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Exploration of Teaching Reform of Professional Ethics in Engineering Cost Based on OBE Concept

Wenbin Shao[1], Weiwei Shao[2,*]
[1] *School of Management Science and Engineering, Anhui University of Finance and Economics, Bengbu, Anhui, China*
[2] *School of Electronic Engineering, Tongling University, Tongling, Anhui, China*
**Corresponding Author.*

Abstract: This article focuses on the exploration of the reform of engineering cost professional ethics teaching based on the Outcome Based Education (OBE) concept. The research aims to integrate the OBE concept into engineering cost professional ethics, clarify students' learning outcomes, and enhance their professional competence and ethical level. By using project-based learning, case analysis and other teaching methods, moral elements such as engineering ethics and social responsibility are combined with professional knowledge of engineering cost to enhance practical abilities and teamwork spirit. The research results show that the reform of professional ethics under the OBE concept significantly improves students' learning enthusiasm and participation, enhances course satisfaction and teaching quality. This article provides new ideas and paths for the reform of professional ethics teaching in engineering cost, which is of great significance for cultivating high-quality engineering cost talents.

Keywords: OBE Concept; Engineering Cost; Professional Ethics; Reform in Education

1. Introduction

In the context of accelerated development of the global economy and rapid advancement of engineering technology, the importance of the education quality and talent cultivation system of the engineering cost major as a key link between technology and economy has become increasingly prominent [1]. The engineering cost major aims to cultivate composite talents who possess both profound professional knowledge and professional ethics, for the sake of content the need of national infrastructure construction and economic development. However, in the face of multiple challenges in the new era, the traditional engineering cost education model is no longer able to fully meet the current society's diversified requirements for talents, especially in terms of professional ethics education, which has obvious shortcomings [2]. Therefore, exploring the reform of engineering cost professional ethics teaching is grounded in the OBE concept has become a key path to enhancing the quality of professional education as well as shaping high-quality personnel that meet social needs.

As an important component of higher education, the core goal of engineering cost education is to cultivate professional talents with various abilities such as engineering cost management, engineering economic analysis, and engineering contract management [3]. However, in current educational practice, engineering cost education faces a series of challenges. For one thing, the application of new building materials and technological innovations have increased the demand for high-quality engineering cost personnel in society [4]. For another, the increasingly complex market economy environment and fierce competition in the engineering cost industry have raised higher standards for the professional ethics, social responsibility, and teamwork ability of professionals. However, traditional engineering cost education models often focus on imparting knowledge and training skills, neglecting the cultivation of students' moral literacy, resulting in a lack of correct value judgments and moral choices when facing practical engineering problems.

In addition, there are still problems with the education of engineering cost majors, such as the disconnect between teaching content and reality, and the single teaching methods and means [5]. Many universities' engineering cost courses still remain at the traditional teaching

mode of theoretical explanation and case analysis, lacking close connection and interaction with actual engineering projects. At the same time, teaching methods and tools are relatively outdated, which is not conducive to enhancing students' interest in learning professional ethics and limits their potential for future career development.

Professional ethics education is the process of integrating ethical requirements related to the profession throughout the entire teaching process, cultivating students' sense of right and wrong [6]. Integrating professional ethics into engineering cost education is beneficial for promoting the development of students' professional ethics.

The research on professional ethics practice has attracted significant attention in academia and education. Literature [7] points out that professional ethics is a key link in cultivating students' engineering ethics concepts and an important aspect in improving their comprehensive quality. The author proposes that moral education elements should be naturally integrated into professional courses to enhance students' professional ethics while teaching. Literature [8] proposes the concept of "integrated professional ethics", emphasizing the cultivation of students' global perspective and critical thinking through interdisciplinary and cross-cultural curriculum design, and enhancing their sense of professional ethics and responsibility.

Although the research on professional ethics in the field of engineering cost started relatively late, it has become a focus of attention in both academia and education. Some scholars have begun to explore how to better integrate professional ethics into engineering cost courses, in order to enhance students' moral literacy and comprehensive quality. Through case analysis, literature [9] explores the path and methods of integrating moral education into engineering cost courses; Literatures [10-11] constructed an engineering cost professional ethics evaluation system based on the OBE concept, providing strong support for teaching improvement and talent cultivation.

