DESIGN AND IMPLEMENTATION OF BASKETBALL TEACHING PLATFORM

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ABSTRACT

With the development of internet technology and multimedia technology, the school begins to explore new teaching model in the reform of new teaching, having strong basketball teaching interactive, higher teaching action imitation memory requirement and other characteristics, therefore becoming the focus of teaching reform. Basketball is one of the most popular sports curriculums, and basketball teaching resources are limit, teachers can not meet the needs of the students. Based on basketball teaching platform of internet technology, the first part of this paper gives the platform design flow chart, the use of the distance multivariate control theory, to establish the mathematical model of teaching platform time and the proportion of content; the second part gives the CAI courseware algorithm and programming based on the internet and VRML technology, to carry out programming and calculation by using VC++ programming software, and to carry out numerical optimization design for the proportion of teaching platform time and content that can obtain the residual analysis chart, the final design of basketball network teaching platform after the optimized, to realize the sharing of basketball teaching resources and teaching staff.

Keywords: *Internet Technology, Basketball Teaching Platform, Distance Multivariate, VC++ Programming, VRML Technology, Numerical Optimization*

1. INTRODUCTION

The basketball sport is one of the students favorite sports, which is a large number of general courses, however the teaching resource is limited by the teachers strength, basketball sports teaching could not reach the expected effect, and even many students do not choose class. With the development of internet and multimedia technology, network teaching has become popular. Basketball teaching has strong learning interactive, teaching action imitation memory and so on, and it is particularly suitable for network teaching. In this paper, based on the theory of multiple variables algorithm, internet basketball teaching platform is divided, the first part of the paper gives the flow chart of Internet basketball teaching platform, and then to give the mathematical model of teaching time and the proportion of the content. For information technology theory, it contains information control technology, to carry out analysis from the perspective of control theory, and then the control of information technology system needs to carry out target control operation as well as all kinds of information transmission and exchange [1]. The collected information is displayed as the process and form of a movement process. In the process of basketball sports training, because basketball training contains a large amount of information elements, such as the sports team as well as team level and ability, these elements form a special basketball running training information structure, the master information can promote the basketball movement training that can be accurate analysis of basketball players and the whole team 's training status information or analysis of tactical methods, therefore, the need for such information monitoring system carry out control and communication [2]. In basketball training, the various information systems carry on the research analysis to master control law, which can improve the quality and level of basketball training, and can provide a scientific basis of basketball training guide.

VRML technology is introduced into the process of making CAI courseware of basketball Internet teaching platform, VRML technology is a virtual environment that is one of the best modeling software, it can establish a directly link of client and the database, which can convenient edit and open courseware. The second part of the text introduces VC++ software programming software, and the applicability of the VC++ programming software is very strong[3]. At the same time the applicability of many areas of programming

calculation, through the multiple control variables optimization algorithm, to optimize the processing for the teaching time and content of basketball network teaching platform, finally to put forward the problems in the platform, and to provide the reliable theory reference for basketball internet teaching.

2. THE DEVELOPMENT OF INTERNET BASKETBALL TEACHING PLATFORM AND ITS MATHEMATICAL MODEL

The development of Internet basketball teaching platform is mainly the interaction between teachers and students, teachers carry out teaching content through the teacher client, and students want to search information input through the student client, the output can obtain teaching content, according to the teaching content, to carry out learning activities [4].

(1) Internet basketball teaching platform flow chart

Internet teaching platform design flow chart as shown in Figure 1, the teachers carry out basic editing of webpage through teacher end, teaching courseware video is passed to the webpage, through the Internet transmission to the web service station, to carry out data processing[5]. The customer flow can get the desired information through command. The student client can get the teaching information through the command input.
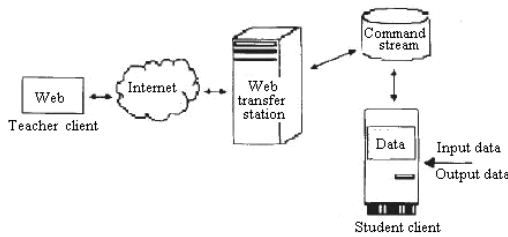

Figure 1: The Development Of Teaching Platform Flow Chart

(2) The time and content ratio of Internet basketball teaching platform and its mathematical model

