

Teaching and Design of Computer Class Experimental Courses based on OBE

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Abstract

Since the 1990s, China's achievements in higher education teaching reform are evident to all. As an important part of China's higher education, higher education is responsible for cultivating skilled talents in society, and how to cultivate high quality workers who meet the needs of society and their own development has been the direction of higher education reform and development. Since entering the 21st century, OBE, as a kind of education and teaching concept oriented to students' learning outcomes, reverses the design of curriculum teaching by focusing on what students can take away when they graduate as their final learning outcomes. OBE, a future-oriented education idea and education concept centered on competence cultivation, is conforming to the wave of improving the quality of talent cultivation in higher education. Among them, instructional design is the core and cornerstone of teaching reform, and how to promote the implementation of OBE concept in classroom teaching is the focus of higher education teachers to improve instructional design. The study adopts various research methods such as literature research method, questionnaire survey method, interview method and experimental method, starting from the research background, the current situation of domestic and foreign research, etc. Based on the support of a large amount of relevant literature research, the study focuses on the improvement of teaching design and teaching implementation of higher computer lab courses based on the analysis of the feasibility and necessity of OBE in higher computer lab courses. Based on the design principles of OBE, we break the traditional knowledge- and process-based teaching design ideas and design the teaching of higher computing laboratory courses in terms of determining course objectives, organizing teaching contents, selecting teaching methods and improving teaching evaluation, so as to provide new ideas on how to truly cultivate students' core competencies. OBE provides a new path and paradigm for higher teaching design, combined with teaching methods that meet the characteristics of higher students, so that the reverse teaching design based on OBE can realize the alignment of teaching contents with vocational positions and the adaptation of teaching activities with work processes, and effectively solve the problem of structural imbalance between students' general abilities and social needs, which is the first line of higher It is the direction that higher first-line educators keep striving for in the educational teaching reform.

Keywords

OBE; Higher Education; Computer Class Experiment; Teaching Design.

1. Research Background

Accreditation of engineering education is the development direction of higher education. The three major agreements of international engineering education accreditation have incorporated the concepts of "student-centered, result-oriented and continuous improvement" and achieved good results. For the different levels of engineering education, the three major engineering agreements have different requirements on the depth and breadth of students' achievements in terms of cultivating talents, graduation requirements, professional competence and learning cycle, etc. Among them, Washington Agreement, Sydney Agreement and Dublin Agreement correspond to the engineering education and engineering technology education of undergraduate, higher vocational and higher education stages in China respectively. China formally joined the Washington Agreement in 2016 month to become the 21st member of the organization, which means that the quality certification system of engineering education in China has been recognized internationally, indicating that the OBE concept leads the reform of engineering education in China, and also lays the foundation for all levels of education, especially engineering education. Although China has not yet joined the Sydney Accord, the "Sydney Accord Application Research Higher Education Institutions Consortium" established in Nanjing on December 26, 2016, which takes international engineering education accreditation standards as a paradigm for practical research on professional construction and curriculum system construction, opens a new chapter of higher education reform in China. Both undergraduate and higher vocational engineering education under the guidance of OBE concept have provided successful practical experiences for the development of higher engineering technology education. Therefore, it is the direction of higher education development to promote China's vocational and technical education to the world by referring to the Dublin Protocol paradigm.



Figure 1. Engineering education accreditation

Outcome orientation is an effective way to improve the quality of higher talents Higher education is employment-oriented and focuses on cultivating workers and technically skilled talents. Unlike general education, higher education should not only consider the needs of discipline construction but also meet the demand of enterprises for skilled talents, and connecting education and labor market and balancing the relationship between work-based and school-based is always the focus of higher education reform. In order to solve the problem of structural imbalance between the comprehensive

ability possessed by higher education students after graduation and the demand of the society, it is an inevitable trend to carry out the result-oriented education and teaching reform. Constructing a scientific and reasonable objective system through the OBE concept can lead to the transformation of higher education to a way that attaches importance to the cultivation and training of students' abilities, and will also usher in a new paradigm of curriculum development and teaching practice.

2. Purpose of the Study and Significance of the Study

2.1 Purpose of the Study

To analyze the current situation of higher computer science laboratory courses, to summarize the aspects and contents that need to be improved, and to explain the necessity of combining OBE concept and higher courses. To explore how to integrate OBE into all aspects of teaching design and how to effectively solve teaching problems by following the OBE design concept and ideas with the nature and characteristics of higher computer science laboratory courses. We will test the practical effect of OBE teaching design in the implementation of higher computer experimental teaching, and provide relevant experience for further development of OBE teaching design in higher education institutions.