However, despite some achievements in research and practice, the education of professional ethics in engineering cost still faces many challenges and problems. How to accurately identify and integrate moral education elements? How to innovate teaching methods and tools to enhance students' interest and initiative in learning? How to construct a scientifically reasonable evaluation system to comprehensively reflect students' learning outcomes and growth trajectories? These issues urgently need further research and resolution.

The OBE concept is an educational philosophy guided by learning outcomes, emphasizing student-centered approach, learning outcomes as the goal, and continuous improvement as the driving force. Through clear learning outcome settings, flexible and diverse teaching methods, and a diversified evaluation system, it promotes students' comprehensive development and enhances their social adaptability [12]. The application of OBE concept in the reform of engineering cost professional ethics teaching has important value and significance.

Firstly, the OBE concept helps to clarify the educational objectives of engineering cost professional ethics. Traditional engineering cost courses often focus on imparting knowledge and training skills, while neglecting the cultivation of students' moral literacy. The OBE concept emphasizes learning outcomes as the guide, and through clear educational goal setting, it can guide teachers to naturally integrate moral education elements into engineering cost professional courses, achieving an organic combination of professional knowledge imparting and moral education.

Secondly, the OBE concept helps to innovate teaching methods for engineering cost professional ethics. Traditional engineering cost courses often adopt an indoctrination based teaching method, which is difficult to stimulate students' interest and initiative in learning. The OBE concept emphasizes student-centered and flexible teaching methods. Through interactive teaching forms like project-based teaching, flipped classroom, and classroom discussions, students' learning experience and participation can be enhanced, and teaching effectiveness and quality can be improved [13].

Finally, the OBE concept helps to build a diversified professional ethics evaluation system for engineering cost. The traditional evaluation system for engineering cost courses often focuses on students' exam scores and homework completion, while neglecting the

evaluation of students' moral and comprehensive qualities. The OBE concept emphasizes learning outcomes as the guide and continuous improvement as the driving force. By constructing a diversified evaluation system that includes knowledge acquisition, skill improvement, and value formation, it can comprehensively reflect students' learning outcomes and growth trajectory, providing strong support for teaching improvement and talent cultivation [14].

In summary, the reform of engineering cost professional ethics teaching based on the OBE concept is an important way to enhance the effectiveness of engineering cost education as well as cultivate students who meet social needs. This study will explore in depth the application and practice of OBE concept in the reform of engineering cost professional ethics teaching, providing a direction for the reform of engineering cost professional ethics teaching.

2. OBE Concept

The OBE concept is an educational model based on student learning outcomes [15]. It emphasizes that teaching design and implementation should be student-centered, focusing on the effectiveness of student learning. The OBE concept was first proposed by American scholar Spady in 1981 and quickly gained widespread attention and application. Nowadays, the OBE concept has become a mature educational theoretical system, and the education community in many countries recognizes the OBE concept.

The core elements of the OBE concept mainly include three aspects [16-17]. Student centeredness, output orientation, and continuous improvement. The student center emphasizes that teaching should be centered on students' learning and development, rather than teachers' teaching; Output orientation emphasizes that instructional design and implementation should revolve around the learning outcomes that students can ultimately achieve; Continuous improvement emphasizes the continuous evaluation and improvement of teaching effectiveness to ensure that students can achieve the expected learning outcomes.

In the field of higher education, the application of OBE concept is becoming increasingly widespread. It requires educators to clarify students' learning outcomes and use them as a guide for curriculum design and teaching implementation [18-19]. The application of OBE concept not only changes the traditional training mode of higher education, but also stimulates students' enthusiasm and creativity in learning, laying a solid foundation for employment and lifelong learning.

3. Feasibility Analysis of Combining OBE Concept with Professional Ethics

3.1 OBE Concept Provides a New Perspective for Professional Ethics

Traditionally, professional ethics are often seen as additional content beyond professional courses, making it difficult to closely integrate with professional course knowledge. The OBE philosophy emphasizes student-centered and outcome oriented approaches, requiring educators to clarify students' learning outcomes and use them as a guide for curriculum design and teaching implementation. This provides the possibility for the combination of professional ethics and professional course knowledge. By integrating moral education elements into students' learning outcomes, an organic combination of professional knowledge imparting and moral education can be achieved, allowing students to receive moral education while learning professional knowledge.

