

# UNIVERSITY STUDENTS' ACTIVITIES IN THE DEVELOPMENT OF MULTIMEDIA EDUCATION SOFTWARE

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## ABSTRACT

Our university has developed a completed Multimedia CAI system of Engineering Drawing. It is available to all students of Engineering Specialties. This education software has been developed by the Department of Engineering and Computer Graphics led by Prof. Zongyi ZUO. During the process of developing the system especially the software, students played a great part in it. This paper introduces the multimedia software Engineering Drawing and how we developed it.

**Keywords:** Multimedia CAI Software, Animation, and Image Processing

## 1. INTRODUCTION

The development of multimedia CAI software was started in 1994. After 6 years of continuous effort the software has been completed successfully and put into use. When we entered the university 2 years ago and were introduced to computer graphics and multimedia for the first time by Prof. Zuo, we started to learn various kinds of techniques and applications of them. At the same time Prof. Zuo invited us to work on the multimedia CAI software Engineering Drawing, which provided us a complete practical system.

## 2. INTRODUCTION OF THE MULTIMEDIA CAI SOFTWARE SERIES

Our multimedia CAI software series consists of 4 parts: the teaching system, the exercise system, the test system and the teaching management system. To develop an interactive and vivid education software, many advanced multimedia techniques were applied such as graphics and image processing, hypertext, solid modeling and rendering, 2D and 3D animation, sound editing etc. The following is the brief introduction of the software.

### 2.1 The Teaching Software of Engineering Drawing

This software includes Descriptive Geometry, Projection Drawing, Engineering Drawing and Computer Graphics. It can help or even replaces the 's class' teaching. In the class of Engineering Drawing at our university, in class we no longer use the traditional tools such as a blackboard, chalks, wooden models and so on.

### 2.2 The Exercise Software

This kind of software allows students to do exercises with the computer and give students advice or

explains when they meet problems.

### 2.3 The Test Software

This software can evaluate the students and give them scores.

### 2.4 The Management Software

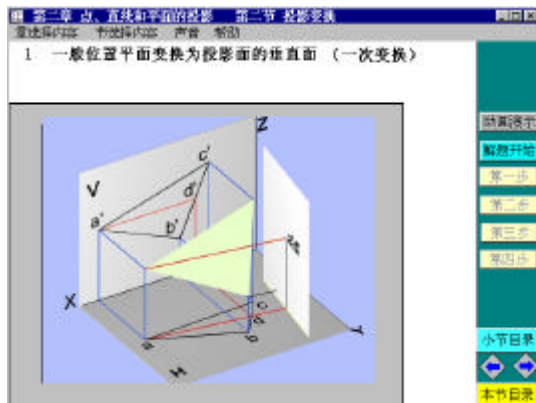
This software manages students' scores and other teaching affairs.

## 3 OUR WORK

I started the project with two of my schoolmates. We mainly responded to 2D and 3D animation creating and rendering, interface decoration-designing, drawing with CAD software, voice recording and inputting.

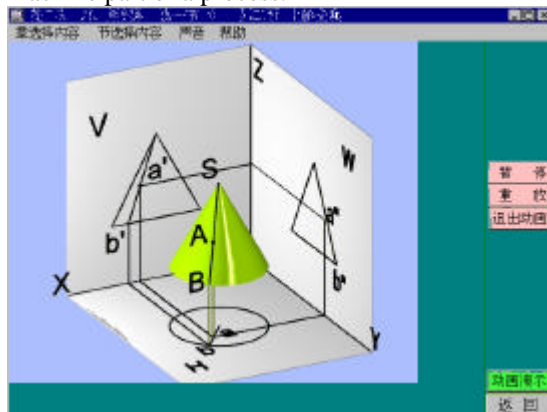
### 3.1 Modeling and rendering solids and create it's animation

This is one of our most important tasks. In the traditional way of Descriptive Geometry teaching, the most difficult task for the teacher is to explain the spatial relationship among planes and objects. It is hard to illustrate the location and form of 3D objects by just drawing on the blackboard or showing wooden models. Students always get confused. However with the help of our animations that were processed with 3DSmax, the construction, shapes and transposition of even subtle parts can be observed clearly. Fig 1 is an animation in the teaching software that displays the process to change an oblique plane into a plane that is perpendicular to a projection plane by creating an auxiliary plane.



