Research on Mixed Teaching Mode based on OBE Concept in the Background of Golden Course

-- Take the "Digital Logic" Course as an Example

Baohong Wu

Wuhan Technology and Business University Artificial Intelligence Academy, Wuhan, Hubei 430065, China

Abstract

In the context of the construction of the Golden Class, Put forward high-level and innovative requirements for teaching. In the era of Internet + education, The OBE education concept has been gradually applied to undergraduate teaching, and the development of online and offline hybrid "golden course" teaching has become a mainstream trend in the talent training model. Utilizing the characteristics of flexible online teaching applications, strong openness, and fragmentation of knowledge points, it can solve the problem of ineffective teaching due to less class hours and more knowledge points. And through the combination with offline teaching, it enhances students' classroom participation, improves students' practical ability, and at the same time makes up for the lack of timely feedback in online education. So as to truly create a "student-centered and result-oriented" golden class.

Keywords

OBE Education Concept; Online and Offline; Golden Lesson.

1. Introduction

With the rapid development of science and technology, modern education information technology has advanced by leaps and bounds, and teaching models and teaching methods have undergone tremendous changes. The starting point of application-oriented talent training is to train a large number of high-tech and high-skilled talents for the country. In order for students to adapt to the needs of the enterprise after graduation, teachers need to continuously explore and dig into professional courses, and discover and research new teaching strategies.

"Digital Logic" is a course with strong engineering practice. Digital logic circuit is an important professional basic course for majors in computer science and technology, Internet of Things engineering and so on. Through the study of this course, students can master the analysis and design methods of digital circuits, and lay a good professional foundation for subsequent courses and future work related to digital circuits.However, computer majors often focus on software programming courses and ignore the reserve of hardware system knowledge. Therefore, how to divert students' attention to the classroom and show a great thirst for knowledge has become the primary problem to be solved in this course at present. In order to cultivate application-oriented and innovative undergraduate talents, the reform and innovation of the theoretical classroom teaching model is imminent. Combining with the problems of students, with the help of OBE education concept, the idea of research on hybrid teaching mode based on OBE concept under the background of golden course is put forward. In view of the high requirements of computer professional technology, the result-oriented curriculum reform is a strong guarantee for the improvement of teaching quality. The basic practical idea is to follow the principle of demand-oriented, curriculum design consistency, introduce advanced

results-oriented concepts, and build scientific curriculum development procedures. Through the development of needs analysis, the reconstruction of the curriculum system, the formulation of curriculum standards, the design of teaching units, the implementation of teaching activities, and the development of curriculum evaluation, corresponding curriculum design results have been achieved.

2. The Main Problems in Course Teaching

(1)The teaching content focuses on the function of the single device at the bottom and the combinational logic circuit and sequential logic circuit composed of it, which is difficult to meet the application in real life; the system is small in scale, and it is difficult to keep up with the new technology and new tools of the development of digital systems.

(2)Traditional teaching methods are not conducive to students' learning and mastering relevant knowledge. The traditional teaching method is that teachers first teach theoretical courses in the classroom, mainly teaching the relevant theories and basic methods of circuit analysis and design, and then let students go to the laboratory to conduct experiments. The content of the experiment is mainly to verify the sample questions described in the class. As a result, most students complete the experiment content mechanically according to the experimental requirements. Most of the time, they may not be clear about the specific problem to be solved.

(3) The practice teaching method is backward, and the evaluation method is too single, which leads to poor teaching effect. Students do not realize the importance of the curriculum, and the learning initiative is not strong.

