

Curriculum Design and Implementation for Project Time Management Based on OBE-CDIO

Qian Chen ^{1, a *} and Yuelin Yin ^{1, b}

¹ Department of Information Management, Dalian Neusoft University of Information, Dalian 116026, China

^achenqian@neusoft.edu.cn; ^byinyuelin@neusoft.edu.cn

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Abstract. In order to promote the construction of engineering education, to improve the quality of engineering education, and to improve the international mutual recognition of engineering education in China, Two major educational concepts, namely the results-oriented OBE engineering education concept and the project-based CDIO which emphasis on student-centered are applied to guide the project time management course, and the goal is to require students to achieve the ability to independently undertake research and design of more complex projects after 5 years of graduation, and be able to independently solve more complex technical problems; they must have practical experience in engineering technology research and design work. Intersperse the actual project into the entire teaching process of Project Time Management and carry out the corresponding course evaluation system.

Introduction

Project Time Management is a core curriculum for engineering management majors. Its prominent feature is that it adopts the content of the project management system of the project management association of the United States, and combines with the characteristics of the major to teach, which is highly practical.

In the dynamic teaching process, the teaching content and teaching method should keep pace with The Times to adapt to the growing "student ability matrix" training requirements.

In recent years, Shantou university has put forward the engineering Education model based on "Outcomes based Education" (OBE), which is based on the CDIO engineering Education reform practice to cultivate students' engineering thinking and execution ability [1]. Among them, the OBE engineering education reform mainly includes the following aspects.

(1) Develop the expected "learning output" at the professional level.

(2) Through integrated curriculum design, the matching matrix between curriculum and training standards is established.

(3) Determine the expected "learning outcomes" at the curriculum level and design appropriate teaching strategies.

(4) Evaluate the actual "learning output" at the professional level and the course level. In order to improve the quality of application-oriented personnel training, our school puts forward the requirements for deepening the reform of teaching methods, promoting the transformation of advantages and improving the quality of education under the guidance of results-oriented education concept [2].

Research Status Domestic and Foreign

Foreign Research Status. Education based on the OBE model is first used in the construction of education and teaching in Western countries, and scholars in the United States and Australia have conducted in-depth research on it. Which, while OBE called the outcome - based education, understood as "results-oriented education" or "results-oriented education" in Chinese, it is a concept in teaching has a strong influence in the early 1990s in North America developed. Among them, American scholar Spady is the leading figure of this concept. In 1994, he explained OBE in his

book *Results-based Education: Key questions and answers*: "Results-based education explicitly means focusing on and organizing everything in the education system, around a fundamental goal, all students can succeed after completing their learning experience [3]. This means first having a clear understanding of the educational outcomes, and then organizing courses, guidance and assessments to ensure that this learning outcome can ultimately take place. In the book *Education-Based Education Model: Disputes and Answers*, an in-depth study of the teaching construction based on the OBE model was conducted. The book defines OBE as "the clear focus and organisation of the education system around ensuring that students gain experience in achieving substantial success in their future lives." [4]

With the popularity of OBE theory, this teaching concept has been quickly introduced by countries all over the world. In Australia, scholars have defined education based on the OBE model as "an educational process based on the achievement of students' stated student goals". Classroom teaching methods and forms are regarded as technical measures rather than teaching objectives. If such teaching methods and modes fail to achieve the established teaching objectives and students' specific abilities and qualities, then the mode should be re-organized. [5] It should be pointed out that because OBE has an all-encompassing approach, such as centralizing, defining and organizing all aspects of the school guidance and certification systems, the guidance system includes such tools and resources as goal setting, planning, curriculum, teaching, guidance and student learning assessment, etc. The certificate system includes such criteria as assessment, marking, credits, various records, transcripts, promotion and graduation, etc. As a result, the results of the two key objectives of the OBE's guidance system and certification system and the application of its four basic principles will be very different [6]. Because of this flexibility of OBE, it can be designed in many forms to meet the needs of different regional education.

