

Research on the Path Strategy for Diagnosis and Improvement of Urban Rail Transit Majors in Higher Vocational Education Based on OBE Concept

Jie Li

Hunan Railway Professional Technology College, Zhuzhou, Hunan, China, 412001

*corresponding author

Keywords: OBE concept, Major in urban rail transit in vocational colleges, Course diagnosis and improvement

Abstract: In recent years, improving the level of vocational education and ensuring the quality of talent cultivation has become an important task of vocational education, and the diagnosis and improvement of courses are important means to achieve this goal. This article is based on the OBE concept to carry out vocational urban rail professional courses. Through the analysis of relevant literature and materials on the diagnosis and improvement of vocational professional courses, we explore how to improve the quality of vocational urban rail professional courses under the OBE concept, We have formed a diagnostic and reform model for urban rail professional courses in vocational colleges, and proposed improvement strategies through studying the specific problems of the diagnostic and reform of the course "Train Reception and Departure Work", ultimately forming a long-term mechanism with promotion and reference significance.

1. Introduction

Since the 1990s, various countries have been paying attention to the quality of higher education. In 2015, while continuously improving the quality of higher education in China, the Ministry of Education issued a notice on the establishment of a diagnosis and improvement system for teaching work in vocational colleges, proposing a diagnosis and improvement system for talent cultivation in vocational colleges. By diagnosing and improving the curriculum, we continuously improve the quality of talent cultivation in vocational colleges. In the academic field, the evaluation of curriculum quality in higher vocational education has gone through several stages. Among them, the evaluation of curriculum quality by scholars of input determinism and process determinism is mainly based on the external factors of the school, while the output determinism represented by the OBE concept believes that the quality of higher education should focus on the final learning achievements of students. Based on this perspective, this article explores the path and strategy of curriculum diagnosis for urban rail transit majors in vocational colleges, using OBE theory as the basic research concept.

In terms of research on the OBE concept, scholars such as Jiang Bo elaborated on the four principles followed by the OBE concept, and then defined the core connotation of the OBE concept[1]. Scholars such as Li Zhiyi believe that the OBE concept emphasizes that students' final learning outcomes reflect teaching objectives, with a focus on studying the content, origin, methods, and path of understanding of students' learning outcomes[2]. Scholars such as Wang Yongquan believe that the teaching process based on the OBE concept should focus on students' learning output and promote the smooth realization of students' learning goals[3]. Scholars such as Gu Peihua analyzed the engineering education model under the OBE concept through the actual case study of Shantou University, and explained in detail the educational and teaching activity plans under this model[4]. Feng Quan believes in his research that the OBE concept should always be implemented in students' learning objectives, evaluation of learning outcomes, and teaching reform[5]. Scholars such as Long Fenjie have explored specific implementation methods for talent cultivation based on the OBE concept by studying the teaching mode of talent cultivation at Guizhou Institute of Technology[6].

In terms of research on curriculum diagnosis and reform strategies, Li Hong analyzed the diagnosis and reform strategies of vocational college courses from the perspective of teachers, emphasizing the importance of the value, tasks, and methods of diagnosis and reform[7]. Scholars such as Qu Ziyi analyzed the relevant strategy suggestions for curriculum diagnosis and reform using the course of power plant steam turbine equipment and operation as a case study[8]. On the basis of existing research results, scholars such as Nie Dayong have analyzed the diagnostic and reform strategies of "Advanced Mathematics" professional courses from four aspects: curriculum standards, curriculum assessment, teaching staff, and quality assurance[9]. Scholars such as Tan Xiangqun have studied the continuous improvement strategies of vocational courses within the framework of "five vertical and five horizontal", and explored a spiral logic for the operation of teaching quality[10]. Ye Jiqiang explored relevant strategies for curriculum diagnosis and reform based on the basic requirements of diagnosis and reform, taking sports related courses as the research object[11].