In the teaching platform, the use of multivariate control method for the proportion control of teaching time and teaching content, to consider a teaching time and content as well as total teaching time and content, the use of G indicates normal population, Σ indicates the covariance matrix, if there are the same G and Σ, to discriminate a sample X and the proportion of the overall relationship for a given time and the ratio of content X, we can calculate the X to the overall distance using intuitive method, then having [6]:

$$\begin{cases} x \in Q_1, & if\ d^2(x,\ Q_1) < d^2(x,\ Q_2), \\ x \in Q_2, & if\ d^2(x,\ Q_2) < d^2(x,\ Q_1) \\ \text{To be judged}, & if\ d^2(x,Q_1) = d^2(x,Q_2) \end{cases} \quad (1)$$

The distance can be expressed as the form of the distance square as following shown[7]:

$$d^2(x,Q_2) - d^2(x,Q_1) = (x-u_2)'\Sigma^{-1}(x-u_2) - (x-u_1)'\Sigma^{-1}(x-u_1) \quad (2)$$

$$= 2[x - \frac{(u_1+u_2)}{2}]'\Sigma^{-1}(u_1-u_2)$$

Wherein u represents an average value, setting $\bar{u} = \dfrac{u_1+u_2}{2}$, and $a = \Sigma^{-1}(u_1-u_2) = (b_1, b_2, \cdots, b_p)'$

Then

$$\begin{aligned} P(x) &= (x-\bar{u})'a = a'(x-\bar{u}) \\ &= b_1(x_1-\bar{u}_1) + \cdots + b_p(x_p-\bar{u}_p) \\ &= a'x - a'\bar{u} \end{aligned} \quad (3)$$

The preceding discrimination rule is expressed as[8]:

$$\begin{cases} x \in Q_1, & if\ P(x) > 0, \\ x \in Q_2, & if\ P(x) < 0, \\ \text{To be judged}, & if\ P(X) = 0 \end{cases} \quad (4)$$

According to the practical teaching experience, this paper will basketball network classroom time and content ratio is initially shown in the proportion of Table 1.

Table 1: Time Proportion And Content Ratio Of Classroom Content

Classroom content	The proportion of time	The proportion of contents
Online theory teaching before class	0.12	0.15
Network control video classroom demonstration	0.35	0.25
Online after-school answer	0.15	0.21
Online basketball test	0.38	0.39

(3) The development of CAI courseware on Internet basketball teaching platform

Basketball teaching is different from other teaching, vividness and lively basketball teaching is relatively strong, thus making CAI courseware should have the innovation. This paper creates a DOA object, and then to call the connection string and the database that are connected. The code is as follows[9]:

```
Initial database
Data source=my server
User ID=lanqiujiaoxuepingtai
Cn.connection String=User ID
Cn.open
```

Using VRML technology, the proportion of classroom content can be programmed control, VRML technology is one of the best modeling software under the virtual environment, its CAI software modeling is the following code [10]:

```
Content {
appearance Appearance {
Content Proportion {
Proportion{ 0.12 0.35 0.15
0.38}
} }
Proportion  Residuals {
radius 0.02 } }
} }
Proportion  Residuals {
radius 0.015
} } }
```

Through the establishment of basketball training information, using the prime scoring methods on basketball training influencing factors to carry out the authority score evaluation, and then to multiply by the obtained value in accordance with respective weight values, and to carry out plus, finally it can obtain the evaluation scores of basketball training information control system [11].

A total of the evaluation scores F in basketball training information control system is:

$$F = \sum_{i=1}^{m} N_i \omega_i \tag{5}$$

N_i is basketball coach as the evaluation indicators of training exercise influence factor:

$$N_i = \sum_{j=1}^{n} X_{ij} p_j \tag{6}$$

p_j is expressed as the j-th influence basketball sport training effect factor's ratio value;

X_{ij} is the average score of i-th basketball player training section's j-th influence training effect factor:

$$\sum_{i=1}^{m} b_i \omega_i, \sum_{i=1}^{m} b_i w_2{}^i, \cdots\cdots, \sum_{i=1}^{m} b_i w_n{}^i \tag{7}$$