3. Methods of Curriculum Reform

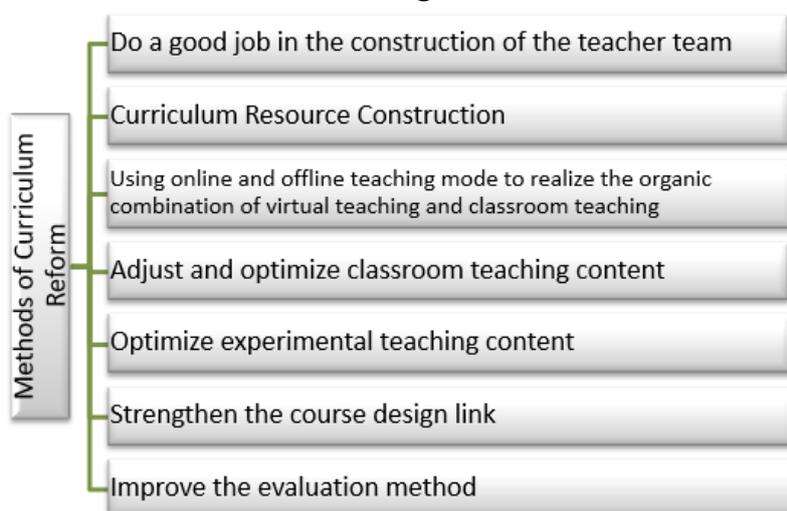The method of curriculum reform is shown in Figure 1.

Figure 1. The method of curriculum reform

(1) Do a good job in the construction of the teacher team

The orderly development of teaching is inseparable from teachers, and the construction of golden courses requires teachers' dedication and hard work. To build an excellent course, teachers must give full play to the main responsibility of teaching and educating people, establish a noble teacher's ethics and style, and build a high-ethics and high-tech teaching team. Carry out high-quality and high-level gold course construction in the form of a team,the construction of golden courses should be studied in depth from the aspects of curriculum

standards, teaching design, teaching methods, construction effects, etc. Integrating high-quality education and teaching resources, optimizing course content, building course resources, and developing new textbooks are gradually improved. The construction of the golden class is accompanied by the growth of teachers. Only by doing a good job in the construction of the teacher team can the construction of the golden class be effectively promoted.

(2)Curriculum resource construction

The preparation of course resources is mainly carried out from two aspects: virtual classroom and flipped classroom, as shown in Figure 2
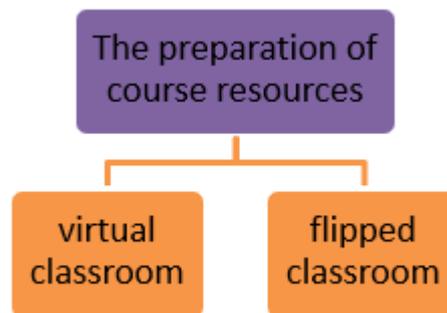

Figure 2. The preparation of course resources

Virtual classroom resources, through the network online platform to publish teaching videos, the videos are mainly in the form of micro-classes, explaining the basic knowledge of the course. After each small video, prepare the corresponding course exercises and homework to consolidate the basic knowledge goals in time. If you encounter some problems after class, you can also discuss and communicate through the online platform. The entire virtual teaching part focuses on students' independent learning, and the teacher only plays a role of supervision and inspection. In the flipped classroom teaching part, due to the poor self-learning awareness of students, it is necessary to check and monitor the learning situation of the virtual teaching part before each class. Prepare some small questions and randomly check students' mastery of key knowledge points. For the flipped classroom to be successfully flipped, teachers must prepare practical training programs corresponding to the knowledge points in the virtual teaching link. The perfect cooperation of the two parts can achieve true mixed teaching.

(3) Using online and offline teaching mode to realize the organic combination of virtual teaching and classroom teaching

Building a golden course with an O2O mixed teaching model and relying on a network teaching platform is an important way to improve the reliability and effectiveness of teaching. The O2O mixed teaching mode can improve the completion of teaching tasks and strengthen the cultivation of students' abilities. In addition, modern educational technology has made the content and forms of education more diversified, allowing more accurate and effective judgments in terms of teaching quality and teaching effects. Integrate curriculum resources through the teaching platform and establish online open courses to provide students with complete pre-class, in-class, and extra-curricular learning materials, and it is also convenient for teachers to control the completion of students' learning tasks.