To sum up, using output determinism to study the quality of higher vocational courses has gradually become the main research direction of domestic scholars at present. The related connotation of OBE concept for students themselves, learning achievements, and continuous improvement has a positive significance for talent cultivation. This article explores the improvement of the quality of urban rail transit courses in vocational colleges under the OBE concept, proposes improvement strategies by studying the specific problems of the course diagnosis and improvement, and ultimately forms a long-term mechanism with promotion and reference significance.

2. The Current Situation and Difficulties of Curriculum Diagnosis and Reform in Urban Rail Transit Majors in Higher Vocational Education

2.1. Current Situation of Curriculum Diagnosis and Reform in Higher Vocational Education

This article provides a detailed analysis of the curriculum reform situation in nearly 20 vocational colleges by consulting relevant materials. It is found that the current curriculum reform in vocational colleges has the following processes:

One is to establish an overall plan for curriculum construction. Based on the professional construction situation and curriculum construction ideas of our college, we will clarify the curriculum training objectives of relevant majors, and then establish annual construction plans and tasks for each major's curriculum. The second is to establish quality control standards for relevant professional courses, which largely determine the results of diagnosis and improvement of relevant professional courses. Detailed control over the development, operation, and management of professional courses will help to comprehensively design specific control standards for course diagnosis and improvement. The third is to establish an operational mechanism for professional course diagnosis and improvement. The operational mechanism for course diagnosis and improvement has the characteristics of strong correlation between various elements. The course standard system, course objectives, course plan, and course implementation process are interrelated and mutually influencing. Constructing a reasonable professional course operating mechanism will help to identify problems that arise during the course of course improvement, and can timely provide early warning and improvement. The fourth is to establish a comprehensive curriculum guarantee mechanism. The guarantee mechanism for relevant professional courses mainly includes organizational structure, institutional system, and funding guarantees. By establishing effective reward and punishment mechanisms, strengthening organizational leadership, and improving funding guarantees, it will be beneficial for the final effect of curriculum reform.

2.2. Problems in the Diagnosis and Reform of Higher Vocational Professional Courses

Through reviewing relevant documents and materials on curriculum diagnosis and improvement in vocational colleges, this article finds that there are mainly three problems in the diagnosis and improvement of vocational professional courses.

One aspect is the overall planning of curriculum construction, which does not highlight the connection between curriculum and social, industrial, and talent development needs. Professional curriculum diagnosis and improvement should focus on social needs, industrial needs, and talent development needs. These three aspects should be the main starting points of curriculum planning. Currently, curriculum diagnosis and improvement do not fully emphasize student output orientation. Secondly, in terms of course quality control standards, the direct method of evaluating course quality based on students' learning outcomes has not been adopted. Most indirect methods of evaluating course quality are used, such as teachers' evaluation of themselves, students' evaluation of the course, and teaching supervision's evaluation. The indirect evaluation method is unilateral in controlling course quality, and if not supported by other evidence, it will not fully reflect the quality standards of the course. Thirdly, in terms of professional course diagnosis and improvement of operational mechanisms, the utilization and investment of course resources cannot effectively support students' learning outcomes. The utilization and investment of curriculum resources should adopt a targeted and adaptable approach, mainly focusing on students' learning outcomes rather than on the development of school hardware and the needs of teachers. It should fully demonstrate that students are the core of curriculum quality control.

2.3. The Urgency of Improving the Curriculum of Urban Rail Transit Majors in Higher Vocational Education

At present, China is increasing its efforts in urbanization construction. During the construction process, transportation problems have become a key issue that urgently needs to be solved. With the continuous improvement of people's material living standards, the per capita vehicle ownership rate is also constantly increasing, and the accompanying environmental pollution has caused great trouble to the people's living environment, which to some extent restricts the development and construction of cities. However, the large capacity of urban rail transit the advantages of low pollution and fast speed will effectively solve the difficulties brought by private cars. At present, there are 30 cities in China with urban rail transit systems, and the development of the urban rail industry requires a large number of relevant professional and technical talents. In such a huge demand for talents, vocational colleges, as units of talent cultivation and output, are bound to strengthen the quality and quantity of talent cultivation. The goal of improving teaching quality should be based on cultivating professional and technical talents with high comprehensive quality, proficient vocational skills, and strong industry adaptability. With the rapid development of the urban rail transit industry, information technology and intelligent equipment have begun to be widely applied. The industry requires skilled personnel who are familiar with professional skills, have outstanding emergency response capabilities, have high comprehensive qualities, and can solve operational problems, which are in short supply. The course diagnosis and improvement of urban rail transit majors in vocational colleges should be combined with social and market needs, and guided by student output results. Therefore, The need to increase course improvement has become extremely important.