3.2 OBE Concept also Provides New Methods for Professional Ethics

Traditionally, professional ethics are often taught through indoctrination, which makes it difficult to enhance students' learning motivation. The OBE philosophy emphasizes flexible and diverse teaching methods as well as personalized teaching plans. By adopting interactive teaching forms such as project-based teaching, flipped classroom, and classroom discussions, students' interest and participation in learning can be stimulated, and teaching effectiveness can be improved [20]. The OBE philosophy stress continuous improvement and a diversified evaluation system. Continuous evaluation as well as improvement of teaching effectiveness can ensure that students can achieve expected learning outcomes; By constructing a diversified evaluation system that includes knowledge acquisition, skill improvement, and value formation, students' learning outcomes

and growth trajectories can be comprehensively reflected.

3.3 Problems and Solutions of Professional Ethics in Engineering Cost Management

There are some problems and deficiencies in the professional ethics of engineering cost management. On the one hand, some courses have rigid and far fetched integration of moral education elements, resulting in a disconnect between moral education content and professional course knowledge. It is hard to achieve the set learning goals of professional ethics. On the other hand, traditional teaching methods are difficult to enhance students' interest in professional ethics. In addition, the evaluation system for engineering cost professional ethics lacks scientificity and visibility, which is not conducive to showcasing students' achievements in learning relevant knowledge.

In summary, the OBE concept supply ideas as well as methods for the professional ethics of engineering cost management. Integrating the OBE concept into professional ethics is beneficial for enhancing the teaching effectiveness of teachers and the learning interest of students. The OBE concept stress continuous improvement as well as a diversified evaluation system, providing strong support for the continuous improvement and comprehensive development of professional ethics.

4. The Application Framework of OBE Concept in Engineering Cost Professional Ethics

The OBE concept provides new reform ideas and practical paths for the professional ethics of engineering cost. Under the guidance of this concept, the educational objectives, teaching content and methods, evaluation system, and other aspects of engineering cost professional ethics need to be adjusted and optimized accordingly to better achieve the organic combination of professional knowledge imparting and value guidance.

4.1 Clarifying Educational Objectives

Under the OBE concept, the educational objectives of engineering cost professional ethics should be clear and specific, guided by students' learning outcomes. These learning outcomes should not only cover the mastery and application of engineering cost professional knowledge, but also include the improvement of moral literacy and the shaping of values. Specifically, the learning outcomes of engineering cost professional ethics can be set as follows.

(1) Professional knowledge and skills. Students are able to proficiently master the basic principles, methods, and tools of engineering cost, and possess the ability to solve practical engineering cost problems.

(2) Moral literacy. Students are able to understand and identify with professional ethical values, establish correct worldviews, outlooks on life, and values, and possess high moral qualities and professional ethics.

(3) Formation of values. Students are able to develop correct professional concepts, sense of responsibility, and team spirit, and possess a sense of social responsibility and citizenship.

(4) Comprehensive quality improvement. Students can improve their comprehensive qualities such as communication skills, teamwork skills, and innovation abilities through course learning.

The establishment of these learning outcomes provides clear direction and objectives for the teaching design, implementation, and evaluation of engineering cost professional ethics.

4.2 Reform of Teaching Content and Methods

Under the guidance of the OBE concept, the course content of engineering cost professional ethics should be integrated, and moral education elements should be naturally integrated into the professional knowledge system of engineering cost. This can be achieved in the following ways.

(1) Case fusion. Select typical cases related to engineering cost, combine the case background, problems, and solutions, and guide students to think about the moral elements, such as professional ethics, social responsibility, etc.

(2) Theoretical infiltration. When teaching engineering cost professional knowledge, relevant moral theories such as professional ethics standards are interspersed to enable students to receive moral education while learning professional knowledge.

(3) Practical experience. By organizing social practice, volunteer service and other activities, students can personally experience the social

responsibility and professional ethics requirements in the field of engineering cost, deepen their understanding and recognition of moral education.

Under the OBE concept, the teaching methods of engineering cost professional ethics should be innovated to strengthen the practicality and experiential nature of moral education. It can be achieved in the following ways.

(1) Case analysis. Select representative engineering cost cases, guide students to conduct case analysis and discussion, and extract moral elements from them, such as professional ethics, integrity awareness, etc.

(2) Role playing. Simulate actual scenarios in the field of engineering cost, allowing students to play different roles for interaction, and experience and understand professional ethics and social responsibility in the field of engineering cost through role-playing.

