

Research and Practice of individualized talent Training Mode for rail transit majors from the perspective of new engineering

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Abstract—In order to cultivate application-oriented talents of urban rail transit, individualized talent training mode is an important measure. In view of the existing problems in the training of rail transit professionals, the research group proposed the framework of individualized talent training under the background of new engineering, planned the matrix corresponding to graduation requirements and knowledge, ability and quality, and then set up the curriculum system and built the multi-evaluation system in the implementation process. The developed solution has been put into practice and will be tested in the future teaching practice activities in order to constantly improve the personalized talent training model.

1 INTRODUCTION

In 2017, colleges and universities all over the country have started the construction of new engineering, and training new engineering talents to meet the needs of social development is the top priority of the construction. Each university has formed its own unique educational resources, and each university has different sources of students. Therefore, how to cultivate personalized talents has become the focus of social attention. Urban rail transit is a new mode of transportation produced in response to the needs of urban development, and it is in urgent need of supporting talents, among which the cultivation of talents in the direction of urban rail transit operation and management has been paid more attention.

Domestic scholars have carried out a lot of researches on the methods and concepts of individualized talent cultivation in universities. Jiang Hui et al. [1] put forward several measures to build personalized innovation and entrepreneurial talent training mode in universities. Feng Xiaoli [2] analyzed the role of active practice teaching in personalized talent training and pointed out the implementation path. Deng Keying et al. [3] summarized the successful experience of personalized talent training in The University of Maryland in the United States, and explained what can be used for reference by Chinese universities. Zhang Sheng et al. [4] analyzed the personalized talent training mode of New Zealand universities and put forward some Suggestions for the talent training of Chinese universities and colleges. Li Zhihai et al. [5] and Pang Gubo et al. [6] respectively discussed different reform measures under the new engineering personalized talent training model and put them into practice. The above research on personalized

training at home and abroad for new engineering construction in colleges and universities have a certain reference value, geared to the needs of the development of urban rail transit industry demand, to new engineering construction as an opportunity to explore results oriented the direction of the urban rail transit operation management of the concept of personalized training mode and method, and the talent graduation requirements, curriculum setting, teaching evaluation system was studied.

2 EXISTING PROBLEMS

The professional talents required by urban rail transit mainly come from various universities directly under the former Ministry of Railways. These universities are relatively small in number and scale, and the scale of talent cultivation cannot fully meet the development and demand of the national rail transit industry. In response to the needs of urban rail transit construction in the central and western regions and the whole country, Xi 'an Traffic Engineering Institute has gradually improved and established a professional group of rail transit. However, due to the influence of various factors, there are mainly the following four problems in personalized talent training:

2.1 The individualization of talent training target is insufficient

Because the teachers troop transport class graduated from the professional teachers, lack of holistic grasp of the professional system, the professional position is not clear, teachers' awareness of training target fuzzy, especially lack of understanding of personal cultivation, professional

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characteristics to concise, college of personalized overall grasp the talent training scheme is allowed to.

2.2The standard of individualized training is not clear and the integrity and systematicness of the curriculum system is weak

For a long time, the relevant personal cultivation standards is less and less specific, and is often used in mapping out the talent training scheme analogy method or grafting, unavoidably marks of copy form, makes the individualized cultivation objectives and specifications of the part relative fuzzy expression, pertinence is not strong, set up the course system of integrity and systemic weak.

2.3The individualization effect of students' comprehensive ability, quality and knowledge structure is poor

These professional graduation requirements associated with student's quality, ability, knowledge is weak, and specific ability, quality, knowledge is more abstract description, so the students' ability to solve complex engineering problems, the lack of innovation ability weak expression, especially the way of its implementation or link problems, due to the cultivation of the students professional training scheme is difficult to achieve the desired effect.

2.4The quantitative analysis of each item in the individualized culture process is insufficient

In the past, in the process of evaluation of graduates, training objectives, curriculum system and curriculum content, subjective or qualitative evaluation was too much, which directly led to difficulties and even mistakes in

decision-making of teachers and managers. In addition, the evaluation of the above indicators is the evaluation value obtained through weighting treatment of many factors, but the weight is mostly subjective and artificial, lacking a certain scientific basis.

The cultivation of innovative talents must start from the aspects of ideological and ideological innovation, teaching content innovation, teaching environment innovation and achievement evaluation innovation so as to form the sustainable development and effective operation mode of innovative talents cultivation.