2.2 Significance of the Study

(1) Theoretical significance

The integration of OBE concept opens up a new perspective of higher education curriculum reform in view of the current problems and dilemmas in higher education. The study integrates the theories of competency-based education and vocational and technical education into the objectives, content, implementation and evaluation of the curriculum, which enriches the theoretical basis of higher education curriculum development and provides a rational basis for the reform of higher education curriculum based on OBE. This study helps to advance the practical research on higher teaching from the theoretical point of view. educational teaching reform under the guidance of OBE concept is increasingly achieving rich results in the curriculum reform of colleges and universities and higher education, but not many cases are really used in teaching practice, especially the exploration of higher teaching is just beginning. The study of teaching design of higher computer application foundation course based on OBE concept is based on the in-depth analysis of relevant theories and development at home and abroad, drawing on the successful experience of OBE teaching theory and practice, combining with the actual situation of teaching implementation of higher computer class experimental courses, studying how to design higher education under OBE concept in terms of teaching objectives, teaching contents, teaching implementation and teaching evaluation, etc., in It provides new ideas for effective design of teaching activities.

(2) Practical significance

By carrying out the OBE-based teaching design of higher computer lab courses and applying it to specific teaching practices, we verify that the teaching design guided by the OBE concept effectively helps students achieve the expected learning outcomes and the teaching effect is significantly improved, which provides reference and reference for the teaching practice of OBE in higher education institutions while improving the quality of higher education. This study takes OBE as a concept to lead the reform of higher computer application foundation courses, which provides an important problem-solving path for the current problems faced in higher courses teaching. Combining OBE concept with specific disciplines into higher teaching not only promotes the reform of traditional teaching, but also can provide new ideas and effective research examples for teaching design of other majors or disciplines. Therefore, this study is forward-looking and innovative.

3. Current Status of Research on the Selected Topic

3.1 Current Status of Foreign Research

OBE (Outcome-Based Education), as an educational concept oriented to learning outcomes, emerged in the United States in the 1980s. Since 1994, the United States has implemented OBE programs in

general education (primary and secondary education and higher education) and revised them continuously; in 2008, Malaysia applied the OBE concept in all public schools; subsequently, the European Union education systems all began to focus on learning outcomes. Through continuous development, OBE has formed a relatively complete theoretical foundation, and its educational philosophy and methods have gained support and application from all levels and types of education systems around the world, becoming the mainstream philosophy and correct direction of education and teaching reform in each country. The foreign language literature of this study was searched in ScienceDirect, WileyOnlineLibrary, SpringerLINK and other databases with "OBE", "Outcome-BasedEducation" the search was conducted with "OBE" and "Outcome-BasedEducation" as keywords, and the time limit was 1994-2020, and there were as many as 9830 search results, which shows that there are abundant foreign research results on OBE, including theoretical research and practical research. Theoretical studies on OBE mainly focus on the elaboration of concepts, principles of implementation and analysis of advantages. The elaboration of the concept of OBE was first proposed and thoroughly studied by SpadyW.G. in his 1981 representative book *Outcomes-Based Instructional Management: A Sociological Perspective*, which defines OBE as: explicitly focusing on and organizing all aspects of the educational system to ensure that learners achieve the expected learning outcomes and mastery after completing learning activities around defined learning objectives Substantial success.

Based on this, Spady proposed a pyramid structure of 1 paradigm, 2 goals, 3 prerequisites, 4 principles and 5 implementation points under the OBE concept. Some scholars also propose that OBE is an educational process based on achieving specific learning outcomes for learners, that the curriculum is only a means of educational instruction and a vehicle for developing learners' competencies, and that learners' learning outcomes drive the operation of the educational system. Although different scholars say different things about the definition of OBE, they agree that student-centered, outcomes-oriented, and continuous improvement are the key elements of OBE implementation, and that education and teaching are oriented and based on students' learning outcomes. In the study of OBE implementation principles, scholars have continuously enriched and deepened the theoretical study of OBE based on Spady's study. chandramaAcharya (2003) systematically outlined the content of Outcomes-Based Education (OBE) and proposed four principles: clear aggregation, reverse design, higher expectations, and expanded opportunities.

Brandt proposed four principles for OBE to follow.

(1) OBE should be implemented with clear student learning outcomes, and curriculum and instruction should be designed with the ultimate goal of education as the integrated competencies students acquire at the end of the learning process.

