Research on the Development and Influencing Factors of Sports Network Education and Training

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Abstract. Network education training is the result of the development of educational innovation in the times, based on the internet information technology, network platform as the carrier, breaking the limitations of time and space, to provide learners with more flexible learning methods, so as to meet the learning motivation of learners with different needs, network education and training has gradually developed into one of the training methods popular with the public. In many kinds of network education and training, sports network education and training because of the characteristics of teaching content, the practice of sports projects and the characteristics of technical action reality guidance, sports network education and training are limited. However, as one of the innovative forms of sports, sports network education and training, in school physical education supplement, as well as the popular development of mass sports, are of great significance. Therefore, this paper analyses the development and influencing factors of sports network education and training, lays a theoretical foundation for the development of sports network education and training, and promotes the good development of sports network education and training.

Keywords: Sports Network Education and Training · Development · Influencing Factors

1 Introduction

With the continuous development and progress of society, our society has entered a brand-new information age, the background of the times into an innovative reform of the educational model and put forward new requirements. In particular, the spread of new coronavirus pneumonia in 2019 has had a greater impact on the public's life and learning style, from home prevention and control during the outbreak, to the post-epidemic era of all aspects of peoples' life active prevention and control, education methods have gradually realized the offline transition, various types of network teaching has been carried out, in order to meet epidemic prevention requirements and public learning

needs, play an active role. As one of the forms of network education and training, sports network education and training has also gained some development, but unlike the characteristics of the other types of network education and training, sports network education and training is limited. To the study of the factors influencing the development of sports network education training, which is of great significance to sports network education and training.

2   Sports Network Education and Training Concept

Network education and training refers to the internet technology and based on a specific network platform, to provide users with education and training activities. The computer technology, artificial intelligence, etc. is the key technology of network education and training, the basic model of network education training as shown in Fig. 1 [2]. Sports network education and training is one of the categories of network education and training, including the teaching content of sports projects and the implementation of teaching activities. It shows the content of sports teaching organized by using applicable teaching strategies based on certain physical education and training objectives, and the network environment that supports sports network education. Based on the static point of view, the sports network education and training provide the students with the content of network sports learning, and from the dynamic point of view, the sports network education and training also includes the interactive and dynamic implementation process of the network education training. Sports network education and training based on internet information technology and satellite communication technology, in time, space freedom, system opening and resource sharing have certain advantages, in general, sports network education and training can be divided into two modes, one is synchronous real-time teaching, the other is asynchronous non-real-time teaching. Synchronized real-time teaching system is a way of online interaction, teachers and students at the same time online direct communication, in a real-time way to complete teaching activities. Asynchronous non-real-time teaching system refers to the video teaching content for advance
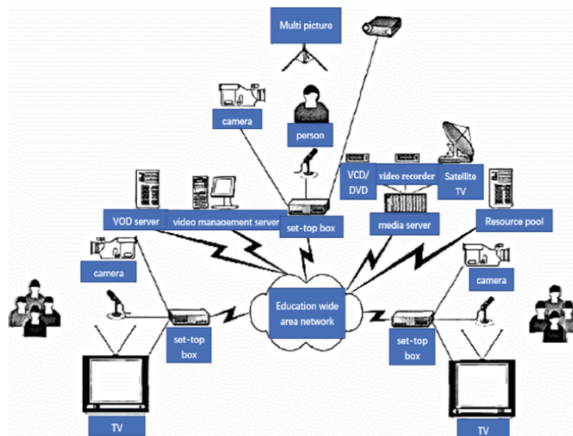

Fig. 1. Diagram of the online teaching model

recording and upload, students can according to their own needs, the need to learn the content of independent choice.

3   Analysis of the Current Situation of the Development of Sports Network Education and Training

3.1   Sports Network Education and Training Companies' Business Model

The current sports network education and training companies' business model survey statistics learned that 90% of sports network education and training for profit-oriented training model, only 10% of sports network education and training for non-profit model, most of the sports network education and training, set free audition hours and minutes, to attract students to initial video viewing learning, students need to pay the relevant fees to unlock the next learning content. Sports network education and training teaching content is diverse, and there is no fixed model, video creators according to their own professional and judgment teaching video production, paid for the demand for sports teaching training, so as to obtain economic benefits. The survey statistics is shown in Table 1.

3.2   Sports Network Education and Training Teaching Model

Sports network education and training needs to be based on the network platform environment. The network education platform construction, according to different user needs, multi-party permission channel design, in order to achieve the administrator's platform maintenance, teacher's teaching management and students' purposeful access [4]. The structure of the sports network education and training platform system is shown in Fig. 2.

