

# **Analysis and Exploration on "Digital Circuit" Course Teaching Reform of the Vocational Colleges**

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**Abstract.** "Digital Circuit" course is the basic course of the professional electronic information and it plays a connecting role in the science system. With the continuous deepening of educational reform, the original teaching courses of "digital circuit" can't keep pace with the times because the society is becoming increasingly demanding. There are several problems in the traditional teaching in vocational education and it is urgent to take the teaching curriculum reform.

## **Introduction**

With the rapid development of modern information technology, business demand for innovative applications of talent increases every year, which both an opportunity and a challenge for college graduates. Our graduates need to have a certain degree of technology transfer, promotion and management capacity, but also need to have the ability to innovate in modern technology. Therefore, according to the basis of culture "thick based" on the more need to focus on practical ability and sense of innovation talents. In order to meet the above training objectives, the reform of teaching content, teaching methods and teaching methods is an important issue currently Vocational Training Colleges solved. Curriculum design is important in college teaching Practical Teaching.

Digital circuit course design is an electrical, computer classes and network majors in designing a comprehensive training in digital circuit after completing courses, including courses targeting, capacity-building curriculum objectives, curriculum design ideas, curriculum design topics, courses design implementation steps, time allocation, assessment and other aspects.

Digital electronic circuit is one of the key courses for the professional in the vocational college, but also very practical basic courses, students must belong to master core competencies. The main aim of the course is to enable students to learn the basic principles of digital logic circuits, basic circuits, can master the system analysis of digital logic circuit design method and its application. Lay the foundation for engaged in production, construction, management and service the first line of advanced technology work. The course for subsequent courses to learn and improve students' ability of engineering practice has a very important role. But now digital circuit teaching is essentially a pattern and undergraduate teaching materials are mostly undergraduate teaching, just slightly abridged and simplified content. Higher Colleges of senior technical talents, such education is difficult to guarantee, so teaching reform in higher vocational colleges imminent.

## **The Situation and Analysis of Traditional Digital Circuit Teaching**

Now appeared on the market a lot of learning materials for higher vocational colleges digital circuits, but a majority of compression or undergraduate textbook, the content is no novelty. The Higher Colleges of digital circuit course in the teaching content and also similar colleges. Systematic teaching content and strong theoretical, theoretical depth requirement is too high, so that most students find this course very boring, even bored.

Digital circuits in many colleges and universities still use traditional teaching methods, teachers on the theoretical knowledge in the classroom, after the end of a unit, to give students with experiments, and those experiments are also some validation experiments, the students according to connection diagram, even machinery to copy other students, how people connect, how he is connected, as what has been done to achieve what did not thoroughly understand, a serious

impediment to the development of students' creative ability and learning initiative.

Higher Colleges goal is to develop business-oriented units of the first line of application-oriented talents, therefore, with particular emphasis on linking theory with practice, in particular, should combine graduates are engaged in jobs, develop their practical ability. However, the current teaching curriculum content of digital circuit theory with practice is not enough, the application of knowledge and skills introduced relatively small, is not conducive to the students' hands-on ability.

### **The Curriculum Orientation and Capability Training Objectives**

Digital circuit as a strong practical discipline, widely used in household appliances, scientific research, advanced medical equipment, advanced CNC machine tools, automated production lines, telecommunications, radio and television, Internet, aviation and other fields. Digital circuit is electrically Vocational Colleges and professional network of an important professional basic course, the main students' practical ability, logic circuit design, innovation and comprehensive design capabilities.

Curriculum design is a practical teaching, curriculum design through a comprehensive course content can be applied to the design, play a role in the consolidation of deepening, expansion and mastery. Through curriculum design, students can master the basic knowledge deepened learned the basic theory, familiar with and master the methods, content, procedures and processes; train students access to relevant documentation and processing and analysis of basic skills; cultivate students' ability and experimental skills, theory and practice closely, strengthen their discovery, analysis and problem-solving skills that can lay the foundation for graduation, students' ability to work independently.

This course is to improve students' practical skills and comprehensive digital IC design capabilities in applications oriented, under the guidance of professional teachers, curriculum design for problem students faced parsing typical design analysis form the basis of the title of the course design main teaching content, organized by teaching in practical work, to guide students in the production practice activities learn to use theoretical knowledge to solve practical problems, preliminary engineering design methods and organizational master practical skills, become familiar with the procedures and methods of scientific practice.

### **The Theory Teaching and Methods Reform**

**The Traditional Teaching Content Puts Emphasis on the Theory.** Some concepts too abstract courses, students cannot integrate theory with practice, resulting in a mismatch between theory and practice. Digital electronic technology is a rapidly developing technology, integration of integrated circuits become more sophisticated, more powerful, new technologies emerging, while existing materials update rate is lagging behind many new technologies cannot occur in a timely manner textbook. Talents do not meet the goal of teaching Higher Education.

**Build New Curriculum Content System of "Digital Circuit" under the Direction of Discipline.** Module 1: Basics of digital circuits. Module 2: Analysis and design of combinational logic circuits and sequential logic circuits. The third element: the integrated use of electronic technology and methods. Teaching content should be reduced or removed on the device internal structure of the analysis process, highlighting the role of the device or integrated components, the main parameters and use precautions, focusing on linking theory with practice. Teaching content should be combined with students 'professional practice, the choice of a number of practical, interesting strong case, or select the students familiar with some of the specific product introduction, arouse students' interest in learning, so that students feel have learned to use, and fully mobilize students initiative and participation.