2.4. The Direction of Curriculum Improvement for Urban Rail Transit Majors in Vocational Colleges

The key to China's employment problem lies in education reform, and the main focus of education reform in the vocational education system should be on cultivating students' practical skills. The urban rail transit majors in vocational colleges belong to the transportation category in the professional catalog, with strong industry characteristics and high requirements for students' hands-on skills. However, the proportion of training students' hands-on skills in urban rail professional courses is insufficient. For example, in the course "Train Reception and Departure Work", the main teaching content includes understanding of train reception and departure work, normal train reception and departure homework, abnormal train reception and departure homework, etc. These courses emphasize the understanding and mastery of theoretical regulations, Students are required to master the skills of using signal equipment to handle train reception and departure operations. Therefore, in the process of curriculum development, it is necessary to comprehensively

consider the integration and education of "on-the-job course competition certification", and pay attention to the output of students' learning outcomes.

3. The Construction of Curriculum Diagnosis and Reform Model for Higher Vocational Education Based on OBE Concept

This article aims to understand the specific situation of diagnosis and improvement of relevant courses in vocational colleges in China through consulting materials and relevant literature, combined with relevant vocational college cases. Based on the actual situation of course diagnosis and improvement and analyzing the problems existing in various vocational colleges during the diagnosis and improvement process, this article ultimately establishes a diagnosis and improvement model for vocational professional courses based on the OBE concept.

3.1. Establish a Professional Curriculum Construction Plan

The starting point for establishing a curriculum construction plan for vocational colleges based on the OBE concept should focus on students' learning outcomes. The formation of learning outcomes includes two steps: first, to align with the needs of the profession and form a curriculum goal chain, including the industry's needs for the profession and the professional's own development needs. Finally, to establish the curriculum's training objectives and learning content based on the training needs. Secondly, to form a curriculum construction plan, in order to ensure that learning outcomes meet established standards, it is necessary to increase the planning of professional curriculum construction, including the construction of curriculum textbooks, teaching resources, teacher teams, teaching plans, and assessment mechanisms.

In terms of curriculum goal chain construction, in combination with the OBE concept, students must meet the multiple needs of enterprises, schools, and individuals upon graduation in order to achieve student output results. Therefore, a curriculum goal system should be formed, which should be divided into different stage goals and gradually achieved based on stage goals. Firstly, based on multiple needs, a standard for students' graduation ability requirements should be formed, which includes the school's own needs (i.e., combining the school's development and educational positioning to cultivate students), social and industry needs (i.e. meeting economic and social development, enterprise employment requirements to cultivate students), and personal needs (i.e. meeting personal physical and mental development characteristics to cultivate students). Therefore, the standard for graduation ability requirements should be defined through consultation among all parties, Develop a measurable indicator system. Secondly, the OBE concept points out that students should clarify the requirements for students' graduation ability at the initial stage of student training, and establish the curriculum system and objectives in combination with the requirements for ability. One ability can correspond to multiple courses, and one course can also achieve the cultivation of multiple abilities. The correlation between the two will determine the final curriculum objectives and learning outcomes. Thirdly, subdivide the course objectives and establish phased course training objectives. During the talent training process, timely understand students' learning situation, and gradually achieve the course objectives of each stage through feedback and correction of learning results. Finally, combine output orientation to achieve the objectives.

In terms of course construction planning, based on the final standards of learning outcomes, timely strengthen the construction of course content, textbook construction, teaching resources, teaching team, teaching plan, and assessment mechanism, and make good planning. Based on the OBE concept, the diagnosis and improvement process of vocational education curriculum should strengthen phased diagnosis and improvement, and ultimately achieve the initial curriculum goals and learning outcomes through various aspects of curriculum construction planning.