Research Status in China. According to the outline of the national plan for medium - and long-term education construction and development (2010-2020), education should focus on the cultivation of students' ability to learn, practice and innovate. At the same time, the plan emphasizes the implementation of undergraduate teaching construction to improve students' comprehensive ability and cultivate students with strong social adaptability. The core of OBE teaching method lies in the cultivation of students' ability. Therefore, OBE teaching method can meet the needs of higher education personnel training in China. In recent years, some colleges and universities in China began to use the OBE teaching method. Shenzhen university and shantou university lead the nation in the application of OBE in undergraduate teaching. At present, all undergraduate syllabuses of Shantou University are OBE standard syllabus [6-10]. Gu Peihua and others systematically expounded the concept, theoretical basis and characteristics of the OBE education model, introduced the practice and exploration of the OBE engineering education model in Shantou University in recent years, and the practical framework, implementation characteristics and implementation focus of the OBE engineering education model of Shantou University. The implementation characteristics and difficulties encountered were elaborated in order to provide reference for building a flexible, high-level and sustainable OBE engineering education model in *Engineering Education Model Based on "Educational Output" (OBE) - Practice and Exploration of Shantou University*. [11]

Curriculum Construction Ideas

Project Time Management as a theoretical and practical strong professional core courses, it involves the definition of project activities, network mapping, time optimization and other aspects of knowledge, which plays a very important role in the engineering practice ability of college students, the cultivation of innovation consciousness and other aspects. It is the key content of construction to set up several assessment indexes in the two dimensions of learning process and result. The construction of the basic idea is: to graduation requirements as the guidance, based on the skills and theoretical knowledge, to strengthen the process evaluation, theoretical examination, practical ability and complementary with innovation ability appraisal, and accordingly set up corresponding evaluation method and the main body, in order to achieve the purpose of the comprehensive

assessment of students, according to the principle of PDCA cycle, using the questionnaire to assess, professional certification and accreditation of engineers constantly compare assessment standards and learning result, ongoing improvement of course examination way. The main construction ideas are shown in figure 1.