(4) Adjust and optimize classroom teaching content

At present, the teaching content of digital logic mainly includes logic algebra, integrated gate circuits and flip-flops, analysis and design of combinational logic circuits, analysis and design of sequential logic circuits, application of medium-scale integrated circuits and programmable logic devices. On the basis of determining the teaching content, adjust and optimize the teaching content. In the teaching process, first explain the relevant basic concepts, especially the representation of binary numbers and the basic knowledge of logical algebra. Then, enter the

learning of digital logic circuit, in this process, pay attention to the external characteristics and basic functions of gate circuits and flip-flops, and highlight the design process of related applications based on their combinational logic circuits and sequential logic circuits. Finally, special emphasis is placed on using simulation software to test whether the results of the design meet the functional requirements. In specific implementation, logic gate circuits focus on logic functions, external characteristics and typical applications. For example, only the functions, symbols and main applications of basic NAND gates, tri-state gates, open-collector NAND gates are introduced, and the internal parts of the circuit are deleted. Analysis of structure and working principle.

In addition, the main content of the flip-flop is reduced to one section, and the basic working principle of the flip-flop is introduced only through the basic R-S flip-flop based on the NAND gate. Special emphasis is placed on why the flip-flop has a storage function and can realize a sequential circuit, and then analyzes the shortcomings of the basic R-S flip-flop, and improves on these shortcomings, so as to introduce common devices such as JK flip-flops, D flip-flops and T flip-flops. And let students understand why edge-triggered flip-flops are used in conjunction with the phenomenon of somersaults, but the internal implementation circuit of the flip-flop is not expanded in detail, so that students can focus on the function, external symbols and characteristics of the flip-flop.

(5) Optimize experimental teaching content

The purpose of experimental teaching is not only to verify the known theories and to train students' basic experimental skills, but more importantly, to cultivate students' practical skills and the ability to solve practical problems based on the knowledge they have learned. The digital logic experiment has a total of 16 class hours. Therefore, the experiment has 3 topics: basic logic gate circuit and flip-flop function test (2 class hours), combinational logic circuit design (6 class hours) and sequential logic circuit design (8 class hours). Except for the first experiment, which is a verification experiment, the other experiment contents are all design-type. It comprehensively examines the students' mastery of combinational logic circuits and sequential logic circuits, and can apply the knowledge they have learned to circuit design, combining theory with practice. It enhances students' practical ability while deepening the study of theoretical knowledge.

The simulation software recommends that students use Proteus. Software simulation weakens the use of digital logic circuit experiment boxes and strengthens the process of software simulation verification and design, so that students no longer waste time due to objective reasons such as hardware connections and electronic devices. The wrong experiment phenomenon, so as to focus more on the design and implementation process of the experimental circuit. This can avoid the limitations of insufficient laboratory resources and insufficient teaching time. Students use their spare time to complete the main process of verification experiments and design experiments based on simulation software. Teachers use experimental classrooms to guide and answer individual students' problems, so that students can While able to complete the experiment content independently, they can also solve some problems that are difficult to solve by themselves through individual communication with the teacher. In addition, in order to increase students' interest in learning, it is necessary to select design assignments with a certain degree of difficulty in combination with the teaching content, so that students can use simulation software to verify the design results while completing the assignments, and combine this method to strengthen and improve the teaching content of the classroom.

(6) Strengthen the course design link

In order to make up for the lack of experimental teaching hours, further mobilize students' initiative in learning and cultivate students' innovative ability, this course offers a curriculum

design. Most of the topics in the course design are related to practical applications, such as car tail light controllers, digital password lock circuits, washing machine work control circuits, etc. Curriculum design allows students to deepen their understanding and consolidate the theoretical knowledge they have learned, and at the same time improve their comprehensive application ability. Through practice, it is found that good topic selection can not only mobilize students' subjective initiative, but also stimulate students' creative enthusiasm. It can not only strengthen the understanding of theoretical knowledge, but also apply the knowledge learned to real life, and mobilize students' learning. Enthusiasm, in a true sense, achieves the teaching philosophy and goals of "student-centered and result-oriented".

The course design also requires students to use simulation software to complete the design and simulation in class, which can make up for the lack of laboratory resources. In addition, by writing a course design report, students can further clarify the basic methods and steps of digital logic circuit design, master the ideas and methods of digital system design, and integrate literature review and paper writing to enhance engineering practice capabilities.

(7) Improve assessment and evaluation methods

The evaluation of students' learning effect is no longer solely based on the usual homework and test scores, but emphasizes the usual classroom performance, the completion of the experiment, and the relative progress in the learning process.