(2) Teachers help students expand their learning opportunities to validate the learning outcomes they have achieved.

(3) Teachers give students higher expectations to help all students achieve self-actualization. In a study of the strengths of OBE, Harden R.M. (2007) suggests that OBE is consistent with the concept of "student-centered" education and offers many advanced strategies, arguing that OBE has advantages that are not found in traditional education and teaching. In the process of its theoretical development, OBE has been emphasized and promoted by scholars in various countries, and gradually applied to educational reform, and scholars have proved the advanced concept of OBE in a large number of successful curriculum construction and teaching practices, and also provided a paradigm for educational teaching reform. In the study of OBE curriculum system, American scholar RelderR.M. (2003) proposed that the OBE-based curriculum design model consists of three modules: teaching objectives, teaching instruction and teaching evaluation, emphasizing that Bloom's classification of educational objectives is of great significance in teaching activities and teaching evaluation. HardenR.M. (2007), a famous medical educator, proposed the "OBE curriculum planning model": In an appropriate educational and teaching environment, educators choose teaching contents, teaching methods and teaching strategies to enable learners to meet the requirements of learning

outcomes, and assess whether learners meet the requirements through appropriate evaluation, so as to guide students' learning. The content, methods, and strategies chosen by the educator in an appropriate educational setting are designed to enable learners to meet the learning outcomes and to guide student learning by assessing whether learners have met the requirements through appropriate assessment.

3.2 Major Research on OBE in Education and Teaching

The research on OBE by domestic scholars has gone from the study of education and teaching theories to the practical investigation in various professional fields, and the research perspective has gone from the macro-level view of talent cultivation to the micro-level reform of specific curriculum theory and pedagogy. Regarding the theoretical research on OBE, most domestic scholars have defined the concept, analyzed the substance and sorted out the principles of OBE on the basis of the "Outcome Oriented Education" proposed by American scholar Spady. For example, Jiang Bo (2003), on the basis of explaining "what is the result", proposed that the OBE concept contains "two formal purposes, three assumptions and four systematic principles", and explained that only the principles of focus, expanded opportunity, higher expectation, and reverse design can be used as the principles of OBE. The four principles of OBE, namely, focus, expanded opportunity, higher expectations, and reverse design, are the core of OBE, which is truly "outcome-based education" [9]. Shin, T.E., and Steven Rock (2016) explained the OBE concept in terms of one paradigm, two goals, three prerequisites, four principles, and five implementation points, and systematically discussed the theoretical origin of the OBE concept based on educational goal theory, competency-based education, sophisticated education, and criterion-referenced assessment, based on which the design and construction of outcome-oriented pragmatic teaching was proposed. Based on the theoretical analysis and interpretation of OBE, scholars have gradually turned to introduce the OBE concept into teaching reform and practical teaching, mainly including the construction of curriculum system and the design of teaching mode.

Regarding the research on the curriculum system under the OBE concept, some scholars think about the construction and reform of the curriculum system under the OBE perspective from the macro level. For example, Haiying (2015) analyzed the adaptability of the requirements of applied talent training and OBE concept, and proposed that a variety of "stakeholder-oriented" should be followed to build a continuously improved and updated curriculum generation system. Liu Bin (2016) addresses the problems of the domestic control curriculum system, takes automation majors as an example, introduces the 3P model and builds an integrated vertical curriculum cluster system by combining students' core competency needs, and proposes a new model for the curriculum system of automation majors.

4. Research Methods

The following research methods were adopted for the purpose and content of the study.

(1) Literature research method

This study uses relevant academic information networks, such as SpringerLINK, China Knowledge Network (CNKI) and other Chinese and English databases to find and collect domestic and foreign literature on "OBE, higher education, and basic computer courses", master's and doctoral academic theses, and relevant books and materials in libraries. Through analyzing and organizing the relevant data, we summarized the theoretical and application experience of OBE in teaching practice, and provided a solid theoretical foundation for this study.

(2) Questionnaire method

The questionnaire method is based on the content of the study, and the researcher collects information from the respondents by designing questions and distributing questionnaires in order to understand the situation of the research topic. In this study, questionnaires were designed for investigation and analysis before teaching design and after teaching practice respectively. The questionnaire before

teaching design was designed to understand the current teaching status of the basic computer application course by learning from students' real ideas, and aimed to propose solution ideas for the problems. The questionnaire after the teaching practice is used as teaching feedback to verify the effect of teaching implementation and to provide experience and reference for the subsequent OBE teaching.

