Application of Virtual Reality Technology in Ideological and Political Practice Teaching in Colleges and Universities Under the Background of Internet Plus

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Abstract. With the rapid development of science and technology, the digital society has gradually formed, which makes the ideological and political practice teaching in colleges and universities also have a digital evolution. In order to explore the digital teaching mode of ideological and political practice in colleges and universities, this paper studies the ideological and political practice teaching system in colleges and universities based on virtual reality technology. The system is modeled by 3dsmax, and uses unity3D rendering scene, script compiler and C# language, and HTCVive interactive equipment to develop various business functions of the application system. The relational database uses SQL Sever to build the database server, and the web server uses Apache tomcat. Practice shows that the development of this application system can further develop and improve the methods and ways of digital teaching methods of ideological and political practice in colleges and universities.

Keywords: virtual reality technology · ideological and political practice teaching · software implementation · unity3D

1 Introduction

The ideological and political theory course in colleges and universities is an important way to cultivate and improve the comprehensive quality of college students. The most distinctive feature of ideological and political education is patriotic education. However, in the actual classroom operation, most of the social practice is limited by the space and time, which makes it difficult for students to move from the classroom of studying ideological and political books to the practical classroom. Virtual reality technology can virtualize patriotic education base, reproduce historic scenes and images, and virtualize a series of exhibitions to complete ideological and political practice education [1]. Through the analysis of the above content, the author of this paper thinks that the practical teaching system of ideological and political education in colleges and universities should be developed based on VR technology. The application of virtual reality technology can increase the interest of ideological and political class, improve the internalization rate of knowledge, enhance theoretical understanding, promote the sense of value identity, and achieve a subtle teaching effect [2].

2 Key Technology

2.1 Unity3D

Unity3D is a multi-platform development engine platform for creating three-dimensional models. The biggest feature of Unity3D is cross-platform development, so it is widely used in many fields, such as creating video games, building visualization and real-time 3D animation. Unity3D engine has a rich resource library in graphical interface, and Unity3D engine provides users with a powerful class library MonoBehavior, which is convenient for system function development. Users can perform synchronous visualization in the interface, which can help them preview the dynamic scene in advance [3].
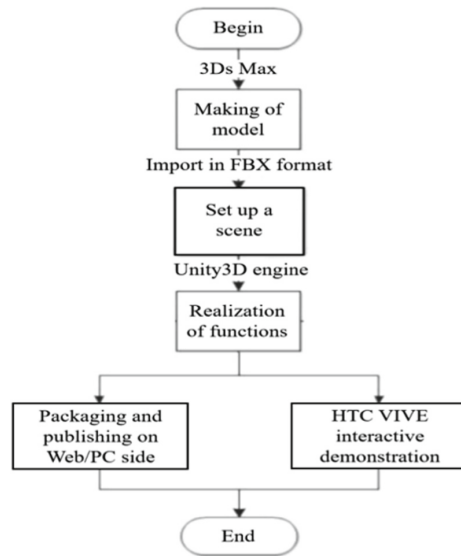
2.2 HTC Vive

HTC Vive is a hardware suite used to improve users' immersion in virtual reality scenes. HTC vive's suite mainly includes the core head-mounted display (HMD) and a streaming box, two base stations and wireless control handles. Streaming box provides an interface facility for the headset to connect with the computer. The function of the base station is to locate the 3D objects in the virtual scene through the laser transmitter combined with the handle device, so as to realize the interactive function [4]. The core device is the headband display, which is the visual window for users to enter the virtual environment. The users of the system can operate the characters in the VR system through the handle device, which solves the problem of interaction between users and the system [5].

3 Development Process

The development architecture diagram of the system is shown in Fig. 1. First of all, 3DSMAX is used for preliminary modeling, Photoshop is used to beautify the maps of various objects, and the FBX format file with animation effect is output. After the model is made, it is imported into Unity3D platform to build the environment scene. Then write a script to complete the functions that the system needs to achieve. After the module is realized, the development is basically completed, and the system is established by exporting executable exe files through unity3d. Since VR hardware is built on different system platforms, it is necessary to select the corresponding target platform in the publishing settings [6]. For example, HTC VIVE application is published on PC platform, and users can enter the designated webpage for learning. This system can be combined with HTC VIVE equipment for VR man-machine interaction, which can enhance the user's sense of operation [7].

Windows10 version is selected as the development operating system of college ideological and political practice teaching system based on VR technology, 3DSMAX software is used as the technical support for the modeling technology, unity3d is used to complete the scene construction and function realization, and C# is the development language of the system. The relational database uses SQL Sever to build the database server, and the web server uses Apache tomcat. The peripheral head display device is HTC vive, and the release software device is steamVR [8]. According to the above

```
              ┌──────────┐
              │  Begin   │
              └──────────┘
                   │  3Ds Max
                   ▼
              ┌──────────┐
              │ Making of│
              │  model   │
              └──────────┘
              Import in FBX format
                   ▼
              ┌──────────┐
              │ Set up a │
              │  scene   │
              └──────────┘
              Unity3D engine
                   ▼
              ┌──────────┐
              │Realization│
              │of functions│
              └──────────┘
          ┌────────┴────────┐
          ▼                 ▼
  ┌──────────────┐   ┌──────────────┐
  │Packaging and │   │  HTC VIVE    │
  │publishing on │   │ interactive  │
  │  Web/PC side │   │demonstration │
  └──────────────┘   └──────────────┘
          └────────┬────────┘
                   ▼
              ┌──────────┐
              │   End    │
              └──────────┘
```

Fig. 1. Technical architecture of the system development (source: originate)

application requirements, we can complete the construction and deployment of the development environment of ideological and political practice teaching system in colleges and universities based on VR technology.