ω_i is the correlation weighted fractional values of the influence of athletes training single factor:

$$W^k = A_k \cdot A_{k-1} \cdots A_2 \cdot A_1 \tag{8}$$

$$C_{.1} = \frac{\lambda_{\max} - m}{m-1} \tag{9}$$

Using the training effect analysis, statistics analysis method carries out statistical on the information data calculation, which can reach

basketball player training effect, its computation formula is as follows:

$$u = \frac{p_1 - p_2}{\sqrt{p_i(1-p_i)(\frac{1}{m_1} + \frac{1}{m_2})}} \tag{10}$$

Then using t statistical test's theory method, and through the information control system to guide effect analysis and difference comparison of before and after comparison of basketball players training.

Before and after the selected training, the t statistical test of the calculation formula is[12]:

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{\sigma_{X_1}^2 + \sigma_{X_2}^2 - 2\gamma\sigma_{X_1}\sigma_{X_2}}{m-1}}} \tag{11}$$

Wherein, $\sigma_{X_1}^2$ and $\sigma_{X_2}^2$ are basketball players training whether the information control system to guide the training effect of variance before and after the training; $\overline{X_1}$ and $\overline{X_2}$ are respectively sample basketball player to guide the training effect without information control system, and to guide the average value of the training effect with information control system; γ is the value of the correlation coefficient, to get the relevant information calculation of data is shown in Table 2.

Table 2: The Estimation Error Of Basketball Training Information Mean

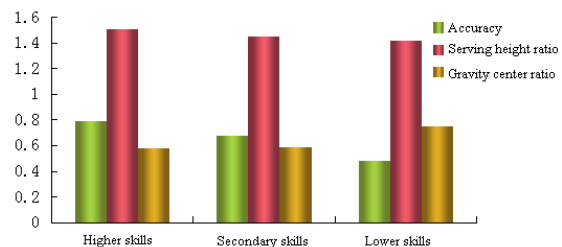| Information	Higher skills	Secondary skills	Lower skills
Accuracy (%)	*78±9*	*63±11*	*42±14*
Serving height ratio	*1.52 ±0.05*	*1.45 ±0.02*	*1.45 ±0.09*
Center of gravity	*0.56 ± 0.08*	*0.55 ± 0.07*	*0.72 ± 0.70*
Trunk inclination	*4.1 ± 3.1*	*4.0 ± 1.8*	*7.8 ± 9.1*
Pitching angle	*52.4 ± 5.7*	*52.5 ± 4.8*	*57.4 ± 5.3*
Pitching speed (m/s)	*8.42 ±0.62*	*8.04 ± 0.40*	*8.06 ± 0.58*

Figure 2: Comparison Chart Of Basketball Training Effect

Basketball sports training process is displayed as a dynamic change process of movement, the use

of decision-making system of information control system also exists certain differences and deficiency, the collection of basketball athletes training information and control information go through the output to the teacher and the athletes themselves in the decision plan, due to the existence of individual characteristics on information feedback effect, it will form a positive and negative effect. On the basis of these positive and negative effects, basketball athletes show performance in training process, coaches need to constantly carry out analysis and observation on the information, while taking some test methods to carry out research, in order to get comprehensive information of basketball players[13]. The information will carry out feedback information for the whole training of the process of basketball movement, and be gone through constantly collection and analysis control output, making the ideal matching training programmer.

3. INTERNET BASKETBALL TEACHING PLATFORM OPTIMIZATION DESIGN

Through the form of the click rate of questionnaire survey and statistics website, to carry out data statistical analysis of the e-government service acceptance, and through the investigation analysis, to obtain data as shown in Table 3.

The first part of the paper gets the mathematical model of the proportion relationship of teaching platform various elements, to preliminary give the ratio relationship between teaching time and content, through the form of questionnaire survey, to carry on questionnaire for the teaching content of students, the final statistical results are shown in Table 3.