(3) Interview method

The interview method is a method of talking for the purpose of research through verbal communication to collect the required research information and to understand the basic situation about the study. In this study, it is necessary to understand the situation of the current status of course teaching from the teachers' point of view and to propose solutions to the shortcomings in traditional teaching. Therefore, before the research of OBE-based course teaching design, the interview method was used for teachers to understand the specific situation and effect of higher teaching, so as to bring some reference for the improvement and optimization of teaching design in the later stage.

(4) Educational experiment method

The educational experiment method is to verify the advancedness of the research by experiment under the guidance of scientific educational theories, and to provide an objective basis for effectively solving teaching problems. In this study, two classes of higher computer application majors are selected as the experimental class and the control class respectively, and different teaching designs are adopted to carry out teaching practice. Through the comparative study of experimental results, the effectiveness of teaching design using OBE in higher computer class experimental courses is investigated.

5. Research Ideas

5.1 Research Idea

The macroscopic research idea of this paper is to carry out the research according to the logic of "theoretical analysis - course teaching design - practical test", as follows.

(1) Theoretical analysis

1) Theoretical analysis On the basis of theoretical analysis, we will explore the necessity of higher OBE teaching practice by combining the current situation and characteristics of higher computer experimental courses.

2) Course teaching design

On the basis of theoretical support, the basic framework of teaching design of higher computer experimental courses based on OBE concept is constructed based on the demand analysis, and the research is carried out according to the steps of "course analysis → objective determination → content reconstruction → method selection → optimization evaluation".

3) Practical test

By applying the teaching design of computer lab courses based on OBE concept in teaching practice, we analyze the learning effectiveness of students' learning outcomes and verify the effectiveness of the teaching design of higher computer lab courses based on OBE concept.

6. Problems in the Teaching of Higher Computer Class Experiments

6.1 Unclear Teaching Objectives

Teaching objectives, as the purpose and intention that the curriculum and teaching should achieve, are the wishes that students can achieve in terms of practical knowledge and ability after finishing a certain teaching activity, and are the basis for teaching activities. Through the survey and analysis, in the current higher courses, due to the general and vague teaching objectives, students cannot clearly understand and grasp the specific knowledge and skills they should acquire at the end of the course and study. Although the course objectives also put forward requirements for students' professional

knowledge and skills, advanced students do not have a clear understanding of the course objectives and professional training goals of computer-based experiments, nor do they have a clear perception of the connection between course learning and future career abilities. Students are not guided, regulated and motivated by clear goals in the learning process, which is one of the reasons for their lack of motivation.

6.2 One-sided Teaching Content

Teaching content is the carrier to achieve teaching objectives and the main source of learning outcomes for students in the learning process. The teaching content of computer class experimental courses includes two parts: basic theory and skills operation, but in the current teaching, teachers only design and present the teaching content in a single way according to the teaching materials, and the teaching content and teaching objectives do not form a corresponding support relationship. Although the practical teaching contents of higher computer class experimental courses have been paid attention to by schools and teachers, in the actual teaching, the selection of teaching contents is detached from the actual needs of enterprises and jobs. Due to the heavy teaching tasks, teachers focus more on completing the teaching material knowledge transfer and do not take the teaching content as a guide for students' learning path, which leads to a certain degree of derailment between the teaching content and enterprise requirements and cannot realize the continuity and integrity between the teaching content. In the learning process, students only follow the teacher mechanically to operate on the computer, which leads to the poor relevance and effectiveness of the teaching content acquired by students and does not cultivate the ability that students really need, not to mention the inability to make students master the core competency of engaging in the profession.



Figure 2. Computer teaching site

6.3 Single Teaching Method

The implementation of teaching is the process of completing teaching tasks and achieving teaching objectives. In the implementation of teaching, the use of diverse and reasonable teaching methods can ensure the successful completion of teaching objectives and teaching contents. In the current teaching implementation process of computer experimental courses, lecture teaching is still the most common way of teaching activities, students are still passive recipients of knowledge and skills, and the single way of teaching leads to the low motivation of students to learn. Although some teachers

have actively tried different teaching methods such as project teaching method, case teaching method and modular teaching method in teaching, the implementation effect is not satisfactory.