3.2. Establishing Curriculum Quality Control Standards

The curriculum quality control standards include two parts: curriculum construction and curriculum teaching. This article explores these two parts based on the OBE concept.

In terms of the quality control standards of curriculum construction, the quality control standards

of curriculum construction shall be established in combination with the curriculum construction planning mentioned above. First, the quality control of the curriculum goal chain shall be established. The output determinism based on the OBE concept shall control the quality of graduates' ability requirements, curriculum system, curriculum objectives, phased objectives and learning achievements respectively, Graduates' ability requirements emphasize whether to analyze their ability requirements according to their professional needs, whether to determine their internal and external needs through multi-party negotiations, whether the curriculum system can reflect their abilities, whether the courses are coordinated to achieve the curriculum goals, whether the curriculum goals emphasize whether they correspond to the graduates' ability requirements, whether the design is accurate, whether the phased goals emphasize whether they correspond to the curriculum goals, and whether they are hierarchical, The emphasis on learning outcomes is on whether it can test the achievement of course objectives, evaluate them, and reflect the mastery of graduates' abilities. Secondly, establish quality control for curriculum construction planning, based on the OBE concept, to control the quality of factors beyond the curriculum goal chain, including six aspects: learning achievement evaluation, textbooks and curriculum resources, teaching staff, curriculum support services, curriculum content, and curriculum teaching plan. Among them, learning achievement evaluation emphasizes whether to combine assessment and evaluation with curriculum goals, whether to establish clear assessment standards Examining the effectiveness of learning outcomes, emphasizing whether teaching auxiliary resources meet the needs of learning outcomes, whether course resources meet the development needs of teachers and students, whether the teaching staff is equipped with standard teaching staff, whether job responsibilities are met, and whether a teacher training and growth plan is formulated. Curriculum support services emphasize whether the requirements of teachers and students are met, and whether there are sound systems to support the operation of the curriculum, the course content emphasizes whether it supports the course objectives and meets the differentiated development requirements of students. The course teaching plan emphasizes whether it reflects the characteristics of the course and whether it changes according to students' needs.

In terms of quality control standards for curriculum teaching, the control cycle of curriculum education quality should be one course and divided into three parts: before class, during class, and after class. Among them, the influencing factors of pre class teaching diagnosis should include whether the teaching design is based on the analysis of the previous classroom effect, whether the teaching method is student-centered, whether it serves the teaching objectives and content, and whether it stimulates students' initiative in thinking; The influencing factors of in class teaching diagnosis should include the implementation of teaching content, students' classroom participation, and whether students have achieved learning outcomes; The influencing factors of after-school teaching diagnosis should include whether to conduct a summary of after-school teaching, whether to conduct an analysis of students' learning outcomes, and whether to arrange after-school tasks based on students' learning situations.

3.3. Establishing a Curriculum Diagnosis and Reform Operating Mechanism

Based on the two aspects of curriculum construction planning mentioned above, the operational mechanism of curriculum diagnosis and improvement is also divided into two parts: curriculum construction and classroom teaching. Among them, the diagnostic and improvement operational mechanism of curriculum construction is divided into two goals to achieve. The first goal is to meet the scientific nature of curriculum construction diagnosis and improvement, establish a corresponding relationship between curriculum goal chain, curriculum construction planning, curriculum construction implementation, and curriculum construction goals. The second goal is to meet the completion degree of curriculum construction goals, that is, whether the curriculum has achieved the initial goal of curriculum construction planning, that is, the implementation of curriculum construction. The diagnosis and improvement operation mechanism of curriculum teaching is also divided into two processes for diagnosis and improvement. The first process is to construct the curriculum according to the classroom quality control standards, with one class as the

cycle. The second process is to diagnose the quality of course teaching based on learning outcomes, and improve the problems in classroom teaching by combining the diagnostic results. Both the operational mechanism of curriculum construction and the operational mechanism of curriculum teaching are processes of diagnosing and improving the curriculum. The two interact and are interrelated, jointly improving the quality of the curriculum.