(3) Group discussion. Divide students into groups to discuss and exchange ideas on a certain engineering cost issue, encourage them to express their own opinions and views, and deepen their understanding and recognition of moral education through group discussions.

Under the OBE concept, the evaluation system of engineering cost professional ethics should be restructured and a diversified evaluation system guided by learning outcomes should be established. This evaluation system should include the following aspects.

(1) Assessment of knowledge mastery. Evaluate students' mastery of engineering cost professional knowledge through exams, assignments, classroom performance, and other methods.

(2) Skill improvement evaluation. Evaluate students' ability to solve practical engineering cost problems through practical projects, case analysis, simulation operations, and other methods.

(3) Evaluation of the formation of values. Evaluate students' moral literacy and value formation through observation, interviews, questionnaire surveys, and other methods. This can be reflected through students' words and actions, teamwork attitude, sense of social responsibility, and other aspects.

(4) Comprehensive quality evaluation. Evaluate students' comprehensive qualities such as communication ability, teamwork ability, and innovation ability through comprehensive quality assessment, social practice reports, and volunteer service records.

The construction of this diversified evaluation system helps to comprehensively and objectively reflect students' learning outcomes and growth trajectories, providing strong support for the continuous improvement and optimization of engineering cost professional ethics.

5. Practice Analysis and Effectiveness Evaluation

To evaluate the practical effectiveness of OBE concept in enhancing the professional ethics practice of engineering cost management, this article selects two classes from the same school and major to implement OBE concept in engineering cost professional ethics reform as a case study for analysis (Class 1 adopts OBE concept in professional ethics reform, and Class 2 adopts traditional teaching methods).

In the reform of professional ethics in engineering cost, the following implementation steps and key activities have been taken.

(1) Clearly define educational objectives. According to the OBE concept, the specific learning outcomes of engineering cost professional ethics have been clarified, including professional knowledge and skills, moral literacy, value formation, and comprehensive quality improvement.

(2) Integrate course content. The natural integration of moral education elements into the professional knowledge system of engineering cost has achieved an organic combination of professional knowledge imparting and value guidance through case analysis, theoretical infiltration, and practical experience.

(3) Innovative teaching methods. The use of mutually engage teaching methods like project-based teaching, flipped classroom, and classroom discussions has strengthened the practicality and experiential nature of moral education.

(4) Build an evaluation system. We have established a diversified evaluation system guided by learning outcomes, including knowledge mastery evaluation, skill improvement evaluation, value formation evaluation, and comprehensive quality evaluation.

During the implementation process, the school actively organized teacher training, teaching

seminars, and academic exchanges to continuously improve the teaching level and professional ethics of teachers. At the same time, the university also emphasizes cooperation and communication with enterprises, inviting experts from enterprises to participate in course design and teaching evaluation, making the professional ethics of engineering cost more practical and industry oriented.

For the sake of evaluate the application outcome of OBE concept in engineering cost professional ethics, methods such as questionnaire survey, interview, and academic performance analysis were used to assess the implementation effect of two classes. The evaluation results are shown in Table 1.

Table 1. Evaluation Results

Class	Satisfaction with learning attitude (%)	Satisfaction with knowledge and skills (%)	Satisfaction with Moral Literacy (%)	Overall quality satisfaction (%)
Class 1	98	96	98	98
Class 2	88	86	82	88

According to Table 1, it can be seen that:

(1) Improvement in learning attitude. Through questionnaire surveys and interviews, it was found that students in Class 1 who adopted the OBE concept of engineering cost professional ethics reform were relatively satisfied with their learning attitude towards engineering cost professional ethics. They are more in agreement with the value and significance of professional ethics, and their interest and participation in course content have also increased.

(2) Improvement of knowledge and skills. Through academic performance analysis, it was found that students in Class 1 have a stronger grasp of engineering cost professional knowledge and skills than those in Class 2 who use traditional education methods. They achieved better results in the exam and demonstrated stronger problem-solving and teamwork abilities in practical projects.

(3) Improvement of moral literacy. Through observation and interviews, it was found that students in Class 1 are more concerned about social hot issues and professional ethics standards, and are able to consciously abide by social morality and professional ethics requirements. At the same time, they actively participate in social practice and volunteer service activities, demonstrating a high sense of social responsibility and civic awareness.

(4) Enhance overall quality. Through comprehensive quality assessment and social practice reports, it has been found that students who adopt the OBE concept of engineering cost professional ethics reform have significantly enhanced their comprehensive qualities such as communication ability, teamwork ability, and innovation ability. They are able to communicate and collaborate better with others, think independently, and creatively solve problems.