6.4 Formalized Teaching Evaluation

Teaching evaluation is the judgment and feedback on whether students have acquired the corresponding knowledge and skills. In higher teaching evaluation, it is still in the form of using performance-based assessment, including final written exams and computer-based quizzes, with the independent evaluation of teachers. This single evaluation does not allow teachers and students to make continuous improvement based on feedback information, and cannot play a role in identifying and supervising students' actual abilities. This kind of summative evaluation, which is based on grades, ignores students' performance and development at each stage of teaching activities, and does not really measure students' learning effects. The single evaluation result causes the lack of feedback information. Based on the final grade only, students cannot clearly know their strengths and weaknesses, which makes it difficult for them to improve their learning in a targeted way as they cannot clearly know how much they have achieved in terms of learning outcomes.

7. Analysis of the Necessity of OBE in the Teaching of Higher Computer Experimental Courses

OBE is a new educational concept, which is oriented to learning outcomes, and the teaching content and implementation are based on the expected learning outcomes, and the teaching evaluation is used to improve the teaching. It provides a new way of thinking to solve and improve the problems of teaching and learning in higher education courses.

7.1 OBE Focuses on Effectiveness

Teaching objectives in the design of traditional course teaching, the main goal of teaching is to let students master the subject knowledge, the OBE concept takes learning outcomes as the teaching objectives, and this learning outcome is clear and enforceable. Computer class experiments are the basic introductory courses for higher various majors, which is an operational course. From the perspective of competence development, the concretization and operability of learning outcomes under OBE concept coincide with this practical class, and this measurable expected learning outcome can make students clear the knowledge, ability and quality they should acquire, and help them develop in their future career.

7.2 OBE Applies Diversity

OBE emphasizes the individual differences of students, in order to meet the individual needs of students' learning, choose scientific teaching methods according to different course contents. In order to meet the individual needs of students' learning, it is necessary to choose scientific teaching methods according to different course contents in order to apply precise measures. (7.3).

7.3 Practicality of OBE Integration

The teaching content is based on the problems existing in the current course content, and the teaching activities need to be carried out based on the teaching objectives, and the teaching content is selected with the expected learning outcomes as the focus, integrating the content that can develop students' abilities and qualities. The use of OBE can clearly formulate a one-to-one correspondence between teaching contents and learning outcomes, and help students guide the practical learning path. When integrating instructional content, useful content is selected and organized through an analysis of the internal and external needs of social demands and self-needs, so that students can acquire the occupational competencies they really need.

7.4 OBE Provides Diversified Evaluation Methods

In order to test the learning effect of students and grasp whether students have achieved the expected learning outcomes, effective teaching quality evaluation is an essential part of teaching activities, and a feedback mechanism to identify problems in the teaching process in time. In the process of

continuous feedback, we can adjust the teaching and learning so that the teaching and learning activities can be developed in a positive way through continuous improvement.

8. OBE-based Teaching Design for Advanced Computer Application Foundation Course

8.1 Course Analysis

(1) Nature of the course

Computer class experiments are the introductory basic computer courses that students in higher education must learn, and have the same important status as other public basic courses such as language and mathematics. Through the study of this course, students should lay a good foundation for applying computers in other courses of study. The teaching of computer application basic courses should not only make students understand and master the basic knowledge and application operation of computers, but also cultivate students' awareness and ability to apply computers to solve practical problems. This study mainly focuses on computer application students, combined with the training objectives and graduation requirements of computer application majors, and puts forward new teaching objectives for the computer class laboratory course.

(2) Curriculum concept

With the rapid development of science and technology in the information society and the constant updating of computer technology, the higher education institutions offer computer class laboratory course as a compulsory course for each major, which should serve for professional teaching. The teaching of basic computer application courses makes students master new technical means, the theoretical knowledge of basic courses is basic, and more attention is paid to the cultivation of students' ability and quality of education in the learning process.

8.2 Course Characteristics

(1) Fundamental

Higher computer class experiments as a basic compulsory course, is the introduction of students to learn computer knowledge and skills, including basic computer theory and basic computer skills, focusing on training students should master the application of the basic computer skills.

(2) Practicality In today's constantly developing computer technology, having the basic computer operation ability has become the basic skills necessary to engage in all walks of life. Daily life and future work are inseparable from the computer class laboratory courses in the operation of the system and the use of office software.

8.3 Design Principles

(1) Clear focus

First, a clear focus on meaningful outcomes is the basic principle of OBE-based curriculum design and teaching. By clear focus, we mean that course and instructional planners always focus explicitly on the outcome goals they expect students to ultimately obtain. In instructional activities, teachers use the expected student learning outcomes as the starting point for designing content, processes, and assessments, and teachers and students are always mindful of what learning outcomes they are trying to achieve, how they are achieving them, and why. Clearly focused goals motivate teachers and students to shift their attitudes toward the curriculum and motivate them to keep working to reach the capstone learning.

