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Preliminary Exploring the Construction of Application-oriented Universities under the Background of Emerging Engineering

Chonggang Ren[1,*], Bingchuan Bian[1], Jicai Yin[1], Peng Guo[1]

[1]College of Mechanical and Architectural Engineering, Taishan University, Tai'an, China
[*]Corresponding author: rencg@tsu.edu.cn

Abstract: *Currently, the country is vigorously developing applied undergraduate education. The construction of application-oriented university plays an important role in the national development strategy. They provide key support for the country's economic, social and scientific and technological development. They are an important part of the national innovation system, and help to improve the country's comprehensive competitiveness and sustainable development. This paper explores the content, methods and strategies of application-oriented university construction under the background of emerging engineering from the aspects of talent training, specialty construction, curriculum setting, laboratory construction, school-enterprise cooperation, teaching and research, graduation design, etc. It is an important attempt to build an application-oriented university under the background of emerging engineering, and it has certain reference significance for the construction of other local universities.*

Keywords: *Application-oriented university, Practical talents, Talent training, Specialty construction, School-enterprise cooperation*

1. Introduction

Application-oriented university play an important role in the national development strategy. The orientation of an application-oriented university is to emphasize practice and vocational training, which provide students with practical skills and knowledge, and cultivate students' practical ability and innovation ability, so as to meet the needs of the society for practical talents[1,2]. Application-oriented universities should actively work with industry, businesses and communities to ensure that education is closely connected with the actual work environment. Education courses should be kept in step with industry trends and needs. Application-oriented universities should also encourage the cultivation of innovation ability to help students become more creative in solving practical problems. Therefore, the construction of application-oriented universities needs to comprehensively consider the balance of academic and vocational education to meet the needs of the society and the market. This paper will summarize the experience of application-oriented university construction from the following aspects.

2. Construction Content

2.1. Talent Training

Applied universities emphasize the cultivation of applied talents who are closely combined with practical work. The goal of application-oriented universities is to cultivate high-quality applied talents with innovative spirit and practical ability. In order to achieve this goal, the college has established a student-centered education model, focusing attention to cultivating students' independent learning ability, practical ability and innovation ability. In addition, it also pays attention to cultivating students' comprehensive quality, such as teamwork ability, cross-cultural communication ability, etc. In the teaching process, teachers pay attention to cultivating students' practical ability, and guide students to participate in practical activities, and improve students' practical level. Therefore, we should pay attention to how to innovate teaching methods, including case teaching, practice teaching, project-driven, etc., so as to improve students' practical operation ability.

Case teaching method is to let students face real problems through practical cases, and cultivate their ability to analyze and solve problems. This teaching method can better combine the theoretical

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knowledge with the practical situation. Project-driven teaching is to let students develop teamwork, communication and leadership in the process of solving practical problems through team project cooperation. This teaching method is helpful to cultivate students' innovative thinking and practical application ability.

Applied university talent training pays attention to practical teaching, emphasizing practical operation and field practice, in order to improve students' practical operation skills. Practical teaching can include experimental courses, practice, project practice and other forms, so that students can accumulate experience in the actual work scenarios. The talent training of application-oriented universities should focus on how to establish practical application-oriented teaching quality standards, and ensure that the course content, teaching methods and evaluation system match the actual career needs. First of all, the quality of teachers should be evaluated and improved, including professional knowledge, teaching experience, industrial experience, etc. The quality of the teacher team is directly related to the quality of teaching, so the standardized standard of teachers is very important to ensure the quality of teaching. Secondly, innovative teaching methods and standards should be encouraged, which helps to cultivate students' innovative thinking and practical application ability. Finally, an effective evaluation and feedback mechanism should be established to ensure timely understanding of students' learning progress and provide targeted feedback. This helps students to better adjust their learning strategies. In general, the research on talent training in application-oriented universities aims to make education more in line with the actual needs of the society and cultivate professionals more suitable for career development.

2.2. Specialty Construction

Specialty construction is the core of application-oriented university construction. In order to ensure that the professional Settings meet the needs of the industry, keep close to the actual application, and cultivate students' practical operation ability and innovative spirit. According to the social needs and the industry development trend, the school will timely adjust and optimize the specialty settings to meet the changing market demand. College has successfully applied for the intelligent manufacturing engineering major. The college strengthens the construction of specialty courses, and improves the practicability and pertinacity of the major, and formulates the talent training program in line with the specialty certification of engineering education, and connects with the local regional economic development. The college summarizes the direction of the talent training program, and condenses the direction of power transmission and transformation equipment, construction machinery, Taishan homestay and other characteristics.

Professional construction should realize interdisciplinary integration, so that students can possess the knowledge and skills of different subject fields. This helps to cultivate professionals with strong comprehensive ability and various qualities. Professional construction should introduce international elements, so that students have the ability of cross-cultural communication and cooperation. This includes the introduction of international courses and the opening of bilingual courses. We should establish an effective professional evaluation and adjustment mechanism, and constantly optimize the professional construction through the evaluation of the curriculum setting, teaching methods and practical links of the professional, to ensure that it keeps pace with The Times. The goal of these studies is to establish a set of scientific and practical professional construction model, so that the majors of application-oriented universities can meet the development needs of the society and the industry, and cultivate high-quality professionals to adapt to the career development.

