

Research on the Training Path of Water Transportation Professionals Based on the Background of Innovation and Entrepreneurship

Jianming Sun^{1,a}, Renqiang Wang^{1,b}, Jingdong Li^{1,c},
Longsheng Wang^{1,d}, Yue Zhao^{1,e} and Hua Deng^{1,f}

¹ College of Navigation Jiangsu Maritime Institute Nanjing, China

^a CDW6015@163.com; ^b wangrenqiang2009@126.com; ^c 845397376@qq.com;

^d 18951792278@163.com; ^e zhaoyue126@126.com; ^f denghua5852@163.com

Keywords: Engineering education; Water transportation; Innovation and entrepreneurship; Talents

Abstract. With the development of social economy, the development of the entire transportation system requires transportation professionals with innovative capabilities. By analyzing the characteristics of transportation majors and the training characteristics of related universities, according to the experimental teaching principles and positioning of transportation majors, combined with the training objectives, the transportation professional practice and experimental teaching system aiming at enhancing experimental teaching are constructed and designed separately. Professional basic experiments, professional skills experiments, comprehensive design experiments, and innovative research experiments in transportation majors enable students to receive sufficient practical training during their school years to improve their comprehensive and innovative abilities.

Introduction

The development of higher engineering education in China has a history of nearly one hundred years, and has established a basic and complete engineering education system with multiple levels, multiple forms and complete disciplines. With the promotion of relevant government departments and relevant non-governmental organizations, the engineering education professional certification work has been gradually carried out and implemented in universities, and a comprehensive consensus has been reached on establishing and perfecting an internationally equivalent engineering education professional certification system. Promoting the certification of engineering education is of great significance to deepening China's engineering education reform and the cultivation of innovative and entrepreneurial talents. On the basis of further improving the quality of engineering education, it can establish an organic connection mechanism between universities and enterprises, improve the adaptability of engineering education to the cultivation of innovative and entrepreneurial talents, and finally achieve the purpose of further deepening undergraduate teaching reform and comprehensively improving teaching quality. Based on the analysis of the characteristics of transportation professionals, this paper proposes the training path of innovative transportation engineers from the aspects of training specification and syllabus, curriculum system reconstruction, professional curriculum teaching model reform, and school-enterprise cooperation education.

The Understanding of the Concept of Transportation Engineering

Engineering Knowledge

Through the cultivation and integration of science, technology, management, commerce, humanities and other fields, students should comprehensively improve their professional skills and comprehensive quality, and cultivate the ability to solve practical problems through multidisciplinary methods. Natural sciences, engineering foundations and expertise are essential in modern engineering education. Students should also be fully aware of the knowledge of humanities and social sciences and economic management knowledge, so that they have good engineering thinking, engineering culture and humanistic spiritual qualities, and master the methodology of

economic analysis and management decision-making. In terms of professional knowledge, it is necessary to combine the characteristics of transportation engineering disciplines with the characteristics of school running, and clearly and highlight the cultivation of “core professional knowledge”. Under the trend of “integrated transportation, smart transportation, green transportation, and safe transportation”, it is necessary to jump out of the traditional professional education perspective of single transportation mode, and let students master the “big transportation” through the “fence stone” education of common professional knowledge. The basic concepts, theories and methods, through the “top stone” education of special professional knowledge, enable students to grasp the specific characteristics of a certain mode of transportation and understand the frontiers of industry development.

Engineering Ability

Engineering ability training should be guided by engineering practice and innovation ability, emphasizing basic engineering ability such as lifelong learning, value judgment, social coordination and communication and cooperation, as well as the cultivation of comprehensive engineering ability such as critical thinking, innovation and entrepreneurship, international exchange and cooperation and crisis response. This is a must-have for modern engineers and engineers of excellence, and it is also a goal that traditional education often ignores. In terms of professional competence, it is necessary to combine the requirements of talents in the transportation industry and science and technology development, clearly and highlight the cultivation of “core professional competence”, and strengthen practical ability requirements such as engineering planning, design, implementation, and analysis.

Engineering Literacy

The cultivation of comprehensive qualities such as engineering spirit, engineering consciousness, human body and mind should be emphasized, reflecting the needs and expectations of modern society for the comprehensive development of excellent engineers. Patriotism, hard work, truth-seeking and pragmatism, and the pursuit of excellence are the concentrated expression of the quality of outstanding engineers. Innovative awareness, humanistic awareness, overall awareness, benefit awareness, safety awareness, service awareness, quality awareness, environmental and sustainable development awareness, occupational health awareness, etc., are the modern engineering consciousness qualities that excellent engineers should possess. Humanistic physical and mental literacy is the spiritual strength and basic conditions that support the future development of college students.

The Significance of Innovation and Entrepreneurship Background in the Training of Transportation Professionals

Clarify the Training Target of Transportation Professionals

The core concept of engineering education professional certification for talent training is output-oriented, and its focus is on the cultivation of students' engineering practice ability and knowledge application ability. Therefore, the training goal of innovative and entrepreneurial talents in transportation should be based on the cultivation of professional talents with professional skills to meet the current development needs of the society. Secondly, to cultivate entrepreneurial talents with innovative capabilities as the core, to meet the needs of society. Continue to develop the demand for talented people with core competencies.