3.4. Establishing a Curriculum Diagnosis and Reform Guarantee Mechanism

The orderly progress of curriculum diagnosis and improvement work in vocational colleges requires certain guarantee measures. Based on the analysis of diagnosis plans in various colleges, this article believes that the curriculum diagnosis and improvement guarantee mechanism mainly focuses on three aspects of organizational, financial, and institutional guarantees.

In terms of organizational guarantee, vocational colleges should establish a clear division of labor working group in the work of curriculum diagnosis and improvement. The work of curriculum diagnosis and improvement should be refined and divided according to the goals of curriculum construction. Each working group should carry out the work according to the division of labor. The working group should also be responsible for the comprehensive promotion of diagnosis and improvement work throughout the school, and should combine the curriculum diagnosis and improvement with the regular work of the school according to the requirements of diagnosis and improvement. In terms of funding guarantee, each vocational college should establish a clear financial guarantee system, provide sufficient financial support for the smooth progress of curriculum diagnosis and reform work, and invest special funds as performance rewards for curriculum diagnosis and reform goals. In terms of institutional guarantee, in response to the complexity of curriculum diagnosis and improvement work, establish a sound and complete work charter and action standards to promote the orderly development of curriculum diagnosis and reform. The relevant system of curriculum diagnosis and reform should have the characteristics of the entire process, all aspects, and all staff, and the institutional system should establish practical measures.

4. Course Cases of “Train Reception and Departure Work”

4.1. Overview of the Course Cases of “Train Reception and Departure Work”

This article is based on the OBE concept to diagnose and improve urban rail courses in vocational colleges. The diagnosis course is targeted at "Train Reception and Departure Work" at Hunan Railway Vocational and Technical College, and the course improvement work is carried out on the problems found in the diagnosis. Detailed improvement strategies and measures are proposed. Based on the above, it can be found that the diagnosis and improvement of courses under the OBE concept mainly start from two aspects: course construction and course teaching. This article will diagnose and improve the course construction and teaching of "Train Reception and Departure Work".

The Work of Receiving and Departing Trains is an important course to train students to master the station operation work. The main task of the course is to enable students to master the practical ability, understand the characteristics and types of the train operation blocking method, be familiar with the specific operating methods of the computer interlocking station console, master the operating procedures and operating language of receiving and departure trains, master the display of various hand signal of receiving and departure trains, and understand the specific requirements of receiving and departure trains in the traffic regulations, Understand the language and key time of vehicle machine control, and understand the specific requirements and specifications for filling in driving vouchers and driving logs. After completing this course, students can comprehensively apply the professional knowledge and skills they have learned to meet the requirements of station duty officers, assistant duty officers, and other positions, and can analyze and solve practical problems in train reception and departure work.

4.2. Diagnosis and Improvement of the Course "Train Reception and Departure Work"

The previous text has elaborated on the diagnosis and improvement work of vocational courses. The diagnosis and improvement work of "Receiving and Departing Train Work" mainly focuses on two aspects: the construction of diagnosis and improvement courses and course teaching.

Firstly, the diagnosis and improvement of curriculum construction. This article mainly diagnoses from the aspects of curriculum objectives, curriculum content, textbook resources, and teaching staff.

In terms of course objectives, the previous text has elaborated on the course objectives, mainly to cultivate students' knowledge and skills in train reception and departure work, and to cultivate students who can adapt to job requirements. Based on the diagnostic requirements of the course objectives, the diagnosis of the course objectives is that the course objectives have a certain level of hierarchy, but the course does not fully meet the ability requirements that graduates should have, the course objectives lack full support for job abilities. Improvement suggestions: continuously clarify the connection between the course and the graduate's ability requirements, and establish a course objective system that meets the needs of all stakeholders.

In terms of course content, it includes three major parts: understanding of train reception and departure work, normal train reception and departure homework, and abnormal train reception and departure homework. Based on the diagnostic requirements of the course content, the diagnosis of the course content is that the course content is reasonably divided and can support the course objectives. At the same time, the course plan and practical training plan are arranged according to the learning differences of students, meeting the requirements of students' differentiated development. Therefore, the diagnosis is that the quality of the course content is good.