3 THE COUNTERMEASURE OF PERSONALIZED TALENT TRAINING

3.1Construct the framework of individualized talent training

From school idea, school-running orientation, the analysis of the connotation of new engineering construction, according to the social demand for rail transportation professionals, gradually building new engineering personalized training mode based on engineering education concept, principle, under the background of the new engineering personalized talent training pattern, for the implementation of the project to explore the basic theory and the practice basis. This paper analyzes the general standards and national standards for professional certification of rail transit majors, focuses on rail transit majors, realizes the accurate positioning of the major, and completes the formulation of personalized talent training objectives for new engineering majors. In this paper, the personalized graduation requirements and the matrix of students' ability, quality and knowledge

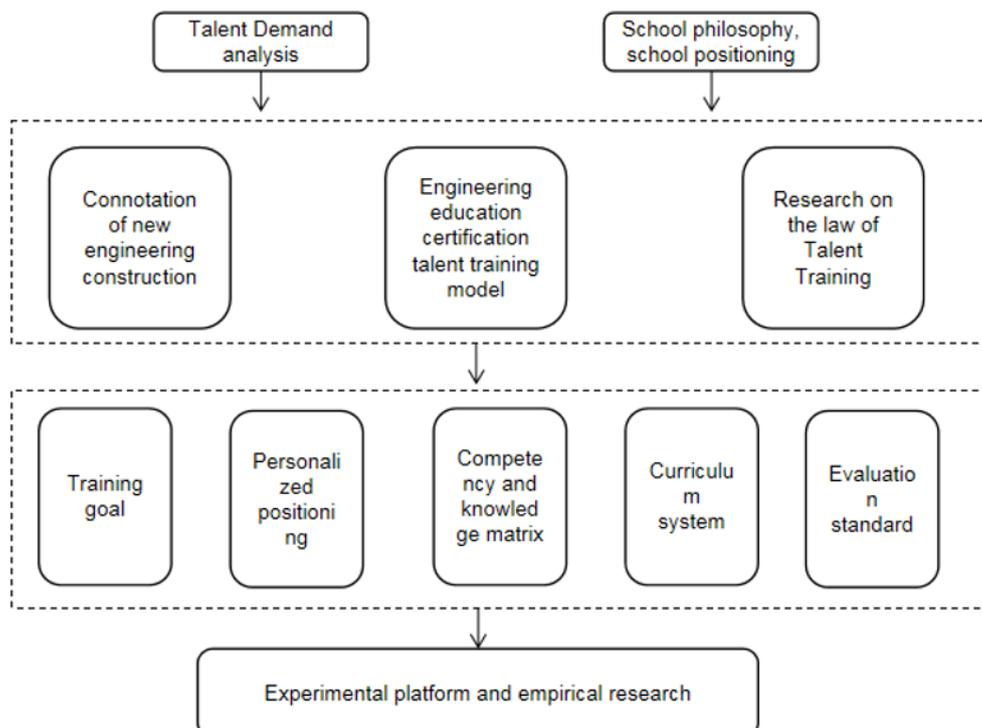


Fig 1 Research idea

are designed in detail, the supplementary standards of engineering education accreditation are analyzed, and the personalized curriculum system is set, then, the personalized talent training objectives, training standards and implementation links or approaches, as well as the evaluation method of curriculum weight are studied. Finally, a humanized talent training program for new engineering is formulated and an empirical study is carried out. The specific research ideas are shown in Figure 1

3.2 To construct individualized matrix of graduation requirement and ability, quality and knowledge

According to the general standards and supplementary standards of engineering education certification for rail transit majors [7], firstly, the graduation requirements in the individualized talent training program for rail transit operation management should be planned, such as being able to apply mathematics, natural science, engineering foundation and professional knowledge to solve professional complex engineering problems. Be able to apply the basic principles of mathematics, natural science and engineering science to identify, express and analyze professional complex engineering problems through literature research to obtain effective conclusions. Secondly, I designed the corresponding knowledge, ability and quality under each graduation requirement (as shown in Table 1), such as having a solid foundation of mathematics and other relevant natural science knowledge; Master the basic theory and knowledge of operations research, management, transportation organization, etc. On this basis, in the future teaching practice to constantly improve the graduation requirements and ability, quality and knowledge matrix.

3.3 Set up a personalized curriculum system

Based on the above personalized graduation requirements and ability, quality and knowledge matrix, the corresponding curriculum system is set up to realize the ability, quality and knowledge through the teaching of specific courses. When planning curriculum system, based on engineering education accreditation track traffic engineering supplement standard and national standard of teaching quality, starting from this professional training objectives, to formulate regulations and policy, operations research, transportation, urban rail transit planning and design of management, introduction to rail transit, transportation equipment, traffic safety, transportation, commerce, transport economics, transportation hub station and design and management information systems at the core of this professional course. Then, combining with the objective of individualized talent cultivation of new engineering, the course modules of individualized talent cultivation (theory course and practice course) are planned. In combination with the personalized talent training objectives, this paper focuses on the setting of multiple personalized development direction selection course modules to meet the needs of personalized

development of students, such as urban rail transit passenger flow analysis, road network planning and design, operation management control and emergency response and other directions to set up a number of personalized training course modules.

