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The application of interactive media in the three dimensional animation teaching

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Abstract. Teaching difficulty, according to the theory of "chemical engineering drawing", combine the AutoCAD, 3 ds Max and Flash software, parts of the model into the three dimensional animation, and together with the components of the pattern set in the Flash software platform. Through the three dimensional animation and interactive control plane drawings, and the dynamic real-time teaching, realize the interaction of "chemical engineering drawing" 3 d animation teaching, improve the quality of the classroom and network teaching and efficiency.

Key words. Interactive media, the three dimensional animation, the teaching application.

"Chemical engineering drawing" is a science and engineering college of chemistry and chemical engineering professional basic course, the characteristics of the course is the demand is higher, perceptual knowledge and the image thinking space form and expression methods are difficult to language and words to describe. The main content of "chemical engineering drawing" figure including chemical equipment, chemical process and computer graphics three parts, including read equipment parts is the basic view of curriculum, the emphasis and difficulty. "Chemical engineering drawing" course teaching reform to help resolve the current prevalent in the chemical teaching practice students knowledge chart, drawing ability is not high, to the student future work development will have a positive and far-reaching influence. Because students lack the stronger beginner when space imagination, and the traditional teaching method (wood pattern and teaching wall charts, PPT courseware teaching, AUTOCAD auxiliary teaching, etc.) cannot be described vividly three-dimensional physical transformation of two-dimensional projection plane projection of this dynamic process, students tend to grasp the corresponding relationship between parts of the structure of the basic view is difficult, and the fear of difficulties to learn about the course.

With the rapid development of Computer and related technology, the Computer aided teaching CAI (Computer Assisted Instruction) are increasingly used in the

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teaching of chemical engineering drawings, provides technical means for teaching reform of the course. At the same time, with the characteristics of innovation economy rapid development of knowledge economy, and the network technology and the remote education technology matures, the network learning and teaching practice to promote the teaching form to produce fundamental change, a dynamic, interactive multimedia teaching software will become a new field of teaching software development, the CAI courseware is not only confined to the classroom teaching, will also be widely used in network teaching. At the same time, advanced 3 d design, the manufacture method is fast and comprehensive to replace the traditional 2 d design, manufacture, make engineering graphics course is given priority to with computer 3 d modelling, the two-dimensional modelling is complementary, combining all kinds of professional knowledge, to realize highly unified comprehensive curriculum design and drawing.

We think it necessary to change the traditional teaching mode, the interactive 3 d animation used in CAI courseware of "chemical engineering drawing", let the students become passive to active, in order to improve the teaching quality and efficiency. Structures of parts by creating vivid three-dimensional model, made into 3 d animation, and together with the components of the pattern set in the Flash software platform, the use of Flash interactive control, realizes the 3 d animation and dynamic real-time teaching of plane drawings, in order to improve the students' interest in learning, to overcome the fear of map reading psychology.

1. The construction of a virtual learning environment

The construction of a virtual learning environment to the three dimensional animation technology combined with virtual reality technology. Mainstream 3 d modeling and animation software such as Maya, 3 ds Max have powerful modeling and animation, texturing and rendering, and other functions, widely used in film and television, games, advertising design, etc; And virtual reality development platform mainly Java3D, Cult3D, Quest3D, Virtools, VR - platform, etc., they are all so different. Among them, the Virtools as real-time 3 d virtual reality editor integration software, has the rich interaction module and intuitive graphical interface development, can easily produce all kinds of 3 d interactive multimedia. The process of the construction of the virtual learning environment includes teaching analysis, 3 d model design, interaction design, and test release/animation resources such as steps. To use 3 ds Max and Virtools software as an example, the design of the three-dimensional model/animation by 3 ds Max software implementation, interaction design and test issued by the Virtools software to complete. Teaching difficulty, according to the theory of "chemical engineering drawing", combine the AutoCAD, 3 ds Max and Flash software, parts of the model into the three dimensional animation, and together with the components of the pattern set in the Flash software platform. Through the three dimensional animation and interactive control plane drawings, and the dynamic real-time teaching, realize the interaction of "chemical engineering drawing" 3 d animation teaching, improve the quality of the classroom and network teaching and efficiency.