(2) Expanding Opportunities

Expanding opportunities means that schools and teachers should take full account of individual student differences, provide students with learning opportunities that lead them to achieve learning outcomes, and help all students have successful learning experiences. The principle of expanded opportunity is based on the belief that all students can succeed and have the capacity to do so, but that they will achieve their learning outcomes in different ways and at different times, so that in the process

of instructional design and implementation, teachers choose flexible ways to meet students' diverse needs and give them "second chances" by establishing diverse assessment mechanisms. " to ensure that students are ultimately able to achieve learning outcomes.

(3) High Expectations

High expectations mean that educators establish challenging goals for students in terms of expected learning outcomes and provide situations and opportunities for students to succeed. In teaching and learning activities, teachers present students with higher learning challenges based on existing curriculum norms, and guide and motivate students to gradually achieve learning outcomes and experience student success and progress in a challenging learning process. It is important to note that high expectations do not mean high standards, and that consistently raising standards rather than increasing student expectations can, on the contrary, prevent students from achieving success and reduce learning effectiveness.

(4) Reverse Design

The principle of reverse design means that teachers should begin their curriculum and instructional design with the peak learning outcomes that students should achieve. Compared to the traditional content-based instructional design, reverse design is based on the analysis of needs to determine the expected learning outcomes for students, break down the learning outcomes into refined competency indicators, and then select appropriate instructional content and methods. In teaching practice, teachers try to replace unnecessary content or learning objectives to ensure that the content for students to learn is more purposeful and practical.

(5) Continuous Improvement

OBE-based teaching design is inseparable from the continuous improvement mechanism, which emphasizes that the training objectives and curriculum objectives should always be dynamically consistent with the social industry and enterprise job requirements, and that the teaching content, teaching design and teaching evaluation can effectively support the completion of students' expected learning outcomes. In the teaching process, teachers diagnose the teaching quality in all aspects according to the completion effect of students' expected learning outcomes, continuously optimize the teaching design and continuously improve the teaching implementation, so as to provide reliable guarantee for students to successfully obtain learning outcomes. Summary I. Research Summary This study takes the higher computer class experimental course as a carrier to explore and study how to carry out teaching design under the guidance of OBE concept, and put the OBE concept into all aspects of teaching design, in which the determination of teaching objectives, the reconstruction of teaching contents, the selection of teaching methods, the optimization of teaching evaluation and the organization of teaching activities are given a new meaning. In concrete teaching practice, it has been proved that the OBE-based teaching activities have significant effects on students' learning motivation, vocational competence development and operational skills acquisition. The importance of this learning outcomes-oriented concept for higher education teaching reform is self-evident, and the design and practice of OBE-based higher computing laboratory courses provide a good model for OBE in higher education teaching reform.

9. Innovations

Exploring and conducting new teaching mode is the requirement of the current education and teaching reform and development trend of higher education institutions. Based on the preliminary exploration of OBE teaching concept and practice, this study carries out the research on the teaching design and teaching application of higher classroom based on OBE, which enriches the teaching practice about OBE.

9.1 Innovation of Research Content

OBE as an emerging educational concept has achieved good results in colleges and universities and higher education, but there is almost no research on teaching practice using OBE concept in higher

education. This study uses OBE concept to guide teaching design, and proposes and builds an operable teaching design model for higher computer classroom laboratory courses.

9.2 Innovation of Research Method

Based on theoretical research, this study applied the constructed teaching design to teaching practice, and analyzed the teaching effect in terms of students' learning performance, on-line work and students' questionnaires, and drew conclusions based on data, providing a reference teaching design example.

10. Research Shortcomings

(1) In the teaching practice due to some internal and external factors, the time for teaching experiments in School H is relatively short, and only OBE-based teaching design and teaching implementation of Office Office software in the practical teaching part of the computer class laboratory course can be carried out, lacking the practical demonstration of the theoretical teaching part.

(2) This study mainly takes computer application students as the research object and carries out the teaching design around the higher computer class experimental course, which has a strong focus, and it is still to be studied whether the OBE-based teaching design can achieve the same effect in other majors.

11. Research Prospects

The research on the practical application of OBE concept in higher education is in its initial stage, and this study has made a breakthrough for specific practical courses, and there are still more areas to be explored in depth. In view of the shortcomings of this study, we should further expand the research time and scope in the next study, and conduct teaching practice in multiple majors to verify the rationality of OBE-based teaching design.

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