Research on the Teaching Reform of Electronic Information Specialty Based On the Concept of CDIO Engineering Education

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Abstract: Based on the background of the transformation of local colleges and universities, the CDIO Engineering education concept is adopted in the reform and exploration of the practical teaching of electronic information engineering, and the CDIO Engineering application-oriented talent training mode is applied to the teaching of electronic information professional courses. We should build a practical teaching platform in line with engineering education, build a scientific and systematic practical teaching system, reform the practical teaching mode, and strengthen the training of teachers in engineering education. According to the concept of CDIO Engineering Education, the reform is carried out in all aspects, including teaching organization and implementation, evaluation system, etc. With the life cycle from product R & D to product operation as the carrier, let students apply the way of connection between practice and courses in the process of actively completing engineering projects. Cultivate high-quality new engineering talents with project development and design, innovation ability and team spirit.

With the development of new industries and technologies, the main goal of new engineering construction is to cultivate high-quality composite talents with international competitiveness, strong practical ability and innovation ability. As a traditional engineering major, electronic information major not only integrates computer science and technology, communication engineering, computer network and other non professional knowledge, but also has a wide range of knowledge and interdisciplinary disciplines. At the same time, information industry is oriented to electronic, information, communication and other fields, involving multiple industrial groups, wide employment and rapid technological development. Under the background of new engineering, CDIO Engineering education mode is based on training ability, which provides an effective way for training high-quality and compound talents of new engineering.

1. Analysis of the Current Situation of Talent Training Mode

At present, many local undergraduate colleges and universities have a long time to upgrade, resulting in unclear training objectives. In addition, the electronic information engineering major involves a wide range of knowledge. At the same time, limited by the conditions of teachers and practical training equipment, there are many problems in the talent training mode, mainly reflected in: (1) Pay attention to the teaching of theoretical knowledge, lack of frontier knowledge, poor engineering practice ability. It is unable to solve the practical engineering problems; (2) it lacks the opportunity to practice in the society and enterprises, the cultivation of engineering practice ability and innovation ability, and the unreasonable setting of engineering practice skills and basic engineering training links; (3) Although students have certain analysis ability through practical teaching, they have no systematic engineering training, and they lack the ability in electronic system design and actual development; (4) engineering education and training need a more perfect evaluation system of practical links; (4) in the teaching process, students pay attention to the teaching of basic knowledge and skills, not the cultivation of innovation ability; (5) the cultivation of team cooperation ability and communication ability is less, which can not meet the needs of enterprises and the development of modern electronic information industry; (6) the reform of personnel training cannot keep up with the rapid development of electronic information technology,

and the reform of personnel training is not strong enough, which leads to the disconnection of teaching mode, teaching content and actual production, especially the practical teaching link, and the learning is not used.

2. Reform of Practical Teaching System under the Concept of CDIO Engineering Education

2.1. CDIO Engineering Education Concept

There are three core contents of CDIO Engineering Education Concept: vision, syllabus and 12 standards, which emphasize the project based on actual production, To achieve the goal of engineering education, we should establish a talent training model guided by 12 standards, and achieve the four levels of abilities required by the training program for engineering graduates: engineering basic ability, team cooperation and communication ability, personal ability and professional ethics, and the ability to conceive, design, implement and operate products and systems under the enterprise or engineering environment.

2.2. Construction of CDIO Engineering Practice Teaching System

In order to meet the needs of local electronic and information talents and realize the goal of professional talents, engineering application technology talents who can be engaged in embedded system development, electronic products manufacturing, system testing and technology management should be trained. The practical link of specialty planning industry should be formed to form a reasonable and efficient practical teaching system and complete the cultivation of four levels of comprehensive ability. The CDIO Engineering education concept is Guide and build a project-oriented integrated practical course system, so as to accumulate knowledge and improve skills, highlight the cultivation of students' cooperation awareness and communication ability, engineering practice ability and innovation practice ability, and build a practical teaching system of electronic information engineering according to CDIO project standards.

