

Application of the Computer Assembly Virtual Platform in Higher Vocational Education

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Abstract—In higher vocational education, it is found that most schools have tight budgets when it is talking about the practical teaching of computer assembly and maintenance. Besides, the hardware equipment provided to students for experiments is poor, and it will bear unnecessary losses in the process of students' realization. The paper explains that it is an effective solution to this problem to use the computer assembly virtual simulation platform to carry out experimental teaching. The virtual simulation experiment teaching is a new development direction, which can promote the reform of teaching forms, teaching methods and teaching concepts, and effectively solve the problems in teaching, thus improving the quality of experimental teaching.

Keywords—Virtual simulation; Eon studio; computer assembly

I. INTRODUCTION

With the development of the information technology and the popularity of computers, it is necessary for people to understand the knowledge of computer assembly and maintenance. Therefore, every college will introduce computer assembly and maintenance related knowledge in higher vocational courses. However, at present, as some colleges and universities are affected by many factors such as funds, places, environment, timeliness, there is a slight deficiency in the hardware required for practical teaching, and even some practical contents cannot be carried out. Therefore, this paper proposes to adopt computer virtual simulation technology to simulate the whole computer assembly hardware and assembly process. It can effectively solve the problems encountered by the teachers in teaching computer assembly and maintenance course-related knowledge.

II. THE INTRODUCTION TO THE VIRTUAL SIMULATION TECHNOLOGY

Virtual simulation, also known as the virtual reality or simulation technique, is a kind of technology using a virtual system to imitate another real system. In a narrow sense, virtual simulation refers to a new type of experimental research technology gradually formed with the development of computer technology in the 1940s; the virtual simulation technology is characterized by establishing a complete virtual environment with a unified system, as well as integrates and controls a large number of entities through a virtual environment. The entities can be simulators, virtual simulation systems, some simple mathematical model representations, and

so on. They interact in a virtual environment or interact with a virtual environment to represent the true features of the objective world. The integration, virtualization and networking characteristics of the virtual simulation technology have fully met the development needs of the modern simulation technology.

Virtual simulation technology has four basic characteristics such as immersion, interactivity, illusion and reality. It is mainly applied in lots of fields such as medical treatment, education, military, industry, urban simulation, scientific computing visualization, entertainment and other fields, Virtual simulation technology have really made great contributions to the development of human science & technology and social progress.

III. THE CURRENT PRACTICE STATUS OF THE COMPUTER HARDWARE ASSEMBLY AND MAINTENANCE COURSES

With the rapid development of computer technology, computer software and hardware are constantly updated. In order to adapt to the development of science and technology as well as the computer technology, the teaching content of computer assembly and maintenance for the higher education needs to be steadily renewed. At present, in order to reduce the hardware losses and capital investment, many colleges and universities provide disassembled hardware which is basically discarded or obsolete computers for students. However, due to the relatively fast update speed of the computer technology and hardware, many accessories can only stay in the explanation level of courseware when they are introduced, and there is a big difference between the accessories provided in the disassembly and the content of the class lectures.

In the actual teaching process, although the teacher has made explanations and demonstrations before the theoretical class and practical training class on the operations to be carried out, due to the differences in individual learning and understanding, some hardware will always be damaged in each practical operation because of improper operation, resulting in the reduction of teaching resources. The students' faulty operation in the practical training has caused unnecessary losses.

It is difficult for most of the existing practical training conditions in colleges and universities to operate one device by one person. The students have no good evaluation on their practical training effects, and they cannot give teachers

feedback on their learning and mastery. The practical training resources are limited, and there is no standard evaluation on the effect of students' practical training. How to use the existing resources to improve the utilization rate is a difficult problem.