The implementation of sports network education and training, network platform is independent and unified, divided into portal sub-platform, learning sub-platform and management sub-platform three platforms, the overall logical framework between the three platforms is shown in Fig. 3.

The three platforms of the porta sub-platform, the learning sub-platform and the management sub-platform have different functions [3]. The portal sub-platform is the window for the external communication and dissemination of the sports network education and training. Network platform, as well as the portal for the teacher's video upload and the students to carry out the learning in the system, which has the basic function. The learning sub-platform is the main platform for the development of sports network education and training. The network curriculum professor, students learning information records and teaching effect testing and notification consultation are all completed by

Table 1. Statistical table of companies' business models for sports-based online education and training

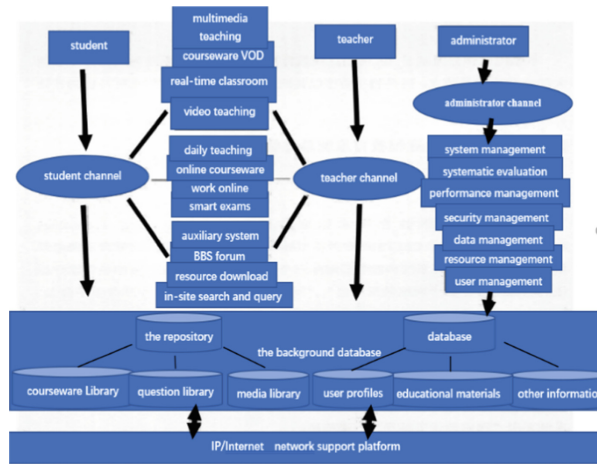|	Profit mode	Non-profit model
proportion	90%	10%

Fig. 2. A systematic diagram of the sports network education and training platform
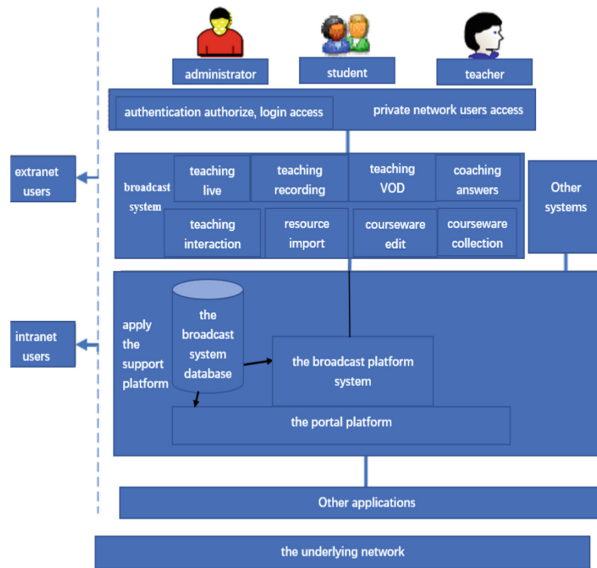

Fig. 3. The overall logical architecture of the sports network education and training platform

this platform. In short, learning sub-platform is to provide users with learning resources platform. The management sub-platform is the core management area of sports network education and training, and plays the role of comprehensive management in the process of sports network education and training, the management sub-platform is restrictive, the functions required for user learning are not reflected in this platform, and the function of management sub-platform is to assist the sports network education and training subject to carry out effective management.
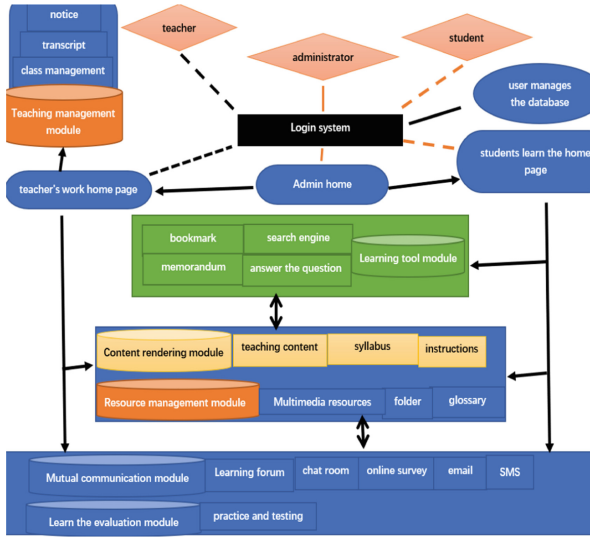
Fig. 4. A workflow diagram for the sports network education and training platform

Sports network education and training, the main workflow of the network platform is as in Fig. 4.