TABLE 1 GRADUATION REQUIREMENTS RELATE TO KNOWLEDGE, ABILITY AND QUALITY

Graduation requirements	Knowledge, ability, quality
Engineering knowledge	Solid knowledge of mathematics and other related natural sciences
	Knowledge of mechanics, electrotechnics and electronics etc
	To master the basic theories and knowledge of operations research, management, transportation organization, etc
	Learn to use computers to analyze and solve problems of thinking, master the basic methods of programming
Problem analysis	It can apply the basic concepts of mathematics and natural science to engineering problems and establish correct mathematical models
	Ability to analyze and solve practical engineering problems using mathematical and other related natural science theories and methods
	Master general optimization methods and basic techniques of computer application in professional field
	Ability to solve practical problems with computers
Design/develop solutions	Master the basic theories and methods of urban rail transit major
	With drawing, engineering mechanics, electronics, computer and other interdisciplinary knowledge structure
	Be able to express, analyze and solve practical problems of rail transit operation and management with professional engineering basic theory
	Understand the important laws, regulations, social, economic and management elements involved in the production, design, research and development activities related to rail transit, and understand their guidelines, policies and regulations

3.4 Establish a multi-evaluation system of each link in the whole process of personalized talent training

In order to dynamically adjust the training objectives and graduation requirements as well as the ability, quality and knowledge matrix, it is very important to supervise the teaching quality of courses and establish the evaluation system of each link in the individualized talent training program. The matrix structure of "training objective - graduation requirement and its index - course" is established, the weights of evaluation items are determined by analytic hierarchy process, and each link of teaching process is quantitatively evaluated by fuzzy

theory. A "trinity" evaluation body composed of schools, employers and students is constructed, and a web-based teaching quality or training quality information platform is built around the teaching process and the training quality of graduates.

According to the characteristics of rail transit industry and specialty, the evaluation of students' individual ability is emphasized, and a flexible and diversified evaluation mechanism is established. In the aspect of practical teaching, it pays attention to the evaluation of students' ability of analyzing and solving problems.

In addition to internship and experiment report, evaluation standards should be gradually established based on process control and completion effect of project implementation. In the comprehensive quality evaluation, it emphasizes the coordination between various departments, upper and lower communication, overall planning, emergency response, teamwork, language and writing expression, etc. , while attaching importance to the evaluation of language civilization, code of conduct, appearance and etiquette, self-discipline and so on.

3.5 Other aspects

Attention should be paid to students' vision design and employment guidance in the early stage of enrollment. Therefore, special attention should be paid to the teaching of introduction to major and career planning. Through the study of this course, students can make clear their career goals and determine the direction of their study and efforts in the university, so that they can fully consider their future employment direction when choosing elective courses. Students are required to pay close attention to the national economic situation and policy development trend, understand the employment situation and development space at home and abroad, be oriented towards social employment, and timely adjust relevant courses.

Reform the teaching of practice course and establish the incentive mechanism to guide students to carry out active practice. Active practice teaching enables students to lay a good theoretical foundation through "confirmatory experiment", enlighten students' innovative thinking through "designed experiment", and improve students' personalized innovation ability through "comprehensive experiment". For example, the practice course, a change in the previous practice centered on concentrated practice, consciously choose a variety of time periods, locations scattered practice;The theme, content and method of decentralized practice are proposed by students or study groups themselves, and determined by teachers after revision and improvement. During the internship, teaching activities were carried out centering on strengthening students' knowledge, abilities and qualities such as applied mathematical model, big data analysis and operation and research principles.

To strengthen the utilization of existing resources and the development of potential resources, for example, in the graduate resources of our university, it is urgent to establish the employment contact channel for graduates, and to use graduates to establish and improve the information exchange channel between employers and

Alma mater, so as to understand the industry's personalized demand for talents. Invite graduates back to Alma mater to analyze and discuss the implementation effect/results and typical cases of the major from time to time;To introduce the latest achievements, technologies and methods of the industry as conditions permit;The existing teaching content is supplemented or updated in the form of supplementary materials to form an environment conducive to the cultivation of personalized innovative talents.

4 PRACTICE SOLUTIONS

The individualized talent training program has been implemented in schools, the preliminarily constructed multiple evaluation system of individualized talent training process is also gradually being applied or tested, and the syllabus of each course is being formulated or improved. At present, the major of rail transit has become the specialty with local characteristics of our school, and the major of transportation and Rail transit signal and Control has been rated as the provincial first-class major. The project team will focus on strengthening the construction of the internship base, graduate resources and evaluation system platform during the construction. In a word, the above-mentioned countermeasures are carried out in this major to verify the feasibility and correctness of the scheme.

5 CONCLUSION

We should take students as the center and carry out effective teaching and graded management according to their individual characteristics. We should forge ahead with determination and have the courage to innovate, and constantly explore the cultivation mode of personalized talents under the new engineering background of rail transit major. We should be guided by students' learning outcomes and continuously improve the personalized talent training model. We should take the new engineering construction as an opportunity to promote the continuous improvement of students' comprehensive knowledge, quality and ability.

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