3D animation of an edge projection  
Figure 1

Fig 2 is an animation of the process to find a point on the surface on a cone by creating auxiliary lines. All 3D animation can pause, stop, go back and show step by step. It is very useful to show a solid, a machine part or a process.

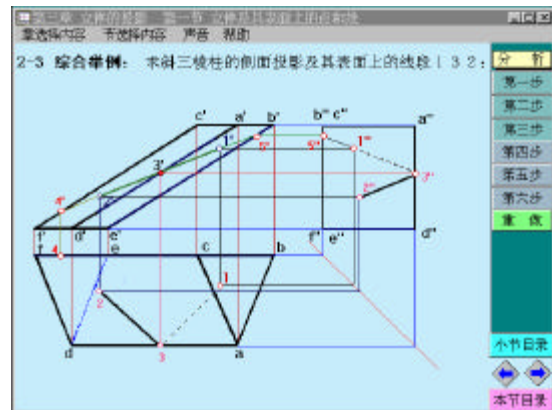


A 3D animation of finding points on the surface of a cone. Figure 2

With these animations demonstrating step by step, all those complex processes become easy to understand.

### 3.2 Creating 2D animation

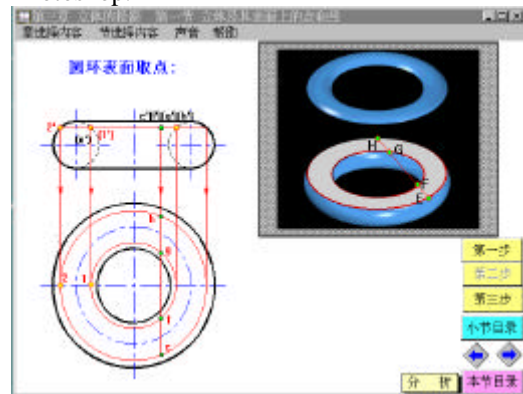
This is also an important task when solving the spatial geometry problem. There are several ways to generate 2D animation. One way is to use Toolbook's function, such as automatic script record, path animation, Openscript programming, or to use the software such as Animator pro etc. Fig 3 is a Descriptive Geometry solving and fig 4 is the processing of the projections of the points on the torus.



An 2D animation showing steps of solution.  
Figure 3

### 3 To beautify the interface of the software

To beautify the interfaces, our main tool is Photoshop.

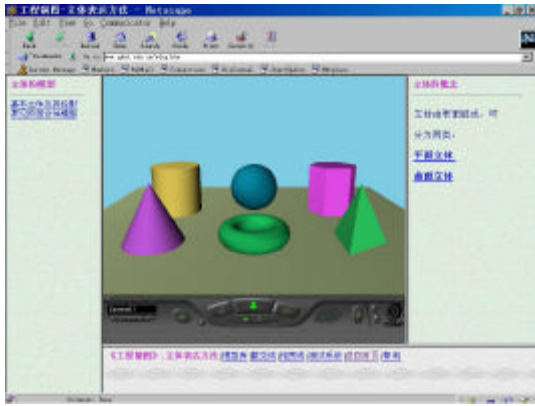


An 2D animation of solving special problem  
Figure 4

We also used many other tools such as Photomagic and Corelcapture. The first page of each chapter and all menus are decorated with the background pictures.



An Chapter page of Isometric Projection  
Figure 5



The virtual reality remote education system.

Figure 6

It makes the interface more attractive. Fig 5, Fig6 and Fig 7 is some interfaces designs.



Chapter page of Introduction

Figure 7

### 3.4 Drawing preparation

We also draw a lot of Engineering Drawings with AutoCAD that are prerequisite for the software. With this job we become familiar with AutoCAD R14-2000.

### 4 CONCLUSION

In the process of developing multimedia CAI software, we have learned many techniques. Besides various graphics software and multimedia authoring tools, we master the computer operating system, text process, image process, animation creation, WWW technique and so on. After comparing the advantages and disadvantages of various graphics software and the graphics file formats, graphics compress and extract, we obtained a general understanding on computer graphics technology.

### 5 REFERENCES

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