In summary, the application effect of OBE concept in engineering cost professional ethics is significant, which can effectively improve students' learning attitude, enhance knowledge and skills, improve moral literacy, and enhance comprehensive quality. This provides strong support for the continuous improvement and optimization of engineering cost professional ethics.

6. Challenges and Solutions Faced

6.1 Challenge Analysis

In the process of implementing the OBE concept of engineering cost professional ethics reform, there will be some challenges and problems encountered. These challenges mainly include the following aspects.

(1) Insufficient teacher training. Some teachers lack a deep understanding of OBE philosophy and professional ethics, and lack relevant teaching experience and skills. This may make it difficult for them to accurately grasp educational goals and teaching methods during the implementation process, affecting the effectiveness of professional ethics implementation.

(2) Lack of teaching resources. Some universities have relatively scarce teaching resources in the field of engineering cost professional ethics, such as case libraries and practice bases. This may result in students lacking sufficient practical opportunities and experiential space during the learning process, making it difficult for them to fully and deeply understand and master the content and requirements of professional ethics.

(3) Student participation is not high. Due to differences in students' understanding and interest in professional ethics, some students may lack sufficient motivation and participation in the learning process. This may lead to poor teaching effectiveness of

professional ethics and difficulty in achieving expected educational goals.

(4) The evaluation system is incomplete. Some universities still have imperfect evaluation systems for engineering cost professional ethics. For example, the evaluation indicators are too single and the evaluation criteria are not clear enough. This may result in evaluation results that are not objective, comprehensive, and accurate enough, making it difficult to provide strong support for the continuous improvement and optimization of professional ethics.

6.2 Solutions

In response to the above challenges and issues, this article proposes the following solutions.

(1) Strengthen teacher training. Universities should provide timely cultivating teachers to deepen their perceive and comprehension of OBE concepts and professional ethics. By organizing special lectures, teaching seminars, and academic exchanges, teachers can gain relevant teaching experience and skills; At the same time, industry experts and scholars can be invited to provide guidance and coaching to enhance the teaching level and implementation effectiveness of professional ethics of teachers.

(2) Optimize teaching resources. Universities should focus on optimizing the resources of engineering cost professional ethics. Can actively cooperate with enterprises to jointly build practice bases and case libraries and other resource platforms; Furthermore it can also make full use of the Internet, information technology and other means to develop online courses and virtual laboratories and other teaching resources to supply students with richer and more diverse learning experiences.

(3) Inspire student engagement. In order to enhance students' participation and enthusiasm, universities can take various measures to stimulate students' interest and motivation in learning. For example, challenging and interesting learning tasks and projects can be set up; Meanwhile, interactive teaching methods such as group discussions and role-playing can also be used to enhance students' sense of participation and experience; In addition, incentive mechanisms can be established to motivate students to actively participate in learning and practicing professional ethics.

(4) Improve the evaluation system. Universities should continuously improve the evaluation system of engineering cost professional ethics. A diversified evaluation index and standard system can be established, including knowledge mastery evaluation, skill improvement evaluation, value formation evaluation, and comprehensive quality evaluation; At the same time, various evaluation methods and technical means can be used to collect and analyze students' learning data and information, providing strong support for the continuous improvement and optimization of professional ethics.

7. Conclusion

This article reviews the application and practice of OBE concept in the reform of engineering cost professional ethics teaching. By clarifying educational objectives, integrating curriculum content, innovating teaching methods, and constructing evaluation systems, the professional ethics of engineering cost have achieved significant results in imparting professional knowledge and guiding values. At the same time, through practical case analysis and effectiveness evaluation, it was found that put to use the OBE concept could promote students' learning motivation, enhance knowledge as well as skills, improve moral literacy, and enhance overall quality. This provides strong supply to the reform of teaching methods for engineering cost professional ethics.

Subsequent research will continue to deepen the reform of engineering cost professional ethics teaching based on the OBE concept, and further improve the curriculum system and teaching methods. On the one hand, we will strengthen cooperation with enterprises and industries, introduce more practical cases and cutting-edge technologies, and make the teaching content more closely related to engineering practice. On the other hand, we will explore more diversified teaching methods and evaluation methods to better enhance students' innovation ability and professional ethics.

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