**Use the Modern Teaching Methods.** With the popularization and application of the continuous improvement of teaching conditions and advanced teaching equipment, we can use more modern teaching methods and means of training students thinking of digital logic. Multimedia timely and reasonable in the classroom teaching, teachers, according to the teaching ideas, complex internal

structure of the device, circuit diagram and a timing diagram, etc., in accordance with its inherent logic, timing relationships, in the form of animation layering, gradual emergence to produce courseware, typical circuit simulation results demonstrate, to accelerate students' understanding of the issues, so that the use of multimedia for visual, auditory and other multi-channel, multi-sensory stimulation comprehensive features, while saving a lot of plate painting charts time and improve teaching efficiency; on the other hand, the use of multimedia images, dynamic, colorful features, to make up for the shortcomings of traditional blackboard, so that the reality of the original dynamic, three-dimensional content to reproduce its dynamic nature, teaching vivid, intuitive, help stimulate students' interest in learning, and create a harmonious interaction of the classroom atmosphere. By analyzing animation, demonstrating teachers analyze problems, problem-solving thinking process, and help students learn thinking skills.

In addition, with the rapid development of computer network technology, online courses, online education and the implementation of resource sharing is another major development direction of modern art and education. We should pay attention to the construction of network programs and resources, course teaching the basic requirements of the course, course syllabus, course Practice syllabus, lesson plans teaching curriculum, electronic lesson plans, practice teaching lesson plans, guide books, curriculum design guide books, textbooks Introduction, reference lists, problem sets, online counseling information and other online teaching materials complete, ready to provide students browse or download. At the same time, the development of fully functional online Tutor system, online examination system and online discussion feature for the students answering questions, providing self-evaluation possible.

### **The Practice Teaching Reform**

Today, vocational education, the number of hours for each course have made greater compression, and the corresponding revision of curricula lag, teachers are introduced to the knowledge that not only cost a lot of hours, while leaving students fewer hours of practice. Combined with backwardness and lack of laboratory equipment, large number of student groups, cannot guarantee that every student can complete the experiment, teachers cannot do eleven guidance, so practice not receive the expected good results. "Learning" and "use" seriously out of line, some of the content "no access to school," some content "learn not use," and some did not learn to use the content. Experimental test form only completed the task in curricular time is not conducive to the development of skills in the operation.

Practical teaching reform should be based digital circuit experiment teaching courses from the original experiment to set up a separate experiment course, increase evaluation efforts. Only the original validation experiments to be divided into three levels, namely proof-test: to enable students to recognize these experiments various device functions, among them the role of the circuit and the device is connected. Learn constitute various circuits commonly used devices. To enable students to master the theoretical knowledge and be familiar with the theory applied in practice. Through a number of complex electronic analysis of the product, and further deepen the theoretical knowledge. Design of Experiment: In some familiarity with the circuit works, the students explore ideas, give full play to the imagination of students, guiding students to design their own simple circuits, to guide students to analyze their work, analyzing the composition of the circuit, grasp it works, further deepen the theoretical study and master the theory into practice ways to improve students' circuit design and analysis capabilities. Integrated experimentation Course Design: students integrated use of the knowledge learned, digital devices designed to provide the market a practical digital system to do by the students themselves design and implementation of logic function circuit, the choice of chips , installation and commissioning, troubleshooting, students in addition to master a variety of functions with the external characteristics of a digital circuit devices commonly used to analyze digital circuits outside the grasp of the general method, strengthen the cultivation of design capabilities, in particular application of the device is to develop design capabilities. Teachers use extra guidance to allow students the freedom to play their own composition student design team, both to explore and learn from each other, and students the spirit of collaboration, team spirit,

thereby improving the overall quality of students. Through comprehensive experiments can appreciate the distance between theoretical design and actual implementation, practical knowledge of what inspired the enthusiasm of students to explore innovation, training students to solve practical problems, engineering practice ability, creativity and the ability to apply new technologies. Increased awareness and interest in learning this course and achieve strengthening students to analyze problem-solving abilities and innovative spirit of the goal.

### **The Reform of Experiment Examination**

The previous assessment form based on the theory test and assessment methods experimentally test report to determine student achievement and mastery-oriented students to meet the test, to focus on the content on rote textbooks and notes. The presence of the student lab reports very seriously each other "reference" phenomenon, this test is not conducive to fully reflect the students the practical mastery of course, but also a serious blow to the students' enthusiasm for learning, is more difficult to measure students' knowledge of the ability to use and practical ability, is not conducive to improving the level of teaching, there is no full examination of the role of guidance and feedback.

The new assessment methods: experimental test results = experimental operation  $\times$  60% + test report  $\times$  40%. The experimental operation division also includes the speed of experimental manipulations, verbal and accuracy of statements I made experiments. For example, a combinational logic circuit design as an example: There are two requirements require students to use one NAND gate realized in this experiment, and requires a minimum of cost, the easiest route. Second, the students realize 74LS153 data selector, the method is not limited. And provides experimental data, circuit error, the problem raised by the teacher site to get a better answer (requires that each group operations and answer questions people must be different), the operation will have 100 points and otherwise the teacher will be in the operating conditions record the actual situation on the field. In the lab report, students are required to complete the experiment in accordance with their own circumstances to write lab reports, since the operation of the teachers experiment with specific records, lab reports to see when the teacher will control each other, and requires that each group should indicate completion of the experiment process the fault occurred and how to exclude this part represents 25% of the test report is divided into proportion.

### **Conclusion**

In summary, teaching reform is an important means to promote scientific teaching activities. Strengthening the curriculum reform of digital circuit in vocational colleges is an inevitable demand for digital circuit curriculum development. This paper analyzed the existing problems from the current status of digital circuit curriculum reform in vocational schools and promoted the some countermeasures of digital circuit curriculum reform.

### **References**

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