2.3. CDIO Practice Base and Platform Construction

The construction of practice base is to lay the foundation for the development of practice links. According to the requirements of CDIO Engineering Education Project, five different levels of practice platforms or bases are established. (1) basic practice platform: it is composed of basic training room and curriculum laboratory to meet the needs of curriculum construction and cultivate students' basic practical skills; (2) comprehensive practice platform: establish a practice platform to serve the comprehensive practice projects set up according to the course group, such as information processing comprehensive training room, electronic design comprehensive training room, embedded system comprehensive training room, etc; (3) innovation practice platform: the three-level innovation and entrepreneurship platform of school innovation and entrepreneurship center, Rongshi innovation and entrepreneurship Park and college innovation laboratory is integrated to provide practice base for students' innovation and entrepreneurship training; (4) in school engineering practice platform: build in school engineering practice platform, introduce enterprise production line, and realize effective integration of teaching and production; (5) Industry university research cooperation platform: strengthen cooperation with enterprises and local governments, combine enterprise training with school training, and adopt "3"+ In the first three years, the teaching mode of "1" mainly focuses on learning in school, supplemented by enterprise practice and internship, supplemented by enterprise practice and supplemented by school guidance and management. The platform is used to effectively realize the docking of university training and enterprise demand. The practice platform management is strengthened, scientific management is carried out by means of information technology, and the self-management of students is mainly used to manage the supervision of teachers The auxiliary management mode can improve the opening rate of practice platform, enable students to fully develop the second classroom, make efficient use of all kinds of practice resources, and constantly improve their practice ability.

3. Reform of Practical Teaching Mode under the Concept of CDIO Engineering Education

3.1. Reform of Practical Teaching Content

With the rapid development of electronic information industry, in practice teaching, we should not only pay attention to the teaching of basic knowledge and skills, but also abandon the eliminated content in time, and pay attention to the latest theory and technology of electronic information, so as to penetrate into the teaching The standard is to arrange the teaching content of each practice link purposefully, to achieve step-by-step, not only to consolidate the original knowledge and skills, but also to meet the requirements of new knowledge and skills, so as to avoid repeated teaching of the same knowledge and skills In the teaching of single practice link, we should pay attention to organizing the teaching content from a systematic point of view, and combine the teaching content in the form of modules and projects, so as to cultivate the ability of students to connect theory with practice. The arrangement of the whole practical teaching content should achieve the organic combination of foundation and frontier, classic and modern, virtual simulation and system realization, so that the practical teaching can keep pace with the development of industry technology.

3.2. Reform of Practical Teaching Mode

The practice teaching takes the project as the main line, and integrates the training objectives of professional knowledge, ability and comprehensive literacy into the project Reform the original practical teaching mode of teachers' explanation and demonstration and students' operation, reflect the process teaching, adopt the interactive and deliberative teaching mode based on problems, projects and cases, cultivate the learning mode of students' autonomy, cooperation and exploration by group cooperation, flipped classroom and other forms, complete the training objectives of knowledge and skills, and improve the students' cooperation and communication ability; Reform the original teaching mode that the teacher gives the practice content and method, the student verifies, adopt the teaching mode that the student designs the project, the teacher instructs and supervises, train the student's innovation consciousness; reform the original mode that the practice teaching link is isolated, rely on the project to adopt the engineering system teaching method, pay attention to the cultivation of the engineering consciousness and the engineering practice ability.

3.3. Reform of Practice Evaluation Mode

Adopt diversified learning evaluation methods, and choose appropriate evaluation methods according to the training requirements, practical contents or forms of students' abilities. You can use the final practical evaluation, learning records, case discussion, group design and production, course paper, course defense, project report, design evaluation (record, report, self-evaluation, mutual evaluation), online platform learning and testing Record, innovative credit recognition and other forms of assessment, through different assessment methods to promote the improvement of students' knowledge and skills, expression ability, cooperation and communication ability and other comprehensive abilities.