Based on the network platform, the implementation of sports network education and training is divided into five stages: analysis stage, design stage, implementation stage, evaluation stage and transmission stage [5].

The first stage, the analysis phase. This stage is the basic stage of sports network education and training, first of all, to determine the teaching object and teaching objectives, according to the target user group's age, gender, cognition and psychological characteristics of a comprehensive investigation and analysis. Purposeful selection of training content, that can meet the learning needs of the target user group.

The second stage, the design stage. On the basis of the training content determination, the video materials that need to be uploaded to the network platform are edited and designed into different units and teaching topics, which makes it easy for users to make independent choices according to their own needs.

The third stage, the realization stage. The realization stage is the implementation stage of sports network education and training, based on the design and upload of teaching content, comprehensive analysis of the basic characteristics of the target users, reasonable choice of sports network education and training video promotion methods and technology.

The fourth stage, the evaluation stage. It is the evaluation of the development of sports network education and training content, in order to provide users with better service.

The fifth stage, the delivery stage. This stage is the process of video transmission and presentation of sports network education and training, and actively guides users to transition from offline learning to online learning.
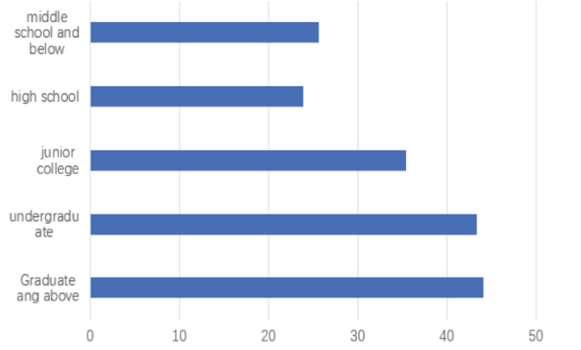
Fig. 5. Basics of Sports Network Training Participants

3.3 The Current Market Situation of Sports Network Education and Training

Through the investigation of the participants in sports network education and training, it is learned that the age is at a relatively young level, and the user-oriented high education, the educational foundation and the ability to accept new things, determine the choice of participants in sports network education and training, and provide guidance for the target orientation of sports network education and training. The survey results is shown in Fig. 5.

4 The Main Factors Affecting the Development of Sports Network Education and Training

Combined with the results of the expert interviews and the results of the literature research, the development and influencing factors of sports network education and training, can be summarized as the characteristics of sports projects, network sports action demonstration learning norms, teaching video quality, teaching teacher level, fee model, network platform stability, practice supervision and results feedback, teaching evaluation, as well as sports training video content and so on. The main factors of the development of sports network education and training are further extracted by factor analysis.

Factor analysis is a statistical technique to extract common factors from variable groups, and to extract the main factors to interpret the contents of the study.

$X = (X_1, X_2, \ldots, X_p)^T$ factor analysis is a method to extract the main factor, and in the process of simplifying the processing of data, the more important factor is extracted, which lays the foundation for further research.

Suppose the P-dimensional random vector is satisfied $X = \mu + A\vec{f} = \bar{e}\,\vec{f} = (f_1, f_2, \ldots, f_q)^T$, is a random variable of q dimension, moreover $q \leq p$, satisfy $E\vec{f} = 0, E\vec{f}\vec{f}^T = \bar{I}_q, f_i$ is a public factor, there is an effect on the components of each test. $\vec{e} = (e_1, e_2, \ldots, e_p)^T$ is a random vector with an unobservable p-dimensionality, satisfy, and $E\vec{f}\vec{e}^T = 0$, the component of e $\vec{e}_i$ is called a special factor. It only works on the X $\vec{X}_i$ component. μ and A represent the meaning of the parameter matrix. If the detection

Table 2. KMO and Bartlett's Inspection analysis table

Sample enough Kaiser-Meyer-Olkin metric		.146
Bartlett's spherical test	Approximately square	176.819
	df	6
	Sig.	.000

Table 3. The public factor variance

Influencers	initial	extract
The characteristics of sports	1.000	.998
Network sports action demonstration learning norms	1.000	.981
The quality of the teaching video	1.000	.670
The level of teaching staff	1.000	.495
Charge mode	1.000	.398
Network platform stability	1.000	.998
Practice monitoring and feedback on results	1.000	.981
Teaching evaluation	1.000	.670
Video content of physical education training	1.000	.495

Extraction method: Main ingredient analysis.

