

# Research on multi-dimensional curriculum evaluation system based on OBE Concept

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**ABSTRACT:** Professional Education Professional Certification is an international popular professional education quality assurance system, is the quality of engineering education and the level of testing, it is also an important driving force to promote the reform of professional education and the construction of "Double first-class" in colleges and universities. Based on the concept of results-oriented education, student-centered curriculum system is constructed to meet the needs of social development and keep the traditional advantages and meet the standards of professional certification. With the goal of developing students' ability to solve complex professional problems, comprehensive practical quality and initiative innovative consciousness, a series of teaching reforms focusing on "Innovation mode, reconstruction system, construction platform and integration of science and education" were carried out, and a three-level training mode of "Foundation-synthesis-innovation" was constructed, establish a complete course quality evaluation system and guarantee mechanism. After years of exploration and practice, the teaching effect and the quality of personnel training have been greatly improved, which strongly supports the construction of the first-class undergraduate majors.

**Key Words:** professional certification; results-oriented education; curriculum system

## 1 Introduction

In 2016, China became a full member of the Washington Agreement, achieving international substantive equivalence of our professional education quality standards and international mutual recognition of professional teacher qualifications. Results-oriented education and "Student-centered" and "Continuous improvement" are the three core concepts of professional accreditation in international professional education. The overall outline of "Double first-class" construction puts forward the new goal of personnel training, highlighting the professionalization and nationalization of personnel. To understand the concept of OBE, to meet the training objectives of universities and the needs of industry and enterprises, to form a comprehensive teaching quality management system and perfect educational quality evaluation mechanism, and to become an effective driving force for the construction of first-class undergraduate majors, it is very important to improve the teaching level and the quality of personnel training.

The curriculum system is an important part of the construction of the first-class undergraduate specialty, and it plays a guiding and promoting role in the cultivation of talents. The curriculum system should serve the needs of the school's orientation, the department's discipline construction and the students' individual development. The construction of a reasonable curriculum system is the core of professional construction, optimizing the curriculum system to ensure the realization of the goal of personnel training. In order to improve students' ability to solve complex professional problems, their comprehensive practice quality and their initiative innovation consciousness, some universities have carried out the construction and practice of professional curriculum system based on OBE concept.

## 2 Professional training objectives and graduation requirements

Based on the OBE certification concept, the development of a multidimensional course evaluation system is essential for ensuring that students acquire the necessary knowledge and skills for their future careers. In order to achieve this, it is important to first define clear and measurable training objectives and graduation requirements for the program.

### 2.1 Professional Training Objectives

The professional training objectives should be developed in consideration of the following aspects:

1. Knowledge: Students should be able to demonstrate a comprehensive understanding of the key concepts and theories related to their field of study.
2. Skills: Students should be able to apply critical thinking, problem-solving, and analytical skills in a practical setting.
3. Competencies: Students should be able to manage and work effectively both independently and as part of a team, while exhibiting a high level of professionalism.
4. Communication: Students should be able to communicate effectively and persuasively in both written and oral forms.
5. Ethical Values: Students should be able to demonstrate an understanding of professional ethics and conduct themselves in a manner that is consistent with these values.

### 2.2 Graduation Requirements

In order to ensure that students meet the professional training objectives, graduation requirements should be developed in line with these objectives. The following requirements should be considered:

1. Credit Hours: Students must complete a set number of credit hours in order to graduate.
2. Core Courses: Students must complete a set of core courses that provide a foundation for the program.
3. Elective Courses: Students must complete a set of elective courses that allow them to specialize in their area of interest.
4. Capstone Project: Students must complete a capstone project that demonstrates their ability to apply the knowledge and skills learned throughout their program.
5. Internship/Practicum: Students must complete an internship or practicum that provides real-world experience in their field of study.

In conclusion, the development of clear and measurable training objectives and graduation requirements based on the OBE certification concept is essential for ensuring that students acquire the necessary knowledge and skills for their future careers. Through the implementation

of a multidimensional course evaluation system, the effectiveness of these objectives and requirements can be continuously monitored and improved upon, ensuring that students receive the highest quality of education possible.

### 3 The design idea and construction of the professional curriculum system based on OBE

#### 3.1 The design of professional curriculum system

At present, there is still a gap between talent training and social demand adaptability in some colleges and universities, and students' knowledge structure and practical ability can not fully meet the social demand. In order to solve the above problems, the reverse design based on the OBE concept is carried out, and the training goal is decided by the professional training ability demand as the starting point, and the graduation requirement is determined by the training goal, then reverse design and adjust the curriculum system by graduation requirements.

