

# Reform and Application of Project Teaching Method in EDA Course Teaching

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Fund Project: Reform and practice of project-based teaching mode based on mobile Internet—taking the electronic technology application course group of independent colleges as an example, the university teaching research project of Hubei Provincial Department of Education Project No. 2018533; Teaching reform and practice of EDA course based on the improvement of classroom teaching quality under the condition of informatization, school level subject No. 2019JYYB02.

**Abstracts:** In view of the strong practicability and wide application range of EDA course, this paper comprehensively considers the disadvantages of traditional teaching mode and the weak practical ability of students, puts forward the project-based teaching method, and explores its application and implementation process in EDA course teaching for reference.

**Keywords:** Project Teaching; EDA Courses; Reform; Application

## 1. Introduction

EDA course, that is, electronic design automation technology course, is a technical course based on computer, taking EDA software as development environment and special integrated circuit as design goal. It is a professional course that electrical and electronic majors need to master. However, the teaching form of traditional EDA course is relatively single, paying attention to the narration of theoretical knowledge and ignoring the cultivation of students' practical ability, and the learning quality is not high. The application of project-based teaching method can effectively improve the quality and level of course teaching.

## 2. Necessity of applying project—based teaching in EDA course teaching

According to the relevant survey, the teaching mode of EDA course is generally to first describe the structure principle of programmable logic devices, then describe the application methods of program design and software, and finally list technical examples. The content described is highly theoretical. If traditional teaching methods are used to teach, the structural principle will be talked about as soon as class begins. Even if students have enough interest in circuit knowledge, it is very difficult to understand, and it will make students feel very boring, resulting in poor teaching effect. The project-based teaching method is based on the cultivation of professional post ability, systematically design or selects the more typical projects in production practice activities, and integrate the curriculum content into the project, so that students can improve their practical ability and level while completing specific projects. Therefore, combined with the characteristics of EDA course and adopting project-based teaching method, students can systematically learn theoretical knowledge and master skills under the guidance of teachers, starting with specific projects and driven by tasks, so as to achieve good learning effect.

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### **3. Application and implementation of project—based teaching in EDA course teaching**

#### **3.1 Selection of project—based teaching content**

EDA course covers a lot of contents, but the teaching time is limited. Therefore, there should be a choice in the selection of teaching contents. We should not only consider the integrity and practicability of knowledge, but also effectively link it with the job and consider the development of students. For EDA technology, the difficulty of learning is HDL language. There are many kinds of HDL languages. Now most textbooks use VHDL language. The teaching of VHDL language cannot be explained sentence by sentence like C language or some other assembly languages, but to grasp the ideas and key points of electronic circuit design and use typical cases to enable students to master the key points of grammar in a very short time.

Through the investigation of enterprise post professional ability and interview with professional engineers, the teaching contents are effectively integrated according to the requirements of the necessary knowledge and ability for ASIC product design and production, so as to better exercise students' professional practice ability, and make the professional teaching contents of colleges and universities more meet the needs of post professional ability training. In the teaching of EDA courses, the project-based teaching method should be applied. The number of projects set by teachers should not be too large, but must be deep, not only the application of new technology and new knowledge, but also through specific projects, so that students can obtain more complete design ideas and methods in participating in project activities, to form scientific learning habits. We should really train students' professional practice ability in practice and cultivate college students into applied professionals needed by the society. The project task arrangement needs to be deepened according to the knowledge points and technical requirements. All tasks should run through the main line, and the project should be close to the students' life reality, so as to mobilize students' learning interest.

#### **3.2 Implementation process of project-based teaching method**

According to various teaching projects, the implementation of project-based teaching method should be different. The following takes the digital clock circuit design as the research object to analyze the implementation process of project-based teaching method.

First, project preparation. With the effective help of multimedia teaching, sort out and summarize the knowledge points contained in the project, and then demonstrate the project operation results with the experimental box, so that students can understand what they need to do, and mobilize their learning enthusiasm. When students' learning enthusiasm is mobilized, teachers should group and divide labor according to students' learning situation.

Second, the formulation of the plan. First of all, students are grouped according to the test box to discuss the scheme of project design. From the perspective of EDA technology test box, the test box has core devices and integrates many interface devices, so that students can independently analyze and explore what hardware the digital clock circuit is composed of. Students are familiar with digital clocks, so most students can quickly say clocks, scan display circuits, etc. When the students say the hardware composition, the teacher can remind the students that the smooth operation of the circuit must be carried out by CPLD, that is, the VHDL code describing the circuit must be compiled and downloaded to the CPLD chip. When students feel that the problem is more complex, they should guide students to divide the project tasks, so that students can understand the design scheme of digital clock circuit and can apply it effectively.

Third, program implementation. According to the content of the scheme, each project task needs to have a corresponding knowledge module, and each knowledge module needs to have a complete teaching process. The primary task of students is to carry out program design, do well in experimental verification, and display the design results. The details are as follows: ① The implementation process of the sub project. First explain the four digit binary addition calculator to let students know the structure and principle of VHDL program, and then let students try to modify the program according to their own knowledge or understanding, such as changing four digit binary to three digit binary, etc., then the teacher introduces if statement to tell about the two digit decimal calculator, so that students can carry out VHDL design of circuit. When they want to design after the above tasks are completed minute and second counting module. ② Project integration. After clarifying the contents of all knowledge modules, combined with examples, this paper describes the application methods of supporting if statements and process statements, so that students can design

the time display function module of digital clock. The comprehensive process plays a very important role in the whole project completion process. The design process is relatively difficult, which is conducive to cultivating students' logical thinking ability. ③ The project is perfect. Under the guidance of teachers, we should continue to complete the design task of digital clock with timing, time reporting and other functions. ④ Description and summary of problems. After the project, teachers should comment on the problems existing in the students' design stage and summarize some important and difficult knowledge points. ⑤ Expansion and extension of project knowledge. After the completion of each knowledge point and teaching task, arrange some representative training assignments for students. For example, after designing the addition calculator, students can try to design the decreasing counter; After designing the digital clock circuit, students can try to design the traffic light controller and other circuits. After practical training, activate students' thinking and improve students' practical operation ability.

Although the design of digital clock circuit is relatively simple, it covers the design ideas and key and difficult contents of EDA technology. The implementation of the project is from simple to complex, in-depth at all levels. The total project is divided into several relatively simple sub projects, and the overall design of the project can mobilize students' learning consciousness and initiative.

### **3.3 Precautions for the implementation of project-based teaching method**

Project-based teaching method is to learn knowledge from point to area by completing projects. Therefore, the selection of projects is a very important content. When selecting project content, we should try to be close to the actual production. The design of the project should establish effective objectives, that is, the knowledge section corresponding to each project should have corresponding ability training objectives. At the same time, we should also ensure the gradual setting of the project. When implementing the project, we should comply with the cognitive law of students, gradually deepen it, and cultivate students' ability level. In addition, in project-based teaching, experimental training is essential. It is necessary to ensure that all kinds of facilities and equipment in the laboratory are fully equipped, so that teachers can guide teaching more effectively.

## **4. Conclusion**

In a word, the application of project-based teaching method in EDA course teaching can mobilize students' interest in participating in course learning, deepen students' understanding and understanding of knowledge through the analysis of problems existing in the process of project implementation, and improve students' ability to analyze and solve problems in interactive communication learning, so as to better achieve the goal of course teaching reform.

## **Referenes**

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