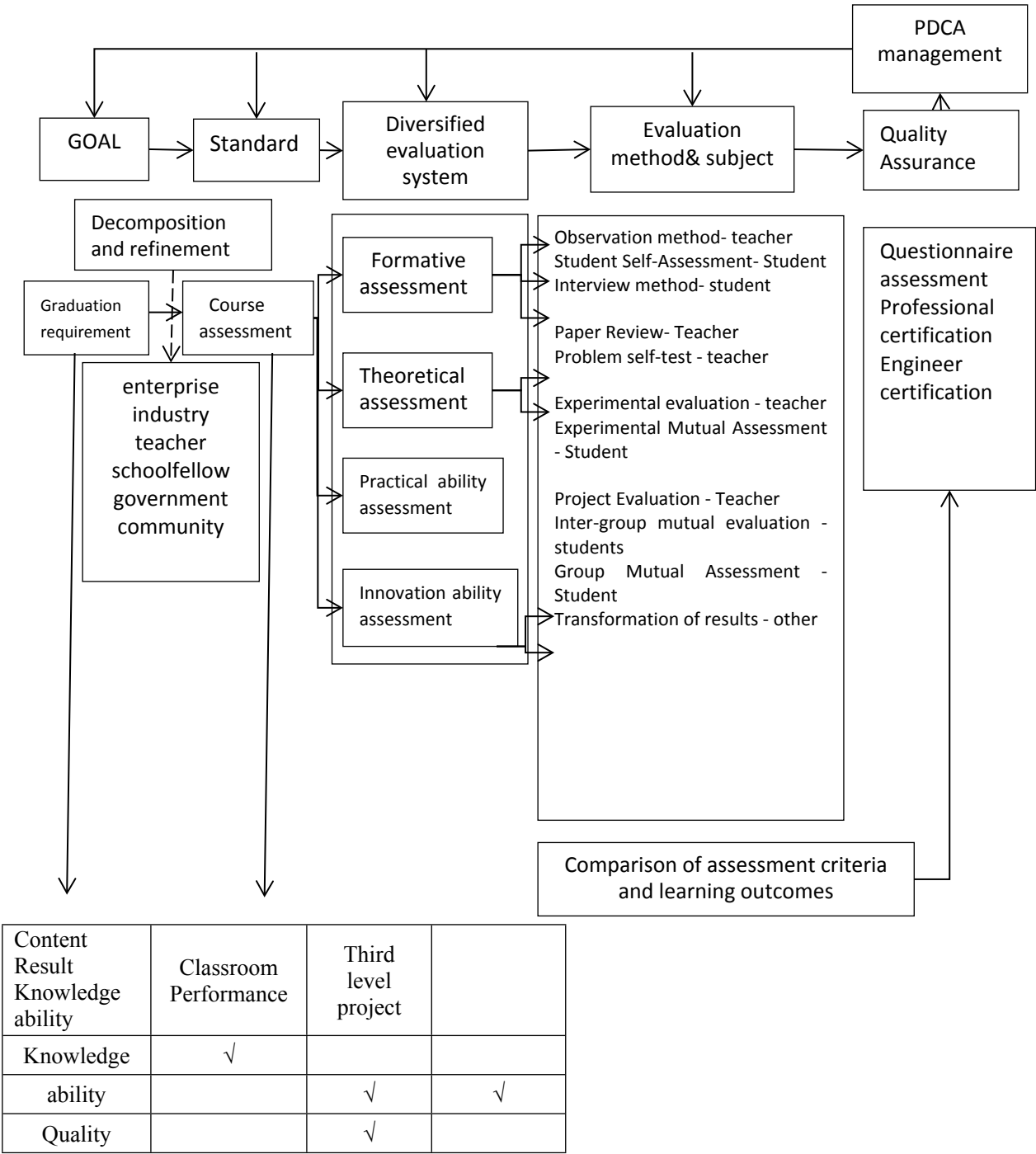


Figure. 1 Construction ideas

Curriculum Evaluation System and Evaluation Mode Exploration

In the construction of the curriculum evaluation model, make full use of the detailed and observable target system provided by the OBE-CDIO outline of the CDIO Outline as the basis for evaluating the implementation effect of inquiry teaching. Diversified evaluation methods are used to examine students' knowledge acquisition, ability development and attitude cultivation, and improve the evaluation subject according to the assessment system. Finally, the teaching is further improved

based on the evaluation results. It can be seen that the basic process of the OBE education model is also met in the process of achieving educational closed loop.

Guided by Graduation Requirements, Establish an OBE-CDIO-Oriented Diversified Curriculum Assessment System. The Project Time Management course group will deepen the OBE education model based on the original CDIO assessment index, and explore ways to establish diversified assessment and evaluation methods that respect interest and stimulate self-confidence. Under the guidance of the CDIO concept, a theoretical and practical assessment system for the integrated teaching process of engineering education model has been constructed. During the CDIO implementation process, students will integrate a variety of knowledge, including basic knowledge, professional basic knowledge and professional knowledge, as well as the experience and capabilities acquired in the practical aspects of the three-level project to complete the product, process and system concept in the form of a team. - Design - Implementation - Run the complete process. On the basis of the original process assessment, theoretical assessment and practical ability assessment, according to the idea of OBE, the innovation ability assessment is added. The essence of design is innovation. The design expression ability is only the means to realize design, and the cultivation of innovation ability is the ultimate. Objectives, the third-level project focus on the combination of student interest, inspiring students to explore design inspiration from their major and life, independent choice of innovative entrepreneurial type projects for time management, the assessment results of third-level projects will be selected based on merit. Organize students to participate in similar competitions, and translate the results into specific implementable projects in Sova, and keep track of them. At the same time, in the process of assessment, Moocs are added to be watch, new teaching methods are used to expand students' knowledge and improve their self-learning ability. In the aspect of theoretical assessment, the assessment of innovative knowledge should be added, and the ability of innovative application of students should be paid attention to when designing questions. as shown in figure 2.

