Study on the Teaching Method of the Course of Digital Television Theory

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Abstract: Digital television theory is an important major course of communication engineering which introduces the basic theory of television. The paper firstly discusses some problems in course of traditional teaching. Secondly, a new teaching method called “three-dimensional method” is brought forward in order to solve the problems. Finally, the application of “three-dimensional method” is narrated.

Introduction
Digital television theory is an important major course of communication engineering which is a key specialty in our university. And the course is regarded as a key profession subject for an electrical engineer. It is difficult for students because of its characteristics such as strength theory, many mathematical equations, a few of abstract conceptions, little actual contact.[1] Therefore, we should explore some new teaching methods of the course in order to improve the quality of teaching, the teaching effect and the students' abilities to analyze and solve problems.

The Characteristics of Satellite Communication Theory
Digital television theory is a professional major course which preliminarily presents the basic conception of digital television system and discusses the basic principles and techniques. The course includes basic color principles, key techniques of analog domain, analog-digital conversion, channel characteristic, communication circuit design and so on[1]. Through the study of the course the student should understand the basic conception of digital television system, master the key techniques of digital television and can analyze a complete television system. Now its theory teaching is 32 hours which is not enough to grasp the key theory for the students.

The Analysis of Traditional Methods
Now the traditional teaching methods have some problems as follows:

The Single Classroom Teaching Mode
Many teachers apply the traditional methods such as talking and writing on the blackboard. The modes reduce the amount of information because of the little effective time in class. On the other hand, it is difficult to clearly dictate and vividly express some key knowledge points.

The Outdate Multimedia Courseware
The multimedia course now used is the replica of the textbook which lists large section words, so it can not reflect the true meaning of multimedia teaching. It is hard for students to accept and students will feel tired and confused because of large section rigid words.

Problems of Experiments
Although experiment assisted instruction is applied, the experiment content is mainly to verify and students are passive without enthusiasm. The experiments of MATLAB are mostly to write programs and programming language is boring. Therefore, the students can not realize the real role
of the computer software in simulation of satellite communication system. It is not conducive to train the innovation abilities of students and to improve their professional qualities.

**Exercises after Class**
Examples and exercises after class are the application of one knowledge point which seldom involves the comprehensive knowledge, so the students’ abilities of comprehensive analysis are not improved.

**Three-Dimensional Method**
According to three-dimensional method the information transfer and relationship between teachers and students are not unidirectional but bidirectional and comprehensive. The method lets students improve the enthusiasm in learning. It includes observing by eyes, discussion by mouths, perceptual experience by ears, innovatively thinking by head and operating by hands based on the theory of constructivism and the mode of target teaching. The method can enhance the vividness of content and interactivity in teaching so that students feel interested to obtain knowledge. In brief, it will improve the students’ abilities of comprehensive analysis and promote the overall qualities of students.

**The Application**
The three-dimensional method is innovative and it fully uses the existing information technology. It will be applied in course of the teaching of digital television system, which will combine several methods such as the traditional method (writing on the blackboard), computer assisted instruction, software simulation and online teaching platform. The methods including interaction between teachers and students and communication between students will be taken in order to achieve the desired effect. The application is listed as follows:

**New multimedia Courseware**
As mentioned before many universities have applied multimedia teaching, but it has not really play a role in teaching because the courseware used is rigid and bored. In order to mobile the enthusiasm of students and achieve the interaction some software are used such as JAVA and CAI to design new multimedia courseware [3]. The new courseware has distinct interface for students. Flash is applied to describe the abstract content by the vivid animation. It is not boring for students at all and lets students actively participate in. Thus, the new courseware unifies the knowledge teaching and quality training. The echo of students is good after some months.

**Matlab/Simulink Simulation Software**
The professional course was confined to theory teaching because of the limited condition. It is a problem all courses faced. Now a complete digital television system built by school funds is not realistic, so Matlab/Simulink simulation software is applied in course of teaching to simulate some parts of digital television system. Simulink of Matlab is a dynamic simulation platform supplied by Math Works Corporation. A complex simulation model is constructed by module blocks so that users can get rid of the pressure of mathematical deduction and the worry of programming. Thus, the observation of the system working principles can be concentrated on. For example, the techniques of analog-digital conversion including PCM, DPCM and LTP can be simulated by Matlab/Simulink.[3] Through the simulation experiments, not only the students’ abilities of mathematical modeling will be improved but also the advantages of the digital television techniques are observed by results of simulation.

**Online Teaching Platform**
Our university has two campuses, one is in Xi’an and the other is in Linton. Most students are in Linton, so that it is very inconvenient for relationship between teachers and students because
teachers live in Xi’an. When students have problems teachers often cannot solve them immediately. According to the actual situation an online teaching platform (BBS section) has been preliminarily built. Students can ask questions on BBS when they have difficulties in course of teaching and teachers will reply them as soon as possible. In the future, we will fully apply internet techniques to the online platform based on BBS so that we will interact with students and solve the problems of students immediately.

**Teaching Practice Base**

The practice teaching is the effective supplement of classroom teaching, which will improve the comprehensive abilities of students. In order to further understand the content of this course the rich resources of apparatus of corporations can be used to build the teaching practice base.

Firstly, in order to let students grasp the basic principles of digital television system we contacted the Xi’an Broadcast and Television Center and supplied an opportunity for students to visit. In course of visit students understand the whole working process by the introduction of engineers. They have further conception of communication system based on the basic theory and asked several questions about the working principle. They wrote practice reports after the visit. From the reports we can see that the interest of students was improved by the visit.

On basis of visit we also contacted some corporations such as Sichuan Changhong Electronics Corporation, Qinling Power Plant and Dragon Communication Corporation of Luoyang to set up practice bases in which students can do production practice. In course of practice students can see the working process of the digital television system equipments and the construction and working principle of digital television system. By the theory with practice students can analyze the principles and technical characteristics of equipments and do some demonstration experiments in the guidance of technical staff. The mode of practice is completely different from classroom teaching and students can practice by hands. Through the further production practice the practical abilities of students can be improved and it is benefit for students to deeply understand the theory.

**Conclusion**

The paper discusses some teaching problems of digital television system based on the traditional methods. Then the feasible research about teaching methods is studied and a new method called three-dimensional method is put forward. In brief, the new method can excite the learning interest and improve the comprehensive abilities of students so that the high quality talents will be trained for our country.

**References**