IV. THE APPLICATION OF SIMULATION PLATFORM IN TEACHING

Aimed at the practical situation and existing problems of the computer hardware assembly and maintenance courses in

higher vocational colleges, the computer assembly virtual platform is applied to the teaching of the content. The virtual reality technology can provide students with a vivid and realistic virtual learning environment by providing realistic virtual experiences, thus accelerating and consolidating the process of acquiring the knowledge and the skills for the students. The functions implemented by the simulation platform are as shown in the Fig. 1:

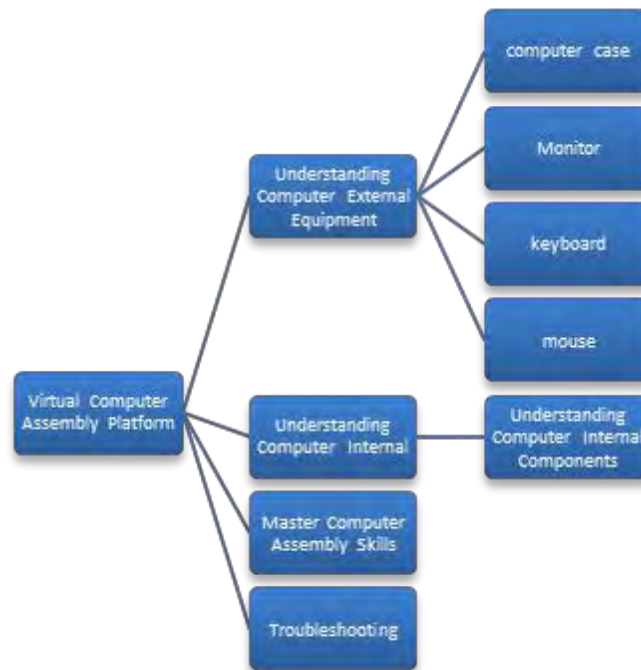


Fig. 1. Instructional objectives

A. Course content presentation

When the teachers explain various hardware knowledge points of computer assembly, it is difficult for students to fully comprehend and understand only through the language narration and the picture display. In the process of explanation, if the teachers show the three-dimensional hardware, students can grasp it more intuitively and vividly. The hardware system of the computer includes five parts: input device, output device, memory, arithmetic unit and control unit. The platform uses 3D modeling software pro/e to build 3D models such as display, CPU, memory bank, hard disk, graphics card. And then it imports the built models into Eon Studio software, and uses Eon Studio to realize simulation of the entire computer

hardware system. Teachers can use the platform to display the appearance of hardware, explain the parameters and the entire installation process, so as to enable the students to understand various parts of the computer and to observe every detail of the hardware through 360 degrees of the hardware rotation, as shown in Fig.2. Compared the traditional teaching methods such as languages, words and pictures, it can promote the students' effective memory with the three dimensional method. The writer chose different classes to be taught with two different methods; after that, the students in the different classes did the same test of computer hardware knowledge. It is found that the students taught by the three-dimensional method have more 18 average scores than the normal students.