1.1. Analysis of teaching

Including requirements analysis, the teaching goal analysis, knowledge analysis, learner analysis and the analysis of media production. Among them, the demand analysis is used to determine which teaching contents suitable for performance in the virtual learning environment; Teaching target analysis is the key to the whole design, determine the overall direction of the teaching, the design of the follow-up work will be conducted around it; Knowledge analysis to determine the emphases and difficulties of teaching, on the three dimensional animation resources, and emphasized in the design of interaction to guide the learning; Learner analysis is based on the cognition of individual differences, different learners needs to be considered in the design of the characteristics of the learners; The media make analysis from the Angle of the production to make software, production process, structural design, content design, material collection and processing and so on carries on the analysis and planning.

1.2. Three-dimensional model/animation design resources

On the basis of the preliminary design of a shooting script, can use 3 ds Max to complete a variety of 3 d model/animation design and production, mainly includes the physical modeling, material and lighting, animation, rendering, editing, picture and so on. Three-dimensional model/animation is the basis of constructing virtual learning environment, high quality design can show a vivid study situation. In order to solve the problem of 3 ds Max software compatibility with Virtools, can take advantage of the Virtools 3 ds Max output plug-in Exporter, 3 d model will be made in 3 ds Max/animation into Virtools supports data formats.

1.3. Interaction design

Is to achieve the purpose of interaction design such as control of the three dimensional animation broadcast, roaming and manipulation of the virtual 3 d model in the scene such as all kinds of interactive functions. Virtual learning environment based on Virtools platform design, the realization of the function of interaction ways include: (1) the direct use of Virtools built-in interaction module (Building Block, BB); (2) using Virtools provides VSL script language and software development kit (SDK) to create custom BB with specific functions. The first way is the main way to realize the interaction, through the required BB drag and the behavior of the object in the script for scripting, and the connection process set parameters, can easily achieve a variety of interactive control of three-dimensional objects, such as rotation, scaling, forward, backward, but in the case of extensive use of BB, attachment and parameter Settings are more complex; The second way can flexibly implement richer interaction capabilities, has strong portability and maintainability, but have higher request for programming.

1.4. The test release

Through debugging is correct, Virtools works can be published as web browsing format or compiled into executable file can be run separately.

2. The design of interactive 3 d animation CAI

Application of AutoCAD software can quickly and accurately draw engineering drawings and 3 d geometric model of the parts, but the plane view and the 3 d model produced by the relatively independent, not with correlation and interactivity. Build three-dimensional entity model in AutoCAD can be imported into 3 dsmax, using 3 ds Max powerful 3 d animation, animation of the model, make some unimaginable space form abstract concepts easy to understand. But the 3 ds Max animation files accounts for a bigger space of unfavorable to the classroom and the teaching of the network. Flash is a kind of important development platform of network courseware based on Web, is also the most widely used in the design of Web page 2 d animation tool, it has a strong interactivity, the generated file is small and good compatibility, can be directly in the online application, its rich data interface and a friendly environment also offers its widely, can be made in 3 ds Max AVI animation files imported into the Flash software, to. SWF format export, greatly reducing the animation files occupy a space, also convenient to class and network teaching.

Will draw the graph of AutoCAD software element and the three-dimensional animation of 3 ds Max transplanted into Flash software, through the Flash software interactive control, realizes the CAI courseware of "chemical engineering drawing" interactivity and intelligent feedback, and then guides the student to apply the three dimensional animation component model analysis, and combined with plane view, eventually to better to learn the structure of the parts and understand engineering drawings. For parts below basic view, main view, left view, top view of teaching, for example, that based on the interactive CAI animation Flash platform, as shown in figure 1. Among them, the use of Flash description language (ActionScript, by adding the button on the three basic view code, achieve control of the corresponding animation video operations.