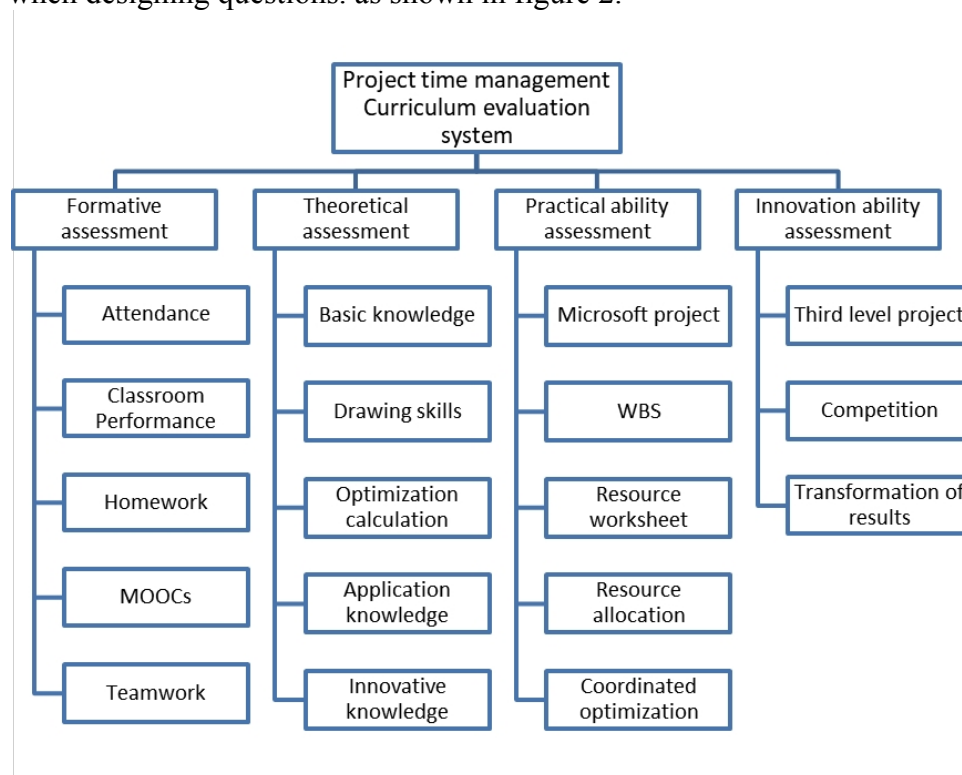


Figure 2 "Project Time Management" Diversified Course Assessment System

Construct an Evaluation Subject with Teachers as the Main Body and Students as the Secondary Body. Change the previous model of teacher's whole process evaluation. Different assessment methods adopt different evaluation methods and evaluation subjects are also different. This educational reform project introduces positive psychology into the curriculum evaluation

system, and takes students' development potential and interest as evaluation targets, advocates exploring positive aspects of students, and focuses on stimulating students' intrinsic motivation and self-construction, thus promoting each student's success. In order to ensure the students' positive psychological state, the assessment process needs to play the main role of the students, increase the students' participation in the curriculum, and improve the students' interest in learning, as shown in Table 1.

Table 1 Course evaluation method and subject of "project time management"

Type of assessment	Examination content	Evaluation method	Evaluation subject
Process assessment	Attendance, classroom performance, teamwork	Observation Student self-evaluation Interview method	Teacher Student Student
Theoretical assessment	Project time management theory	Test paper evaluation Problem self-test	Teacher Student
Practical ability	Microsoft Project software	application experiment evaluation	Teacher Student
Creativity	Third-level project (project application, time management, schedule control)	Project evaluation Inter-group evaluation Group mutual evaluation Transformation of results	Teacher Student Student Other

Establish an Internal Teaching Quality Assurance Mechanism. The evaluation of learning outcomes is an important part of OBE-CDIO teaching. Commonly used evaluation methods are: observation method, student self-evaluation method, interview method, test paper evaluation, experimental evaluation, etc. The evaluation content includes : student project implementation content, unit knowledge points summary and quiz, solutions and processes for troubleshooting and inquiry activities, results report, student learning strategies, self or other evaluation. Through the evaluation system of its learning outcomes, a new assessment system established with diversified assessment forms, integrated assessment contents, whole-process assessment process and complex assessment environment is established. Based on the results of the outcomes and the content of the assessment, according to the CDIO internal requirements, based on the reference CDIO standard, the questionnaire evaluation, professional certification and engineer certification are used to construct the internal quality assurance mechanism of the engineering education of the course, and the curriculum content is integrated. Improve the teaching content and form a good feedback mechanism to continuously improve.

Conclusion

Introduce product outcomes oriented OBE and project-based CDIO teaching concepts into the "Project Time Management" course. After nearly years of practice, it has been found that by interspersing diverse content and non-practical experiments in the classroom, the contradiction between abstract theory and practical application is successfully solved, reducing the gap between the teaching and practice. It provides a good platform for students to apply basic theoretical knowledge, ability to analyze and solve problems, and exercise and improve teamwork and engineering practice. It lays the foundation for the cultivation of students into senior talents in the field of project management. Meet the needs of talents in this field in social and economic development.

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