Construction of Network-aided Teaching System of Tourism Management in Colleges and Universities Based on Javaweb Technology

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Abstract. With the rapid rise of smart tourism industry, the education and teaching mode and talent training system used in colleges and universities can not fully meet the training needs of applied talents in tourism management, which further aggravates the contradiction between supply and demand of talents. In this regard, based on the current teaching situation of tourism management specialty, this paper puts forward a set of construction scheme of network-assisted teaching system, which sets a new paradigm for the cultivation of applied talents in tourism management. The system takes Javaweb technology as the core and integrates VR technology to form a comprehensive application program integrating data information and functional services. The function setting of the system meets many needs in the teaching practice of tourism management major courses, and focuses on remote login, online teaching, virtual training, assessment and other aspects to realize the network and digital transformation of teaching process. The simulation and comparison experiments show that the system functions normally, which effectively makes up for the shortcomings of traditional teaching mode in practical training, strengthens the analysis and application of students' behavior data, achieves the purpose of assisting teaching, and has certain promotion significance.

Keywords: Javaweb; Tourism management; Virtual scene training; Network teaching system; Computer software application

1 Introduction

With the rapid development of digital information technologies such as 5G communication, big data, Internet of Things and cloud computing, the relationship between traditional tourism industry and digital economy has become increasingly close. With the blessing of digital technology, smart tourism came into being. As a new format with digitalization, networking and intelligence, smart tourism is in urgent need of the support of management application-oriented talents who know both tourism and digital intelligent thinking, so as to promote the high-quality development of the tourism industry. [1] Facing the actual demand of applied talents in tourism management,

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there are obvious disadvantages in the education and teaching mode and personnel training system used by colleges and universities. Under the traditional teaching concept, there are still phenomena of "emphasizing theory over practice" and "emphasizing knowledge over literacy" in tourism management major. The superposition of outdated curriculum system, single teaching method, weak teachers and one-sided evaluation mechanism has seriously restricted the quality of personnel training and led to the dilemma of disjointed production and education. [2] In view of this, this paper holds that, in view of the present situation of education and teaching of tourism management specialty and the contradiction between the training of applied talents in tourism management and the market demand, colleges and universities should adhere to the innovation drive and strive to deepen the reform of education and teaching mode and talent training system under the environment of "Internet+education". [3] The network-aided teaching system of tourism management in colleges and universities will be put forward with students as the main body and "integrating theory with practice" as the guidance, reshape the whole process and all aspects of education and teaching activities, give full play to the practical advantages of digital teaching means or tools, promote the further improvement of the teaching management system of tourism management, create a new ecology for the cultivation of applied talents in tourism management, and make an attempt for the modernization and intelligent construction of higher education..

2 System construction

The development of network-aided teaching system for tourism management in colleges and universities is divided into two parts. One is the design of virtual training function module. The second is to complete the construction of the system structure framework in the Java language environment, and integrate and package it into a standard Web application. First of all, the virtual training function module of tourism management specialty contains many scenes such as scenic spot planning, tourism marketing, scenic spot management, hotel management, tour guide business and so on. The construction of each scene needs to go through many steps, such as original material collection, 3ds Max modeling, scene combination production, interactive operation design. [4] Figure 1 shows the overall design and development flow chart.

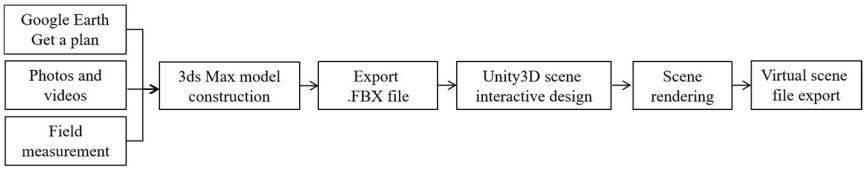

Fig. 1. Virtual scene development process

Among them, each scene and all objects in the scene will be based on the real three-dimensional data, and the corresponding model will be made in 3ds Max software. In Unity 3D software, the integration and assembly of models and scenes, the

addition and optimization of dynamic effects, the setting and processing of objects in the environment, and the development of key interactive functions will be completed. [5] Figure 2 shows the virtual scene of tour guide business. Student users can control the movement and turning of the visual angle by themselves, and interact with the model in the scene through input devices to achieve the purpose of simulation training. The following is the implementation code for the user to hold down the right mouse button to move the viewing angle.

```
void Start()
{    Vector3 angle = transform.eulerAngles;
     x = angle.y;
     y = angle.x;     }
void LateUpdate()   {
     if (target) {
          if (Input.GetMouseButton(1))   {
               x += Input.GetAxis("Mouse X") * xSpeed * 0.02f;
               y -= Input.GetAxis("Mouse Y") * ySpeed * 0.02f;
               y = ClamAngle(y, yMinLimit, yMaxLimit);   }
          distance -= Input.GetAxis("Mouse ScrollWheel") * mSpeed;
          distance = Mathf.Clamp(distance, minDinstance, maxDinstance);
```

Secondly, in the framework of the system structure, the front-end is an interactive page, which is built with JSP technology as the core, while the back-end server follows the MVC design pattern, and chooses SpringMVC 4.1 development framework with Apache Tomcat 9.0 to complete the server-side configuration. [6] In addition, the bottom operating system of the system is Windows Swever Standard, JDK version is 1.8.0_251, the integrated development tool is Eclipse Neon 4.6.2, and the database server is MySQL 5.7. As for the application service module of the system, it also needs to be combined with the basic structural framework of the system in the development process, and the association and connection are completed under the specific data interface to ensure that the requests sent by users in the front-end interface can be regulated and answered by the server.