In terms of textbook resources, the course materials used are the "Practice of Receiving and Departing Trains" published by China Building Materials Industry Press, which covers a relatively complete range of content. There are some courseware and exercises, and based on the diagnostic requirements of the textbook resources, the diagnosis of the textbook resources is that the textbook is a regular textbook, there are insufficient teaching supporting resources, and there are no micro courses, videos, animations, etc. under the new version of the standard. Improvement suggestions: Select or develop new forms of loose leaf teaching materials, provide micro courses and animations for various knowledge and skill points, provide videos of train operation under normal and abnormal conditions, and strengthen the construction of online open courses.

In terms of the teaching staff, all course teachers have a full-time master's degree or above. At the same time, the school has formulated a regular training plan for teachers to practice in enterprises, and the teachers have a good theoretical foundation. The diagnosis of the teaching staff is that some teachers lack on-site work experience in rail industry enterprises, practical ability, and insufficient understanding of regulations, resulting in some deviations in the teaching process of knowledge and skills points. Improvement suggestions: Increase the introduction of on-site experts from enterprises, strengthen on-the-job learning among teachers on enterprise sites, and further enhance teachers' understanding of regulations, accident analysis, judgment, and handling, as well as practical skills.

Secondly, the diagnosis and improvement of course teaching, including periodic analysis of the diagnosis and improvement of a course and the achievement of course learning outcomes. The phased diagnosis and summary diagnosis of course teaching are similar to the diagnosis of a class, both based on the diagnostic results of learning outcomes. By tracing the process data of course teaching, problems can be found in the process, and targeted improvements can be made in subsequent course teaching. During the practical training of train reception and departure work, it was found that students have a good grasp of the characteristics and types of train blocking methods, but there is a lack of specific operating methods for computer interlocking station consoles. The diagnostic reason is that students do not have enough understanding of the previously learned content, and specific operating methods are available in textbooks and training manuals. However, students are unable to discover and solve problems in a timely manner. We hope that the teacher can provide problem-solving methods. Suggestions for improvement: teachers will change teaching

to students' learning by themselves, and strengthen the importance of students' independent learning and team cooperative learning. At the same time, according to the evaluation of learning achievements, students will be appropriately provided with targeted after-school learning tasks or personalized learning guidance.

5. Conclusions

In recent years, improving the level of vocational education and ensuring the quality of talent cultivation has become an important task of vocational education, and the diagnosis and improvement of curriculum are important means to achieve this goal. However, as a newly emerging work, the development of relevant theories is not yet mature. Exploring the model of vocational curriculum diagnosis and reform is of great significance for improving the level of vocational education. This article is based on the OBE concept to carry out the diagnosis and reform of urban rail transit professional courses in vocational education. It is believed that the core of vocational education should focus on students' learning outcomes. Through the analysis and research of relevant literature and materials on the diagnosis and improvement of vocational courses, a diagnostic and reform model for vocational courses was ultimately established. However, due to personal abilities, there are still many shortcomings in this article. On the one hand, the diagnosis implemented in the course "Train Service" targeted in this article is not comprehensive enough, and the relevant measures for improvement have not been specifically implemented. On the other hand, The course diagnosis and reform model based on the OBE concept in this article is applicable to urban rail transit professional courses, but the reference value of courses in other fields has not been studied in detail, and the promotion significance of research conclusions has not been verified. In future research, we will continue to promote the practice of OBE concept in the diagnosis and reform of vocational courses, with the goal of discovering and solving problems, and continuously improve the quality of vocational courses.

Acknowledgement

This paper was supported by a project from the foundation "Research on diagnosis and improvement of urban rail professional courses based on OBE concept" (XJK21BZJ031) and "Research on course diagnosis and improvement of Railway Operation Specialty based on SOLO theory – taking 'Work of receiving and sending trains' course as an example" (ZJGB2020023).

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