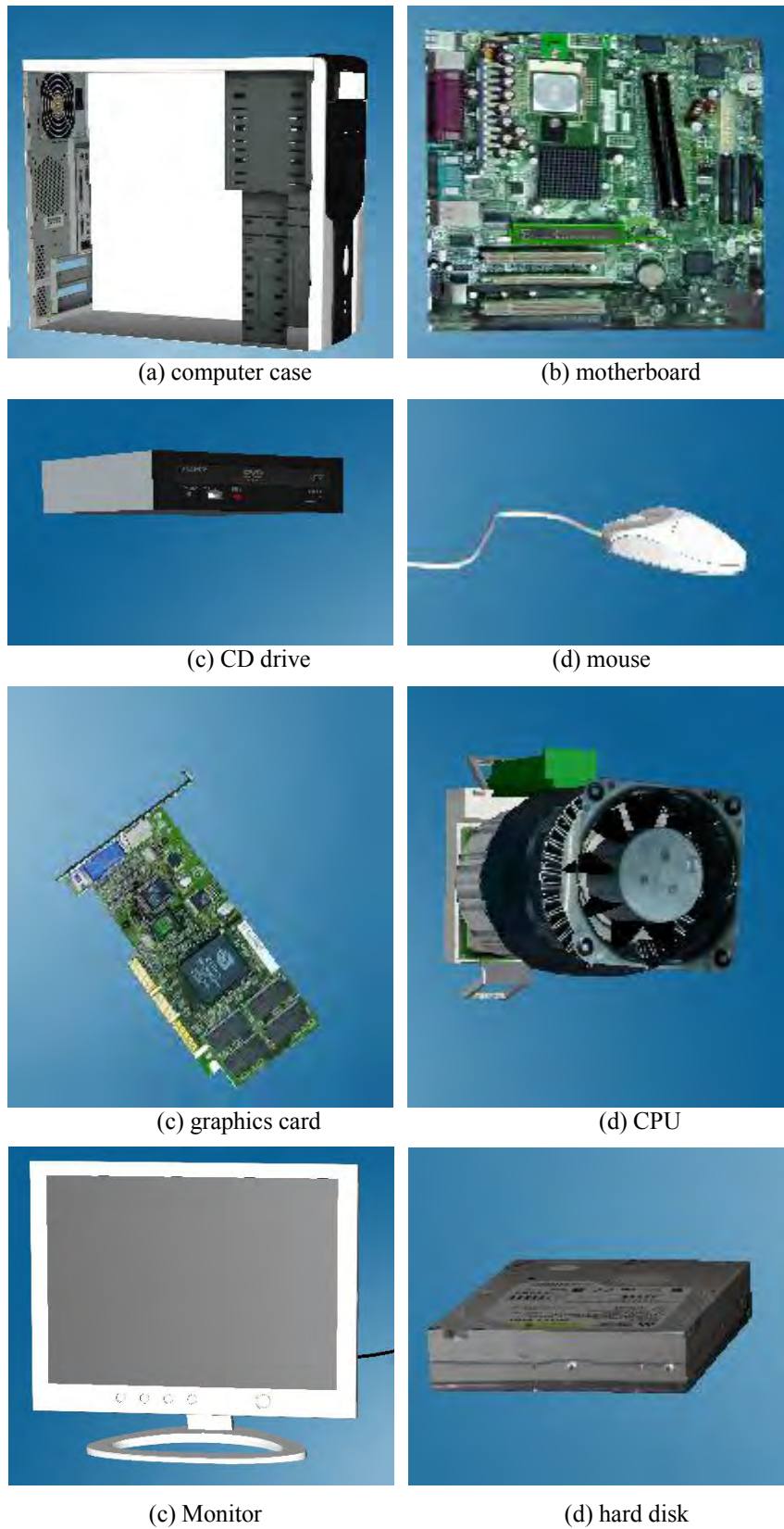


Fig. 2. Hardware display



Fig. 3. Error prompt

B. Hardware virtual installation

The platform can simulate various components in a three-dimensional manner on the computer. And the students can operate these simulated components through external devices such as a mouse and a keyboard so as to realize the practical process of computer assembly. In the actual implementation of installation, due to different degrees of mastery of each student, some damage will be more or less caused to the computer during the installation, while the simulation system can well solve this problem. The realistic stimulation of the installation process through the system, can not only make the students master the basic skills of the installed machine, but also can make a simple reminder of the reason for the errors in the students' installation process, which is more intelligent, as shown in Fig 3. The simulation system has a built-in function module for troubleshooting. It enables the students to find out the cause of the fault and solve the fault through the tips. Through the practice, it has greatly improved the efficiency, and it is more conducive to saving the students' learning time.

V. CONCLUSION

It is a new development direction to adopt the virtual simulation technology for experiment teaching. It promotes the reform of teaching forms, teaching methods and teaching concepts. The rapid development of computer and network communication technology has promoted the application of

virtual simulation technology in various fields. Making full use of virtual simulation in computer assembly and maintenance teaching highlights many advantages such as easy maintenance, low loss, low capital investment, which can effectively solve difficult problems in teaching, thereby to improve the experimental teaching quality.

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