3.4. Construction of Teaching Materials and Resource Base

Teaching materials are the basic resources for students to learn. It is an important part of teaching reform to choose or develop appropriate teaching materials according to training objectives and personnel training modes the teaching mode with project as the main line, the teaching materials with module and project as the organizational form should be selected for the professional courses and practical links of electronic information engineering. At the same time, the current students' learning is no longer limited to the classroom, and the full excavation of spare time can truly realize the cultivation of high-quality engineering technicians. In the information age, the professional resources can be built by making full use of the network platform Library, to provide learning resources for students in the second classroom, this measure is also conducive to the infiltration of professional frontier theory and technology, so that students' professional learning content and industry frontier technology are synchronized, and the seamless connection between graduation and employment is realized.

4. Teaching Content Design

4.1. Selection of Teaching Content

Among the 12 standards of CDIO education mode, the test standards for learning objectives are divided into two aspects: one is from the perspective of specific learning achievements, The extent to which the basic ability of individuals, the ability of teamwork and the ability to build products, processes and systems meet the professional objectives and are tested by professional stakeholders; the other is the extent to which professional stakeholders participate in the development of the standards for the ability and level to be achieved by students. According to this standard, in the formulation of teaching objectives and contents, it needs the participation of professional stakeholders, that is, employers, so as to combine the teaching contents, the abilities that students need with the actual production and meet the social needs. According to the needs of employers, the OBE education mode based on learning output is to drive the whole curriculum activities with students' output, and the courses are set up to realize the cultivation of students' specific abilities. According to the OBE model, we should first determine what kind of achievements and abilities students need to achieve in the process of education, and then design teaching objectives and contents around this goal. Not only according to the training objectives of professional talents, but also pay attention to the needs of the employers and other professional stakeholders, so that students can not only master the course knowledge and train the basic ability in the learning process, but also closely contact the production practice and apply the knowledge. (OBE) determine the teaching objectives and contents. In the selection of teaching content, according to the needs of the industry and the actual situation of teaching, based on the OBE education mode, a comprehensive project is selected as the teaching carrier, and the project is divided into several functional modules according to the system function. Combined with the requirements of the industry post for students' knowledge and ability, the corresponding teaching situation is designed for different functional modules. In the process of completing the carrier project, students can solve problems through their own inquiry and cooperation, so as to cultivate their abilities of independent learning, unity and cooperation, innovation and practice, and improve their professional quality while learning theoretical knowledge. Because the selected project is the actual problem that students may encounter in the current professional field, in the teaching process, we will integrate the knowledge points required in the curriculum syllabus into the project to combine knowledge learning with practical problems.

4.2. Organization and Implementation of Teaching Process

In the process of teaching organization, according to the CDIO teaching mode, guide students to follow the concept design implementation- There are four steps to organize the teaching. The teaching ideas are as follows: Step 1: put forward the task requirements: the teachers consult the relevant teaching materials and documents according to the teaching contents, communicate with the experts of the industry and enterprises, select a specific small product as the learning carrier, distribute it to each student in advance, guide the students to think and stimulate their interest in learning; step 2: conceive - the students according to the Institute After raising questions and fully previewing teaching materials and searching for relevant materials, we will discuss them in groups after class, draw several realizable implementation plans, analyze the advantages and disadvantages of each plan and determine the best plan; step 3: Design - learn in depth according to the determined plan Learn the relevant theoretical knowledge and apply it to the project. Through theoretical analysis and experiment, determine the design details, and solve the problems encountered in the design by searching for materials, group discussion, teacher guidance and other ways. Step 4: Implementation - complete the design by using simulation software, laboratory equipment, etc., and guide the students to continue to think about the system on the basis of completing the basic requirements Optimize, expand the function, encourage students to make physical objects; step five: Run - after completing the functional modules, assemble and realize the designed system, test the system function, analyze the test results, and draw conclusions. Step 6: display and summarize:

reflection or description on the knowledge learned is 10 for learners' understanding and consolidation of knowledge After the completion of the project, the students are required to show in groups. They can speak freely and fully express their opinions. At the same time, they can also obtain new methods and knowledge by listening to other group students, so that the students can develop their thinking, improve their design and expand new functions.
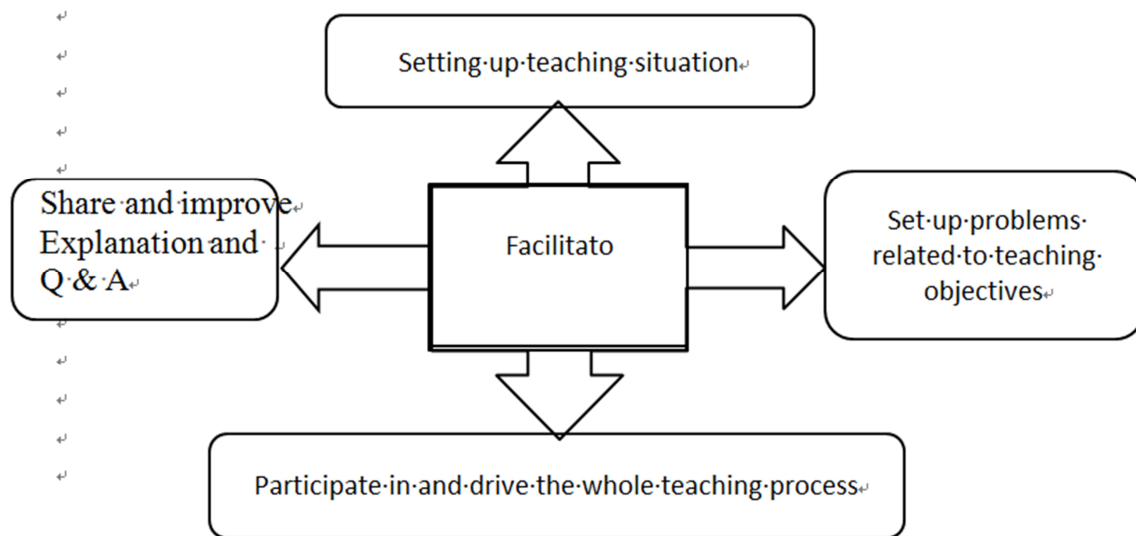
Figure 1. Teacher role

5. Evaluation System

According to the concept of CDIO Engineering Education, we should not only examine the subject knowledge, but also integrate the students' personal ability and interpersonal communication ability, product, process and system construction ability. The way of assessment also needs to be handled flexibly according to the characteristics of the course and the development of the project. It is necessary to examine not only the students' mastery of basic theoretical knowledge and the ability to use the knowledge, but also the students' team cooperation and knowledge building ability. The final grade will be determined according to the written test and practice results. The mastery of basic knowledge can be examined in the form of final written examination. The examination of knowledge application and other abilities can be based on the performance of students in the process of each chapter. In the development of the project, the students in the class are divided into several learning groups, and a group leader is set up, who is responsible for organizing the discussion and display of the students in the group on a regular basis. On the basis of completing the basic functions of each project, students are allowed to freely play the extension of system functions, organize students to show in groups and select one or two excellent cases to show in the class through group evaluation, and conduct self-evaluation and group evaluation at the completion of each problem and the end of each course unit. The scores are evaluated by members of each group, and account for the final scores According to a certain proportion.

6. Conclusion

According to the performance of the students in the development of each chapter, the scores are given. In the development of the project, the students in the class are divided into several learning groups, and a group leader is set up, who is responsible for organizing the discussion and display of the students in the group on a regular basis. On the basis of completing the basic functions of each project, students are allowed to freely play the extension of system functions, organize students to show in groups and select one or two excellent cases to show in the class through group evaluation, and conduct self-evaluation and group evaluation at the completion of each problem and the end of each course unit. The scores are evaluated by members of each group, and account for the final

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