Taking output-oriented as the guiding ideology, the paper establishes the support of the coupling logic weight between the curriculum objectives and the graduation requirements of the students, and constructs a multi-level, multi-module and integrated curriculum system based on the concept of OBE, through the integration of science and education to train students to solve complex professional problems, the formation of teaching quality monitoring and evaluation results for continuous professional reform

In order to solve the problems existing in professional achievement-oriented education.

#### 3.2 The construction of professional curriculum system based on OBE concept

##### 3.2.1 the construction of professional certification curriculum system.

The information needed for the curriculum system mainly comes from the supplementary standards for professional education certification, the national standards for teaching quality, the working meetings of the professional construction committee and the Teaching Steering Committee of the college, and widely soliciting employers, alumni and enterprise industry experts, and reference to the school development plan and industry development trends. Curriculum system consists of public basic courses, professional basic courses, professional courses (including elective courses), practice links, using modular model to establish the framework of curriculum system -Figure 1). The curriculum system can be Modular design according to the theory of discipline structure and the theory of intelligent structure. The curriculum system can take into account the cultivation of various types of talents through the combination of flexibility of curriculum modules and individual differences. The common basic courses include mathematics and natural sciences, public elective courses (including humanities courses), and the practical links include course design, internship and graduation design/thesis.

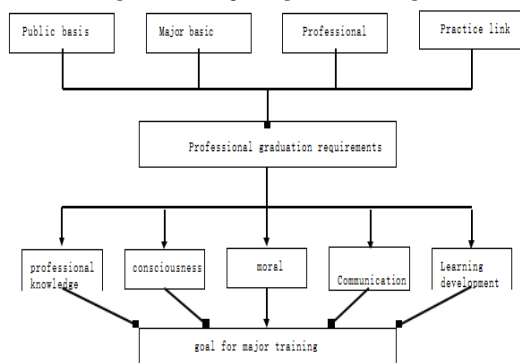


Fig. 1 the basic framework of professional curriculum system

##### 3.2.2 the construction practice of characteristic curriculum system.

to build a professional curriculum system with both professional advantages and professional certification standards, on the basis of

maintaining and developing the characteristics of professional direction, the four-level curriculum system of "General Education + Discipline Foundation + professional core + practical curriculum" has been developed. In general education of Humanities and society, there are some courses, such as General Theory of Chinese Studies, mental health of college students, professional development, employment and entrepreneurship. We should attach importance to the improvement of professional quality, and add some excellent courses in general education, such as professional economics and project management, professional ethics, etc. We should pay attention to the cultivation of students' comprehensive professional abilities, strengthen the process management of graduation project, encourage teachers and enterprise experts to jointly guide the Graduation Project/thesis, and employ enterprise experts to participate in the thesis defense of undergraduates, and the work done by students to comment on and guide.

taking "Knowledge construction, ability training, quality improvement and professional demand" as the achievement-oriented, optimizing the support-weight relationship between the teaching objectives of 70 specialized courses and the 12 graduation requirement index points; The training goal-oriented, graduation requirements as the standard, curriculum system as the carrier of the entire chain-oriented output of the talent training model. Set up the logic system of curriculum objective with "Golden Course + ideological and political course" as the main carrier (Figure 2), construct the teaching model with students as the core, and transfer the teaching center from teaching to learning. Nine ideological and political courses, including "Drilling equipment" national first-class course, "Freshman seminar course" and "Construction of geotechnical specialty", it has formed a curriculum system which combines knowledge imparting with ability training, technical education and non-technical education.

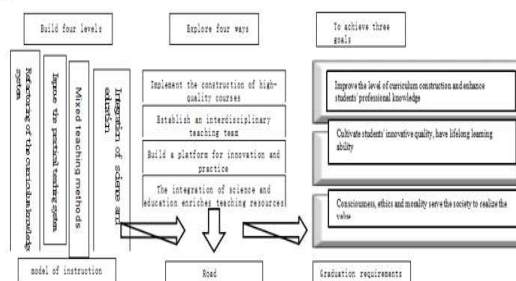


Fig. 2 the professional curriculum system supports the realization of graduation goal

aiming at the six main problems existing in curriculum teaching, such as unreasonable curriculum system, imperfect teaching contents, lagging teaching methods and means, low enthusiasm of students, insufficient ability of innovation and practice, separation between theory and practice, and separation between teaching and scientific research, etc., with the goal of cultivating students' comprehensive practical quality, ability to solve complex professional problems and initiative innovative consciousness, a series of teaching reforms focusing on "Innovation mode, reconstruction system, construction platform and integration of science and education" were carried out, and a three-level training mode of "Foundation-synthesis-innovation" was constructed. Taking the training mode of mechanical design ability as an example, the relative scattered curriculum knowledge points are connected in series to form an organic unity and train the students' ability of combining theory with practice and comprehensive application.

implementation of output-oriented teaching quality monitoring methods. The goal of learning achievement is the key of the OBE concept. The teaching content and the course goal are formulated by the teachers according to the requirements of professional certification for graduates.

