methods, it is found that the state of the physical entity may change at any time due to the dynamics of the state of the sensor. The existing search methods are generally not efficient in searching for the real-time state of the physical entity. And searching based on the real-time status of physical entities is indeed one of the important functions of the Internet of Things search. In this regard, this paper proposes and implements a physical entity search method based on clustering to improve the search efficiency of physical entities. Although there are still many difficulties and problems in the promotion and application of experiential and digital reforms, this kind of education system reform is still the general trend. If you can't face these difficulties and problems, you can stop, but you can't completely rely on these new styles. Abandon the tradition of teaching methods. This is for our education practitioners to stay awake, clarify the key store and significance of digitalization in physical education, calmly respond to various problems in the education process, and work hard to cultivate outstanding talents for the motherland.

Acknowledgements

2020 Changzhou University Curriculum Ideological and Political Teaching Reform Project, Project No: KCSZ202012, "College Physical Education" Curriculum Core Literacy Reform Pilot Project

Reference

- [1] Qi Mingming. *Research on the optimization of primary school physical education teaching design based on core literacy* [J]. *Sports Science and Technology Literature Bulletin*, 2020, 028(004):44-45,177.
- [2] Miao Yuanyuan. *The design of middle school physical education based on the background of core literacy* [J]. *Tianjin Education*, 2019, 000(004):91-92.
- [3] Dong Cuixiang, Su Yinwei, Zhong Jian. *New exploration of physical education design based on the core literacy of the subject* [J]. *Physical Education Teaching*, 2020, 040(004): 13-17.
- [4] Wang Teng, Zhan Jianguo, Zhang Jinling. *A study on the path of elementary school physical education classroom teaching design infiltrating the core literacy concept of physical education* [J]. *Sports Teachers*, 2018, 41(05):5-6.
- [5] Shao Weide, Qi Jing. *Design ideas of physical education classroom teaching goals based on "core literacy of physical education subject"* [J]. *Physical Education Teaching*, 2020, 040(001): 6-7.
- [6] Wang Dan. *The design of middle school physical education based on the background of core literacy* [J]. *Parents*, 2019, 000(033): P.24-24.
- [7] Liang Yuan. *College physical education teaching design based on the improvement of core literacy* [J]. *Sports Science and Technology Literature Bulletin*, 2018, 26(10): 83-84.
- [8] Xia Lan. *Based on the cloud classroom to improve the core literacy of high school students' information technology discipline-taking homework-driven method as an example* [J]. *Experimental Teaching and Instruments*, 2019, v.36; No.373 (05):45-46.
- [9] Fang Mengmeng, Ren Jie. *Exploration of elementary school physical education unit teaching design based on core literacy* [J]. *Tibet Education*, 2018, 000(004):40-42.
- [10] Wang Qingqing. *Classroom teaching design and classroom teaching research based on the core literacy of high school mathematics* [J]. *New Curriculum Guidance*, 2019, 000(025): P.37-38.
- [11] Ou Peiling. *Research on teaching design based on the cultivation of core literacy—Taking "Information Security" as an example* [J]. *Audio-visual Education for Primary and Secondary Schools*: 2019, 000(005): 34-36.
- [12] Ying Kangkai. *Research on junior high school science teaching design based on core literacy* [J]. *Education: Elementary Education*, 2019, 000(010): P.75-76.
- [13] Lin Yu. *Classroom teaching design and classroom teaching research based on the core literacy of high school mathematics* [J]. *Mathematics Learning and Research*, 2018, 000(024): P.109-109.
- [14] Liu Huafei. *High school information technology algorithm teaching design and exploration with computational thinking as the core literacy* [J]. *China and Foreign Exchange*, 2018, 000(007): 229-231.
- [15] Miao Licai. *Teaching design practice based on the core literacy of high school information technology—Take the "TCP/IPv4 setting" teaching design practice as an example* [J]. *Modern Information Technology*, 2020, v. 4(08):192 -195.
- [16] Wang Guangbiao. *The Cognitive Goals and Case Analysis of Physical Education Classroom Teaching Based on the Core Quality of Physical Education Subject* [J]. *Physical Education Teaching*, 2020, 40(2): 22-23.
- [17] Wang Zhijun. *Exploration of PE classroom teaching based on core literacy* [J]. *Academic Weekly*, 2020, 000(011): P.11-12.
- [18] Yang He, Wang Tao. *The design of middle school physical education based on the background of core literacy* [J]. *Youth Sports*, 2019, 71(03):98-99.
- [19] Shen Zhihui. *Research on the teaching design of high school physics unit from the perspective of subject core literacy—Taking the third unit "Newton's law of motion" as an example* [J]. *Physics Bulletin*, 2019, 38(4):62-65.
- [20] Tian Xuhai. *High school physics law teaching design based on core literacy—Taking the teaching of "Exploring the relationship between acceleration, force and mass" as an example* [J]. *Physics Teaching*, 2018, 040(007): 40-41.
- [21] Yao Min. *Research on the classroom teaching strategy of secondary vocational mathematics based on core literacy—Taking the teaching design of "the surface area of the rotating body" as an example* [J]. *Jiangsu Educational Research: Vocational Education (C Edition)*, 2018, 000(011): 19-21.
- [22] Pan Chunfang, Xiang Qiangyuan. *Instructional design based on the core literacy of physics—take "free fall motion" as an example* [J]. *Curriculum Education Research: Foreign Language Learning Method and Teaching Method Research*, 2017, 000(020): P.197-198.
- [23] Wu Yang, Li Xinghua, Zou Jiachen. *Exploring the optimization of teaching design based on the core literacy of physics—taking "free fall motion" as an example* [J]. *Hunan Middle School Physics*, 2017, 000(003): P.81-84.

- [24] Wang Jun. *Analysis of the high school mathematics network teaching strategy based on the cultivation of core literacy—Taking the teaching design of "the volume of spatial geometry" as an example [J]. Journal of Mathematics, 2020, No. 839(18):30-33.*
- [25] Hu Zhipeng. *Physics teaching design based on "discipline core literacy"—Taking "planetary movement" as an example [J]. Physics Teacher, 2019, 040(005): 37-40.*
- [26] Wu Gang. *Exploratory teaching design based on the development of core literacy—"The Effect of Magnetic Field on Moving Charge" as an example [J]. Physics Teacher, 2019, 40(04):24-26.*
- [27] Zhong Yong. *Classroom teaching design based on the core literacy orientation of physics [J]. Physics Bulletin, 2019, 38(3):62-65.*
- [28] Wang Qiangshan. *Classroom teaching design strategy based on the core literacy of mathematics [J]. Chinese Times Principal Edition, 2019, 000(002): P.72-75.*
- [29] Luo Wenzhou, Liang Xu. *Instructional design based on core literacy—Taking "the law of gravity" as an example [J]. Physics Teaching, 2019, v.41; No. 461(10):35-38.*
- [30] Xu Shaonan. *Research on the school-based curriculum development based on the core literacy of students [J]. Speed Reading (first ten days), 2018, 000(005):172-173.*