3. The production of "chemical engineering drawing" CAI

Teaching difficulty, according to the theory of "chemical engineering drawing", combine the AutoCAD, 3 ds Max and Flash software, parts of the model into the three dimensional animation, and together with the components of the pattern set in the Flash software platform. Through the three dimensional animation and interactive control plane drawings, and the dynamic real-time teaching, realize the interaction of "chemical engineering drawing" 3 d animation teaching, improve the quality of the classroom and network teaching and efficiency.

3.1 Using AutoCAD draw the plane figure (part three view drawing),Set in the AutoCAD drawing limit, unit, the layer, the text style, mark style, capture the

spacing, etc. Draw the center line in the corresponding layer basic view, main view and left view, top view, dimension, text. Final drawings space layout, insert the title bar chart block. Will this map using screen copy or choose screenshots tools graphically is copied to the clipboard, and paste after inventory in graphics file format. As shown in figure 1.

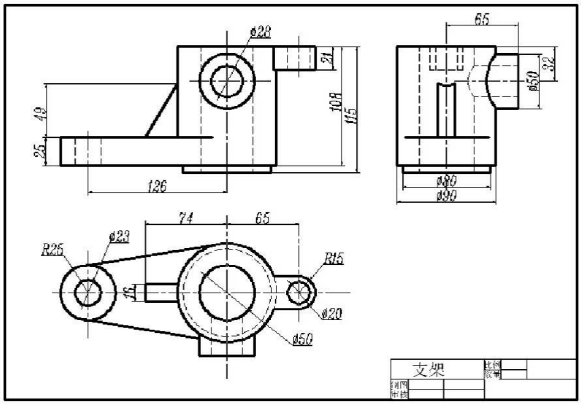

Fig. 1. figure 1

3.2 Use AutoCAD parts 3 d model is established, AutoCAD can use three ways to create 3 d graphics, namely the way of wire frame model, surface model and solid model. The entity model method has the characteristics of the body, can undertake all kinds of Boolean operation between basic entity object operation, so as to create complex combination of 3 d modeling. In the process of drawing, in order to make the entity object looks more clear, also can undertake shading and rendering of 3 d entity object processing, adding color. As shown in figure 3. Build a good model for. Save DWG file format.

3.3 Parts 3 d model into 3 ds Max, making the three dimensional animation 3 ds Max has strong texture rendering and 3 d animation function, compatible with AutoCAD to build three-dimensional model, through the File (File/Import) operation can be. DWG File to Import them. According to the actual effect, the model can be in 3 ds Max textures for further processing, such as the model with metal material, and set the scene lighting, background, etc.Open the Animate button, Animate object movement by keyframes. In frame 0 will object to adjust to the right start bit, and then in 100 frames, 200 frames to rotate, the position of the corresponding to the three basic views, has produced three AVI animation files are saved. As shown in figure 4, for the three at the end of the animation files in the position of the frame (200).

3.4 View on the plane and 3 ds Max 3 d animation files import Flash software, interactive animation files in the Flash software, through the use of the menu file/import/import video... That can be made in 3 ds Max three AVI file to import, in the form of embedded video stored in the repository. Because the video on the timeline of 200 frames, for the convenience of control, converts it to a movie clip components, and through filling between animation for amplification processing,