Fig. 2. Virtual practical training scene of tour guide business

3 Functional implementation

3.1 Student side

A. Online learning.

The system can provide a large number of digital learning resources for students to learn online. Digital learning resources include video courses, ppt courseware materials, micro-courses, comprehensive graphics and other forms, aiming at refining the teaching content of related courses of tourism management specialty and improving the pertinence of teaching. In addition, the system will also support student users to complete homework answering, simulation test and other operations online, complete the digital transformation of teaching process from multiple dimensions, and promote the individualized development of students. [7]

B. Virtual scene training.

Under this module, student users can choose different scenarios for practical training. The system shows the scene in the form of naked-eye 3D, and supports students to interact visually directly through input devices such as mouse, keyboard or touch screen, so that students can complete related tasks in the situation and strengthen their practical application ability, analysis and summary ability and innovative thinking. [8]

When the system is running, the server needs to accommodate and handle the interactive requests of many student users, and frequently render virtual scenes, so that the running load of the server increases, and the picture is stuck and the operation is delayed. In this regard, the system adopts the 3D scene slicing method to split the model data and the mapping data in the scene, and optimizes the loading and rendering algorithms to improve the overall operating efficiency of the system and strengthen concurrency control. As shown in Formula 1, it is the calculation formula of system operation efficiency, where T is the rendering time, C is the resource consumption value in the rendering process, m is the number of model slices, n is the number of mapping slices, and x and y are coefficients. The comparison results before and after optimization are shown in Table 1. [9] The results show that by slicing the model and map, the operating efficiency of the system is improved to a certain extent, and the normal operation of the system is guaranteed.

$$W = \frac{T}{C}, \quad T = \sum_{i=1}^{k} \left(x_i m_i + y_i n_i \right) \tag{1}$$

Table 1. The performance comparison of the system before and after the scenario optimization

	Group 1	Group 2	Group 3
Original efficiency value	20.1	37.6	13.2
Optimized efficiency value	29.4	38	33.7

3.2 Teacher side

Under the system, teacher users can complete the assessment of learning effect online. When teachers initiate the evaluation of teaching effect online, the platform can automatically capture the learning behavior data generated by student users in the platform, and build the evaluation system standard of learning effect, as shown in Table 2.

Table 2. Learning effect evaluation system

Evaluation indicator	Observation point	Evaluation standards
Learning attitude A_1	Login frequency A_{11}, study duration A_{12}, cumulative timeA_{13}	Excellent: 3 points Good: 2 points Poor: 1 point
Learning process A_2	Learning completion degree A_{21}, Training completion degree A_{22}, team ability A_{23}	
Learning result A_3	Examination performance A_{31}, Training score A_{32}, Teacher score A_{33}	

The platform completes the construction of the judgment matrix based on the actual scoring results, and calculates the sample weight P and the entropy value E of a single index by entropy method, and calculates the final index weight W according to the difference coefficient D of a single index. The overall calculation process is shown in Formula 3, where m represents the number of samples. [10] After the weight of each index value is determined, the platform automatically calculates the teaching effect score, as shown in Table 3 for the simulation test results. The results show that the platform can automatically complete the evaluation of the learning effect of tourism management courses, and improve the one-sided evaluation mechanism under the traditional mode.

$$P=\frac{A_{ij}}{\sum_{i=1}^{n}A_{ij}},\quad E=-\frac{1}{\ln(m)}\times\sum_{i=1}^{m}(P\times\ln(P)),\quad D=1-E,\quad W=\frac{D}{\sum_{i=1}^{m}D} \tag{2}$$

Table 3. Simulation test results

Evaluation indicator	Observation point	Weighted value	Item score	Average score
A_1	A_{11}	W_{11}=0.053	1.91	2.41
	A_{12}	W_{12}=0.101	2.14	
A_2	A_{21}	W_{21}=0.079	2.66	
	A_{22}	W_{22}=0.067	2.57	

A_3	A_{31}	W_{31}=0.134	2.10	
	A_{32}	W_{32}=0.082	2.43	

4 Conclusion

In order to improve the training quality of applied talents of tourism management in colleges and universities, this paper puts forward a set of Web-based network-aided teaching system construction scheme based on many problems faced in the teaching practice. The system focuses on the combination of theoretical knowledge teaching and virtual scene training, and realizes the transformation and upgrading of education and teaching mode and talent training system. In the follow-up research, the platform will further enhance the richness of virtual reality experimental scenes, optimize the interactivity of the experimental process, and provide technical support for the cultivation of applied talents in tourism management.

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