Put Forward New Requirements for the Training of Transportation Professionals

At this stage, the engineering education major's 10 certification standards for graduate students focus on two abilities in terms of talent cultivation, namely the ability of engineering practice and the ability to comprehensively apply multidisciplinary knowledge. From this perspective, higher education needs to change from the traditional “what the teacher can teach” to the “what the students can learn”. Higher education should take the relevant work of students after graduation as the guiding direction, formulate talent training programs for transportation professionals to adapt to future work needs and social development, and thoroughly implement student-centered design teaching programs and implement teaching activities.

Promote the Training of Transportation Professionals and the World

The engineering education professional certification has achieved mutual recognition between the graduates of the countries and their institutions, which greatly promotes the international exchange of students from higher education institutions. Under the standards of engineering education professional certification, the qualifications of China's transportation major graduates can be recognized by foreign universities and foreign companies, which will promote the international flow of college graduates in China.

The Status Quo of Practical Teaching of Transportation Professionals Training

The Practice Link is Too Narrow

The original practice link is in line with the professional ideas and training objectives and specifications of automotive application engineering. The main problem is that the practice link is too narrow, mainly based on mechanical and electronic, with vehicle use and maintenance as the main line, and the whole practical teaching system is based on this. The widening of the new transportation professional discipline will inevitably require the addition of experiments and internships that are compatible with new and broadened knowledge such as transportation organization and transportation planning.

The Practice Content is Backward

The practice content is restricted by factors such as capital, equipment conditions, and practice base, and there is still a lack of advancement and effectiveness. The development of automotive technology is changing with each passing day. The application of electronic and computer control technology in automobiles is very deep and extensive. Hyundai has become a high-tech product combining machine, electricity, gas and liquid. However, most of the current experiments and internships still lie in the experiments of automotive products based on mechanical systems, such as the experimental course of the internal combustion engine principle, the automobile disassembly experiment corresponding to the automobile construction course, the automobile performance experiment corresponding to the automobile application course, and the corresponding automobile maintenance course. The testing experiments corresponding to the maintenance experiment, automobile diagnosis and testing technology course, most of the equipment used are for the mechanical system of the automobile, and there are few devices capable of detecting the electromechanical integration system of the modern automobile. This requires that the practice should shift from the experiment and practice of traditional cars to the experiments and internships based on modern high-tech automotive products.

Students' Autonomy and Creativity are not Fully Realized.

Since the equipment resources used in most experiments and internships are large-scale equipment, cars and engines are used, and the laboratory equipment is limited. Therefore, it is difficult to carry out experiments and internships during the limited hours of the experimental class. Most of the experiments stayed in the state of the teacher's presentation and the students' observations. This kind of passive practical teaching method is difficult to achieve the purpose of practical teaching. Practical teaching requires the students' subjective initiative, emphasizing students' hands-on and brainstorming, allowing students to define their goals and tasks, understanding the transportation industry's needs for their own abilities and qualities, and clarifying the knowledge and skills they need to master and maximizing students.

The Management System of Laboratory Practice Teaching is Imperfect

Laboratory construction should solve the current lack of experimental vitality and self-development. At present, laboratory management has a phenomenon of disconnection from scientific research. The main body of teaching and research is not integrated into the construction and development of laboratories, but mainly by laboratory personnel to maintain daily operations. A laboratory construction development model integrating teaching, scientific research and experimentation should be established. The laboratory provides resources and conditions for teaching and scientific research, and teaching and scientific research drive the development of

laboratories. To solve this problem, we should first carry out the reform of the management system and establish a number of entities that integrate teaching, research, and experiment. Each entity is responsible for the planning, construction, and daily life of the relevant experimental links in accordance with the scope of its own teaching and research. Only in this way can we solve the problem of insufficient laboratory vitality and disconnection from teaching and research. At the same time, laboratories should be gradually open to students, teachers and society.

To Train Reform Proposals for Innovative Transportation Talents

Innovative Training Requirements at Different Levels of Training Mode

Innovative talents in transportation industry not only require a solid professional foundation, outstanding professional features, but also meet the needs of different levels of talent. Part of the undergraduate graduates will go to the practice of social production, serve all kinds of enterprises and institutions, and some will continue to further study. In the end, some will enter the scientific research field, so the requirements for different graduates will be different. Therefore, to cultivate the innovative ability of different types of talents, a hierarchical training program should be set up so that the employed students can meet the requirements of different enterprises and institutions for talents. Students who continue their studies can have strong research capabilities and good scientific research. In order to achieve a hierarchical training goal, it is necessary to adopt a self-selected mode based on professional modules and hierarchical modules.