According to the different situations of students, individualized teaching is implemented, so that teaching can be tailored to each individual. Especially for those students who have poor learning ability in the course of digital logic, through individual communication, let them master the ideas of analyzing problems and solving problems, so that they can gradually find their own learning methods on the basis of understanding and form Your own way of thinking makes it fairer for such students to give each assignment and practice results based on their relative progress.

In addition, the given practical results comprehensively consider the two aspects of the textual report and the display of the completed circuit and its simulation results. In the evaluation, only the text report has a clear analysis of the simulation results, the knowledge points are understood correctly, and the effective verification method can be designed by oneself, and the test idea can be clearly explained, or have your own innovative design ideas and can be implemented when the design is implemented. This avoids that in the past, only looking at the experimental report and not paying attention to the one-sidedness of the evaluation brought about by the intermediate process of student practice. At the same time, if there is no demonstration and result analysis of the simulation process, you will not be able to pass the assessment of the practical part of this course to urge students to participate in the practice. This evaluation method fully mobilizes students' interest and subjective initiative, and most students can consciously complete the practical requirements and put forward their own ideas.

4. The Purpose and Significance of Curriculum Reform

The mixed teaching mode based on the OBE concept under the background of the golden course construction has a very important purpose and significance for promoting teaching work and improving teaching quality.

(1) Curriculum teaching reform can stimulate students' learning interest and potential, master the theoretical knowledge system of "Digital Logic", lay a foundation for subsequent professional courses, and cultivate students' ability to learn independently. At the same time, it can provide theoretical basis for practical teaching, and also for Cultivate students' practical ability and provide a teaching platform.

(2) The reform of the hybrid teaching model requires teachers to combine new teaching concepts, adopt new teaching methods, and apply new teaching techniques to systematically

formulate curriculum plans, design teaching plans, introduce cases and evaluate effects, which greatly improves teachers' teaching level And the quality of teaching. It also provides new ideas and new horizons for the theoretical teaching reform of other full-time teachers, and has certain theoretical reference value.

(3) The introduction of new teaching methods and simulation tools helps students better understand digital integrated circuits, enriches the reform model of theoretical teaching, and makes new teaching concepts more diversified, thereby improving the quality of teaching and truly achieving "student-oriented" The center, results-oriented" teaching effect lays the foundation for cultivating innovative talents with all aspects of development.

(4) It provides new research ideas and cases for the improvement of theoretical teaching methods and teaching methods, reduces the amount of offline class hours, and helps students make full use of fragmented time for learning, expand theoretical knowledge, and enrich teaching content.

In short, based on the OBE concept, the online and offline hybrid "golden course" classroom teaching mode has a positive effect and significance for the digital logic courses of the computer major, and even other professional courses with strong practicality.

5. Concluding Remarks

Taking the course of "Digital Logic" as an example, this article discusses the existing problems in the course teaching, discusses the ideas of the course reform to find the method of reform, expounds the research of online teaching mode and the development of classroom teaching, and proves that the mixed type is under the current situation. The teaching mode is an effective and feasible educational teaching mode, which achieves the reform of the classroom teaching mode in the true sense. Through the setting and implementation of various teaching links, students will be fully mobilized to learn independently, so that students are interested in learning, able to learn by themselves, think about learning, and learn by doing.

Acknowledgments

References

[1] Zhu Juan, Ding Heping. Research on the optimization of application-oriented university information teaching under the construction of golden courses [J]. Science and Technology Wind, 2021 (16): 85-86.

[2] Li Wenyuan, Wang Rong, Meng Qiao, Wang Zhigong, Zhang Zaichen. Exploration of the teaching reform of "Digital Circuits and Systems" [J]. Journal of Electrical & Electronic Education, 2018, 40(6): 35-39.

[3] Zhu Minglin.Research on Teaching Reform of Digital Circuit Course[J].Technology Wind, 2019 (32): 77.

[4] Shan Yuyan.Discussion on the Teaching Method of Digital Logic Circuit[J].Shandong Industrial Technology, 2018,277(23):233.

[5] Zhao Quanke, Han Yanyi, Qin Xiaomei. Reform and exploration of new experimental teaching mode for the "Digital Circuit Experiment" course[J].Industry and Information Education,2019(10):54-58.