factor X meets the above formula, the random vector X has a factor structure. The formula is calculated $Var(X) = \vec{A}\vec{A}^T + \sum$, thereinto matrix A is called a factor load, the element a_{ij} represents the i-th heft $\vec{X}_i$ on the j-th factor f_i of payload. Can be remembered as $h_i^2 = \sum_{j=1}^{q} a_{ij}^2$, this can be obtained formula $Val(X_i) = h_i^2 + \sigma_i^2$. As can be seen from the above formula, h_i^2 is common factor pair $\vec{X}_i$ reaction to the impact, called public factor of $\vec{X}_i$ "Contribution". While $h_i^2 \geq \sigma_i^2$, indicate the effect of public factor of $\vec{X}_i$ is greater than that of particular factor of $\vec{e_i}$, this is also proved in reverse, the heft $\vec{X}_i$ of h_i^2 is dependency of public factor f_i. The study is in progress, when there are clearly defined public factor f_i, the formula takes the form is $g_i^2 = \sum_{i=1}^{p} a_{ij}^2$, the meaning expressed is the contribution of the public factor f_j to X. When the value represented of g_j^2 is higher, means that the effect of public factors of f_j to X is also more significant. So, the final calculation of g_j^2, can be used as an important measure of the importance of public factor [1] (Tables 2 and 3).

Through the KMO and Bartlett tests, the initial variable is phased for factor analysis.

Calculated by factor analysis, as the general variance explanation explained in Table 4 is always known, 78.620% can be explained by the first two factors, factors 1 and 2,

Table 4. Explains the total variance

ingredient	The initial feature value			Extracts the sum of squares and loads			The sum of rotation squares is loaded		
	total	Variance %	cumulation%	total	Variance %	cumulation%	total	Variance %	cumulation%
1	2.009	50.236	50.236	2.009	50.236	50.236	1.746	43.650	43.650
2	1.135	28.383	78.620	1.135	28.383	78.620	1.399	34.970	78.620
3	1.265	11.251	89.871						
4	1.026	10.128	99.999						
5	2.533E-5	.001	100.000						

Extraction method: Main ingredient analysis.

Table 5. Component Conversion Matrix

variable	Factor 1	Factor 2
The characteristics of sports	.515	
Network sports action demonstration learning norms	.758	
Practice monitoring and feedback on results	.748	
Teaching evaluation	.574	
Charge mode		.645
Network platform stability		.681
The level of teaching staff		.754
The quality of the teaching video		.756
Video content of physical education training		.817

Extraction method: Main ingredient analysis method.
Rotation: Has Kaiser standardized orthogonal rotation.

can basically reflect the factors that affect the development of sports network education and training (Table 5).

Extracted by the above factors, determine the factors 1 and 2. Through factor extraction, the factors affecting the development of sports network education and training are the limitation of sports characteristics and the quality of sports network education and training.

4.1   Limitations on the Characteristics of Sports

Sports network education and training is different from other subjects of network education and training, sports projects have their own characteristics. Sports network education and training formed a lot of restrictions, include a variety of technical systems, some sports also have complex technical movements and difficult characteristics. So, in the course of sports network education and training, the video shows the detailed

action details of the norms, as well as the correction of the learner's practice action. The teacher can't guide and correct the practitioner's action in real time, the teaching evaluation and the learner's feedback also have the time error, which affects the effect of the sports network education training, and also affects the user's choice of such education and training. The limitation of the practical characteristics of sports is one of the factors affecting the development of sports network education and training.

4.2   Quality of Sports Education and Training Network Education

The quality of sports network education and training is also an important factor affecting the development of sports network education and training. The quality of sports network education and training includes many contents, such as charging mode, network platform stability, teaching teacher level, teaching video quality, and video content of sports education training are specific factors. There is a two-way impact of the charging model, on the one hand, affecting the choice of users, on the other hand, reasonable pricing, teaching video production of the financial base also has a certain impact, and then affect the quality of teaching video. In addition, as the material basis of sports network education and training, the stability of the platform, the level of teachers, the choice of teaching content and the quality of video production, etc. all have different degrees of influence on the development of sports network education and training. High-quality teaching and training content is the key to attract users. If the quality of sports network education and training is not good, it will certainly have a negative impact on the development of sports network education and training.

5   Conclusion

At present, most of the sports network education and training for the purpose of profit to carry out sports network training, based on the basic needs of the target user reasonable choice and production of teaching videos. Although in the network training market occupies a certain position, and also achieved certain teaching results. But compared with other types of network training, there is still a certain gap. The limitation of sports project's own characteristics, as well as the uneven quality of sports network education and training, have had a certain impact on the development of sports network education and training. Actively exploring the scientific network teaching mode, breaking the restriction on the teaching of sports items and optimizing the quality of physical education and training are the key issues that need to be paid attention to and implemented in the development of sports network education and training.

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