The Differentiation of Practical Ability Training

The practical ability of students who are employed and those who continue to pursue further studies must also be differentiated. For the students who are employed to strengthen the cultivation of social practice ability, encourage them to participate in entrepreneurial projects, and develop their ideas. For students who continue to pursue further studies, strengthen the cultivation of scientific research capabilities, encourage them to participate in research projects, master computer programming methods, and strengthen mathematics courses. For the practical teaching link, the corresponding selection module should also be set.

Strengthen the Whole Process of Student Guidance

First of all, the implementation of innovative talent training ideas from the first-year freshmen. The students who just entered the school have a very shallow understanding of the profession. Even if they have enrolled in education, they still cannot form a deep understanding. Most of the students have no idea about their future development. Therefore, in the first semester after the first year of enrollment, a professional introductory course is offered, on the one hand, comprehensively introduces the professional situation, on the other hand, urges students to think about their future development direction and establish appropriate goals. Secondly, a questionnaire survey can be conducted for first-year students to determine what kind of guidance they need, in which direction, etc., and to adjust the training plan for each level of students accordingly. Again, professional teachers should give adequate guidance when students choose their professional direction and future direction. In order to avoid blind choices, students should set options in modules.

Innovative Teaching Methods and Teaching Process

In terms of teaching methods, we actively carry out innovative teaching research and explore various effective teaching methods and methods that are flexible and three-dimensional. Break through the traditional mode of knowledge transfer and explore the teaching mode based on ability development. While teaching basic knowledge, the theoretical curriculum strives to incorporate the latest scientific research results into classroom teaching. Practical course teaching emphasizes the use of comprehensive knowledge and skills.

Conclusion

Under the background of the era of innovation and entrepreneurship, the continuous development of the transportation industry, the training mode, curriculum system and teaching content of the transportation major have also undergone the same adjustment, and thus committed to cultivating high-end and professional talents for urban development. Based on the analysis of the existing transportation professional training programs in colleges and universities, this paper discusses the innovative talent training mode of transportation majors, and puts forward some corresponding reform proposals, aiming at cultivating professional talents with innovative ability to contribute ideas. The development of the transportation industry contributes to the progress of society.

References

- [1] Andersson, Martin. Start-up rates, Entrepreneurship Culture and the Business Cycle. Swedish patterns from national and regional data[J]. Papers in Innovation Studies, 2013.
- [2] Massis A D, Kotlar J, Cassia L. How do family firm CEOs perceive their competitive advantages and disadvantages? Empirical evidence from the transportation industry[J]. International Journal of Entrepreneurship & Small Business, 2013(19):167-189.
- [3] Tamasila M, Taucean I, Albulescu C T. Entrepreneurship Education at Politehnica University of Timisoara, Romania[C]// Managing Intellectual Capital and Innovation for Sustainable and Inclusive Society: Managing Intellectual Capital and Innovation; Proceedings of the Makelearn and Tiim Joint International Conference. ToKnowPress, 2015.
- [4] Tamasila M, Taucean I. Entrepreneurship Education at Politehnica University of Timisoara, Romania[J]. Claudiu Albulescu, 2015.
- [5] Mumuni E, Oladele O I. Access to livelihood capitals and propensity for entrepreneurship amongst rice farmers in Ghana[J]. Agriculture & Food Security, 2016, 5(1):1.
- [6] Kulińska, Ewa, OdlanickaPoczobutt, Monika. The Practical Aspects of Local Development of Entrepreneurship and Innovation in Travel Companies[J]. Foundations of Management, 2017, 9(1):7-24.
- [7] Yu X. Research on Reducing the Cost of Innovation and Entrepreneurship in Shanghai[J]. Scientific Development, 2016.
- [8] Huo W, Li C, Wang M. Thoughts on the Planning of Characteristic Towns Drove by Innovation and Entrepreneurship in Zhejiang Province——Combined with the Survey of Characteristic Towns[J]. China Ancient City, 2017.
- [9] Liang J, Fan S, Shi H, et al. Thinking and Exploration of Innovative Education in Oil and Gas Storage and Transportation Engineering in Guangxi[J]. Guangdong Chemical Industry, 2016.
- [10] Wei L, Wei Y. Information System Construction and Statistical Analysis of Innovation and Entrepreneurship Education[C]// International Conference on Intelligent Transportation, Big Data & Smart City. IEEE Computer Society, 2016:443-447.
- [11] Wang Y. Development and Implementation of Innovation and Entrepreneurship Project Management System for College Students[C]// International Conference on Intelligent Transportation, Big Data & Smart City. IEEE Computer Society, 2018:504-507.
- [12] Ling X, Shi Q. Research and Practice of Innovation and Entrepreneurship Education for Oil and Gas Storage and Transportation Engineering[J]. Guangdong Chemical Industry, 2017.
- [13] Liu W, Jin L S, Tang B, et al. Research on the Cultivation Mode of Undergraduates Based on Innovation and Entrepreneurship Education[J]. Education Teaching Forum, 2017.
- [14] Mcphee C, Saurabh P. Editorial: Innovation and Entrepreneurship in India (January 2018)[J]. 2018, 8(1):3-4.