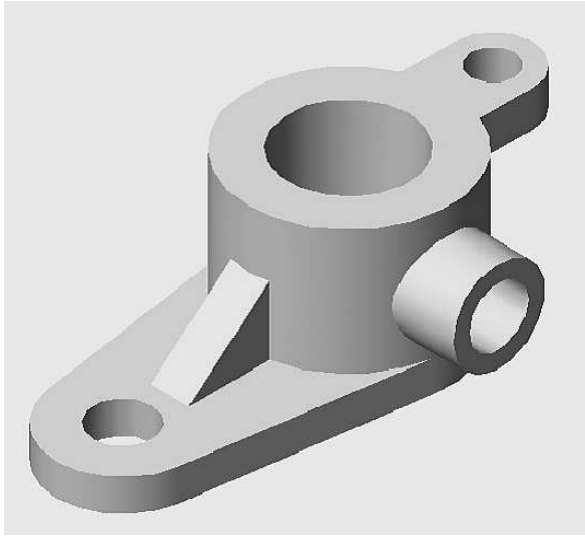

Fig. 2. Part 3d model

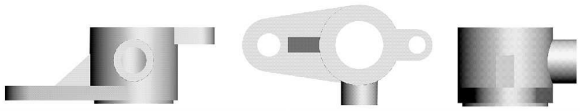

Fig. 3. Three animation files

and then into a movie clip components, respectively named video, vertical video, left video, in the first frame of the scene in the import, three video files belong to different layers. Copy part three view drawing (figure 2) to the Flash stage in the appropriate position, respectively according to three basic view for amplification processing fill (animation), and in three views set in the corresponding button element, at the same time, using the Flash ActionScript programming language setup code on three buttons, to control the operation of enlarged view and video animation synchronization. Amplification of movie clip.

Set on the button in the vertical component, changed the transparency to 0%, and in frame 1, 10 frames and 20 respectively frame button element set control code, such as frame 1 button element code is as follows:

```
on ( release)
{ _ root. zuospn. _ visible = 0;
_ root. zuspn. _ visible = 0;
_ root. fu. _ visible = 1;
_ root. fu. play ( )
_ root. fuspn. play ( )
_ root. fuspn. fusp. play ( )
_ root. zuo. _ visible = 0;
_ root. zhu. _ visible = 0;
}
```

Three amplified the basic view of movie clips into three components, respectively, in the corresponding layer of the main scene import in the first frame. Finally create a mask layer, the three enlarged view of the movie clip into being under the mask layer.

Observation of view, the view was amplified, and the other two views is hidden, at the same time, with the enlarged view corresponds to the 3 d part model rotating animation starts, turns to the direction of projection and view the animation is stopped, the other two animation remained motionless. Figure 8, to observe the vertical 3 d model shows the top view of amplification and the corresponding animation of spin in place. By rotating the animation demo of the original abstract two-dimensional plane view linked with 3 d part model, interactive, at the same time due to the studio to make teaching more vivid, make students more can deepen understanding of view formation and parts structure, greatly improve the learning initiative and participation. Also, we will be interactive 3 d animation CAI applied in "chemical engineering drawing" of the chemical equipment and chemical process, the content of the figure is also very good results have been achieved.

4. Conclusion

VR (Virtual Reality, VR) is the use of computer and sensors, simulate a realistic 3 d Virtual environment, to provide users a visual, hearing, touch, such as sensory experience, through the interaction between users and the Virtual world, let it have immersive experience. Immersion, interactivity and vision is the main characteristic of virtual reality. At present, the virtual reality technology has been widely used in entertainment, education and training, medicine, engineering, military, and many other fields. Virtual learning environment is the application of virtual reality technology in education, such as virtual classroom, virtual laboratory. Using the virtual learning environment can breakthrough the limitation of time and space, immerse learners in a certain degree of virtual learning situation, to explore and experience. Vivid 3 d animation resources and reasonable effective interaction function to arouse learners' interest in learning, cultivate their autonomous learning ability, so as to enhance learning effect. The key to build a virtual learning environment is the three dimensional animation resources, and interaction design. There are a lot of literature on how to build a virtual learning environment study, developed a variety of applications in virtual learning system of different subjects, but most of them pursue the design thought of "based on technology", only from the Angle of technology development, describes the process of the construction of the virtual learning system, and the three dimensional animation resources and interactive design method of the summary is not enough, lack of necessary teaching design concept.

The teaching of "chemical engineering drawing" use interactive animation CAI, to break through the limitation of the traditional teaching, using the modern computer tools to reform the traditional teaching mode. Deep feeling in the teaching practice, the writer use a computer simulation model of three dimensional animation teaching, not only can help students understand some more image, vivid is difficult to understand the key issues, such as the view of reading, parts of the structure of

the imagination, etc., can also reduce the financial burden on teachers' teaching and chemical mapping of abstract content into vivid. Courseware interactive bringing great students self-study related content repeatedly, overcome the "chemical engineering drawing" of the fear in learning, improve their interest in learning. The application of interactive 3 d animation, improve the quality of the classroom and network teaching and efficiency of the teaching of "chemical engineering drawing" will also continue to promote.

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