4 Functional Implementation

The users of the practical teaching system of ideological and political education in colleges and universities based on VR technology are students. The functions mainly include login and registration, function menu, answer inspection, memorial hall and immersion scene. The first three scenes are mainly UI design interface scenes, while the last two scenes are virtual scenes. The performance parameters of each scene are shown in Table 1. Considering the computational load of CPU and the rendering work of GPU, the number and fineness of system models need to be limited. Scenes with high average frame rate and model vertices are virtual scenes, so optimizing the performance of virtual scenes should also be the focus of this paper [9].

The interaction is completed by canvas component, and the user uses the handle to emit physical rays to collide with the model object and then trigger the operation. The system determines the triggered model object by setting the TAG value for each model object and triggering the tag value. Open Unity and create a new empty project. Select Fiel-Build Settings in the menu of Unity, and select PC, Mac& Linux Standalone. After that, the FBX format modeling of 3dsmax is imported to build and render the scene. After setting up some scenes, you can select Edit- Project Settings-Player in the menu, check "Virtual Reality Supported" in the "Other Settings" section and click the Play button on the Unity interface for a preliminary demonstration. In the development of the system, it is necessary to use the InputTracking class to obtain the position of each

Table 1. Performance parameters of each scenario (source: originate)

Scene name	Average frame rate (FPS)	Triangular numbers Tris	Number of model vertices Verts	Batches	Saved by batching
Login	74.3	628	1.5K	16	0
Menu	69.5	13M	1.9M	635	12
Exam	73.2	78	264	11	0
Memorial Hall	122	14.7M	18.6M	4511	30296
Scene	98	5.7M	9.8M	3656	9631

```
using UnityEngine;
   using UnityEngine.VR;
      publicclass          UpdateEyeAnchors:
MonoBehaviour
   {
   GameObject[]eyes = new GameObject[2];
   stringeyeAnchorNames ={"LefEyeAnchor",
"RightEyeAnchor" } ; void Update ()
      {
      for ( int i =0 ; i<2 ; ++i )
      {
      // If the eye anchor is no longer a child of
us, don't use it
         if( eyes[i] ! = null &&eyes[i] .
transform.parent ! = transform )
         {
         eyes[i]=null ;)
         }
      //If we don't have an eye anchor , try to
find oneor create one
      if ( eyes[i]==null )
      {
         Transformt=transform.Find( eyeAnchorN
ames[i] ) ;
         if ( t )
         eyes[i]= t.gameObject;
         if ( eyes[i] == null )
         {
         eyes[i]=new
GameObject( eyeAnchorNames[i] );
            eyes[i].transform.parent=gameObject.tra
nsform ;
         }
      }
      // Update the eye transform
         eyes[i].transform.localPosition=
InputTracking.GetLocalPosition ( ( VRNode )
i ) ;
         eyes[i]  .transform.localRotation=InputTr
acking.GetLocalRotation ( ( VRNode ) i ) ;
      }
   }
}
```

Fig. 2. Code implementation of VR device to obtain eye position (source: originate)

node visually [10]. The implementation method is to use the sample script code shown in Fig. 2.

5   Conclusion

This paper studies the principle and process of constructing the ideological and political practice teaching system in colleges and universities, which combines virtual reality technology, three-dimensional scene visual modeling technology and HTC Vive handle development technology. Due to the limited ability and time of the author, there are still some problems to be improved. For example, in this paper, when modeling by 3ds Max modeling software, due to the large number of models, there are some problems in the quality of models. It is hoped that professionals can effectively solve the problems of the speed and quality of model construction by introducing computational models in the follow-up.

References

1. Chen Mengxiang, Xu Ce. Exploration of Practice Path of Immersive Red Education Base Based on VR Technology. The Theory and Practice of Innovation and Enntrepreneurship.2021.09.
2. Shu Jun. Realization of Campus Exhibition and Interactive System Based on Unity3D and HTC Vive. Nanchang Hangkong University.2019.06.
3. Huang Bo, Xu Ling. Application Advantages and Realistic Foundation of Virtual Reality (VR) Technology in Ideological and Political Teaching in Colleges and Universities. China Journal of Multimedia & Network Teaching.2021–02–11.
4. Tang Ping. Design and Application of Practical Teaching of Ideological and Political Course in Colleges and Universities Based on Red VR Stadium. Henan Normal University.2019.05.
5. An Huiyu. Application of Virtual Reality (VR) Technology in Practical Teaching of Ideological and Political Course in Colleges and Universities. Educational Economic Information Edition.2019.12.
6. Sun Xinniu,Wang Mingxing.A summary of the application research of virtual reality technology in ideological and political education.Computer and circulation.2020.10.
7. Yang Shaozun.The Application Research of Unity3d Educational Games in the History Teaching of Grade 7.Nanchang University.2017.05.
8. Tian Bichun.The Dilemma and Countermeasures of VR Technology Application in Ideological and Political Course.Journal of Zunyi Normal University.2022.04.
9. Xu Dandan.Research on the Construction and Innovative Development of VR Teaching Platform for Ideological and Political Course in Colleges and Universities.Journal of Liaoning Agricultural Technical College.2022–03–15.
10. Li Lingling.Research on the Integration of 5G+VR Technology and Ideological and Political Teaching. Educational modernization.2019–08–02.