After the examination, through the support of the curriculum objectives to the graduation requirements, the content of the curriculum assessment, the grading standards and the evaluation and analysis of the achievement, the curriculum quality evaluation report is formed, and combined with the external evaluation and analysis results, the major and the teacher can accurately discover the student ability obtains the short board, effectively carries on the curriculum construction to improve continuously.

The four-in-one quality evaluation system of professional certification and evaluation, college evaluation, social evaluation and student evaluation is constructed, and summed up the teaching effect of "Five degrees" (the degree of graduation requirements, social needs of the degree of adaptation, the conditions of teachers to support the degree of effectiveness of quality assurance, the degree of satisfaction of students and units). It has established a tracking and feedback mechanism for the training quality of graduates and an external evaluation mechanism in which the employer is the main body, the employer evaluates the graduates' ability and quality, and puts forward the comprehensive opinions.

#### 4 The practice link curriculum system construction

Constructing the practical teaching system of "4 levels, 3 combinations, 2 expansions": 4 levels of curriculum experiment, on-campus practical training, scientific research training and practical practice; The combination of in-class and out-of-school, teaching and scientific research, the expansion of specialty and technology, and the expansion of ability and quality will gradually improve the students' adaptability to the society and the ability of sustainable development. The experiment project of professional curriculum design includes "Innovation experiment" and "University student innovation and Entrepreneurship Project" into 8 credits out of class to promote students' self-study, free exploration and life-long learning.

Construction of high-quality practical teaching base: relying on the cooperation between schools and enterprises, the school built itself to expand the experimental space and area, adding 628 m<sup>2</sup> of laboratory Gross leasable area, and innovatively establishing 10 undergraduate teaching laboratories with an area of nearly 2,000 m<sup>2</sup>, we invested more than 8 million yuan in teaching, purchased teaching instruments and equipment, and jointly built 25 cooperative practice bases including "Professional national-level professional practice education center", to provide strong supporting conditions for students' practical ability training.

To establish six practical teaching platforms: output-oriented practical ability training as a guide, it has built six practical teaching platforms, namely, basic and Professional Foundation, professional and scientific research projects, cooperation between schools and enterprises, competition of disciplines and professional skills, innovation and entrepreneurship practice of college students, and cooperation and exchange between schools and enterprises abroad, to form a multi-level, multi-module, integrated professional practice teaching system.

#### 5 The implementation effect

This course system has been implemented in professional teaching, and the unification of the course knowledge system has been realized by sorting out the knowledge contents of various courses, the students' comprehensive ability, such as knowledge, ability, quality and emotion, has been effectively promoted, and their research interest and ability on scientific and technological achievements have been enhanced. In the past 5 years, undergraduates have undertaken 56 innovation projects (23 at the national level), published 7 papers and granted 11 national patents, "Create youth" National College Students Entrepreneurship Practice

Challenge Competition Gold Award, provincial and ministerial-level students of all kinds of competition awards 46 (National 16).

To establish an expert committee on the integration of Science and education, with industry experts, subject leaders and heads of core courses as the main bodies, based on output-oriented evaluation results, the latest scientific and technological achievements and industry trends, revise the training objectives and graduation requirements, especially the reform practice of the curriculum system and curriculum content. Through the integration of science and education model, students' ability to solve complex professional problems has been significantly improved, and students' professional awareness and lifelong learning literacy have been enhanced.

#### 6 Conclusion

(1) the construction of curriculum system based on the OBE concept is the key to guarantee the specialty to pass the professional education certification, and is also the inevitable choice to implement the construction of the first-class undergraduate specialty, train the first-class talents and cope with the trend of educational globalization, the curriculum system should highlight the essential attribute of the return of professional education to serve the needs of the country and social and economic development.

(2) adhere to the "Student-centered, industry-oriented, continuous improvement" teaching model, enhance the interaction between teachers and students, so that students from passive learning to active learning; The establishment of diversified teaching models, evaluation methods and feedback mechanisms, teaching evaluation can give full play to teachers, students and external role, improve the curriculum effect.

(3) to combine the elements of discipline construction, personnel training and curriculum ideological and political education with teaching, to guide teaching with ideological and political education elements, and to carry out the manifestation and leading role of ideological and political education in curriculum construction, to solve the problem of the curriculum system and social development needs out of touch.

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