Table 3: Statistical Results

Classroom content	The proportion of time	The proportion of contents
Online theory teaching before class	0.15	0.08
Network control video classroom demonstration	0.36	0.42
Online after-school answer	0.15	0.32
Online basketball test	0.34	0.18

The use of Table 3 statistic results, the teaching platform of time and content ratio apply the VC++ software to carry on programming, and to carry on numerical optimization processing on the teaching content, residual is calculated as shown in Figure 3.
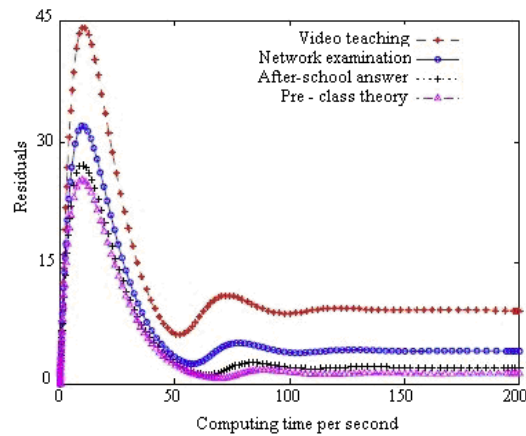

Figure 3: Optimal Residual Plot

Through the residual optimization map, we can see that the time and the content ratio calculation of basketball teaching platform began to fluctuate, and then to tend to be stable. Finally, the calculation of results is shown in Table 3 and in Figure 4.

Table 3: Calculating The Optimal Results

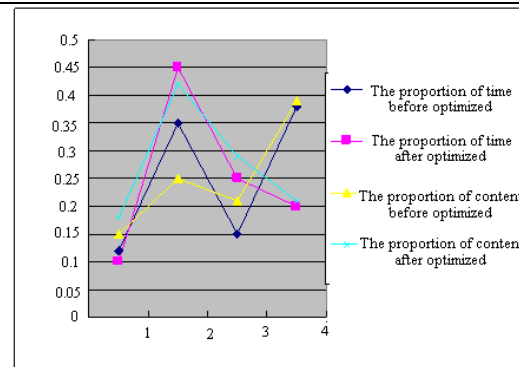| Classroom content	Teaching effect	Student support rate
Online theory teaching before class	0.10	0.18
Network control video classroom demonstration	0.45	0.42
Online after-school answer	0.25	0.29
Online basketball test	0.20	0.21

Figure 4: Calculating The Optimal Results

Through the optimization results, we can see that according to the requirements of the curriculum and the intention of students, teaching platform time and content ratio have relatively large adjustment, in which the proportion of the teaching video adjusts larger. Because the physical education curriculum is relatively large of action imitation, and if teachers only do it again action,

students cannot bear, so in the teaching platform, to increase the part of video content and proportion are very realistic requirements. In addition, the after-school answer part is also increased, because physical education teachers and students interaction are strong, which is also in line with the actual needs of teaching.

4. EXISTING PROBLEMS IN TEACHING PLATFORM

After the analysis of the first part and the second part, it can be seen that the basketball network teaching platform meets the needs of teaching, and can realize the teaching materials and teachers sharing, and however there are also many problems in the platform [14].

(1) Speed issue

The network teaching platform is based on the Internet technology, the campus networks are often LAN, a plurality of screen shares a server that is very high requirements on speed, especially video transmission, if not up to the number of frames transmitted per second, video will be very card.

(2) Server bearing capacity

Network teaching platform is a great test on server, sharing a server between teacher client and student client, the server pressure is relatively large, which requires data during processing to optimize the use of the data, such as VRML courseware.

(3) To evaluate the long-term teaching effect

The development of teaching effectiveness platform is only a short period of questionnaire survey for students, there are not to assess long-term teaching effect, if the basketball teaching platform plays a better teaching effect in the future, to carry out evaluation of long-term effect on network teaching platform.

5. CONCLUSION

Through the multivariate theoretical model, the establishment of the mathematical model of basketball network teaching platform time and content proportional control, the first part of the text gives a sketch teaching platform process, based on Internet data processing technology, to carry out linking between the database and the client, the use of VRML technology develops network platform teaching CAI courseware, to give the specific algorithm; the second part of the paper carries out programming calculations using VC++ programming software, the teaching platform time and the proportion of content carry out numerical optimization design, and obtain the

residual analysis, finally after the optimized data and before optimization data are compared, to find that the part of video teaching and after-school answer are increased in the teaching platform design, which is consistent with the actual basketball classroom.

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