2.3. Curriculum Setting

Application-oriented universities pay attention to cultivating students' practical application ability, so the setting of professional courses emphasizes practicality. In terms of curriculum setting, it closely focuses on social needs and industry development trend, and pays attention to the cultivation of students' practical ability and innovation ability. We should strengthen the setting of practical courses, such as experiment, practice, practical training, etc. So that students can master professional knowledge in practice. We should focus on how to combine theoretical knowledge with practical application through course design, so that students can gain practical operation and problem-solving experience in the learning process. In addition, it also pays attention to the cohesion and integrity between courses to avoid the phenomenon of duplication and disconnection of courses. Applied universities usually require students to have interdisciplinary knowledge and skills. Therefore, how to realize the integration of different disciplines in the curriculum, cultivate students' comprehensive ability, so that they can solve practical problems when using all aspects of knowledge should be done. Applied universities emphasize

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cultivating innovative spirit and entrepreneurial ability.

The research should focus on how to integrate innovation and entrepreneurship elements into the curriculum and cultivate students' innovative thinking and practical operation ability. With the rapid development of information technology, the research also focuses on how to make full use of information technology in the curriculum, improve the teaching effect, and cultivate students' information literacy and technology application ability. The course construction of applied universities should also focus on online education and distance practice. We provide high-quality teaching resources through online education platforms for students from different regions or industries. At the same time, remote practice has also become a teaching method, so that students can apply what they have learned in practical work. These studies can help to optimize the curriculum setting of application-oriented universities, so that they can better meet the needs of the society and the industry, and cultivate high-quality talents with practical application ability.

2.4. Laboratory Construction

Research of applied universities in laboratory construction usually focuses on improving the practicability of laboratory facilities and resources to better support the practical training of disciplines and specialties. Laboratory construction is an important part of the construction of an application-oriented university. Laboratory construction should be based on according to specialty needs. That should be rationally configured with experimental equipment to improve the practicability and advanced nature of the laboratory. At the same time, the laboratory should strengthen the management to ensure the safety and effectiveness of the experimental equipment. Applied universities usually require students to have interdisciplinary knowledge and ability. Therefore, research should focus on how to build interdisciplinary laboratories, promote cross-cooperation among different majors, and improve students' overall literacy.

Laboratory construction should simulate real application scenarios and improve students' problem-solving and practical application ability. This may include building a practical working environment related to the industry. Laboratory construction needs to be combined with practical courses to enable students to consolidate their theoretical knowledge in practical operation. Laboratory teaching should be connected with the relevant courses to form a complete practical teaching system. Modern laboratory construction not only focuses on the traditional experimental equipment, but also needs to integrate information technology, such as virtual experiments, the digital processing of experimental data, etc. Research should focus on how to use information technology to improve the effect of laboratory teaching. Laboratory construction should also pay attention to the management and safety of laboratories, including the maintenance of laboratory equipment, standardization of laboratory operation process, establishing safety management system, etc. These studies can help to improve the quality and efficiency of applied university laboratories and ensure that the laboratories can better support students' practical application skills. Since the university became one of the first application-oriented universities in Shandong Province. The college has successfully applied for the intelligent manufacturing and digital twin laboratory.

2.5. School-enterprise Cooperation

School-enterprise cooperation is an important way to build application-oriented universities. The college pays attention to the practicality and pertinacity of the major, and establishes a close industry-university-research cooperation mechanism to meet the needs of the development of the industry. The college actively cooperates with enterprises, and has successively established the school-enterprise cooperation direction of industrial robots of Mechanical manufacturing and its automation major with Shuanghui Intelligent Technology Co., Ltd, and built intelligent power transmission and transformation equipment direction of intelligent manufacturing engineering major with Taikai Group. We work together with enterprises to develop practical talent training programs, to provide more practical opportunities for students[3]. At the same time, the college strengthens the construction of the teaching staff, and pays attention to the cultivation of teachers' practical ability and innovation ability. The college sends teachers to enterprises for temporary training, and establishes a mechanism of close contact between teachers and the industry to improve the professional level and practical ability of teachers, to ensure that teachers' professional knowledge and skills can meet the needs of social development.

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2.6. Teaching and Research

The goal of teaching research in application-oriented universities is to improve the teaching quality, promote the development of subjects and cultivate students' practical application ability. The teaching research of application-oriented universities should pay attention to the reform and innovation of teaching methods and teaching content. In terms of teaching methods, a variety of teaching methods, such as case teaching, discussion teaching, project teaching, etc., are adopted to meet the learning needs of different students.

In terms of teaching content, the teaching content should be updated in time according to the development trend of the industry and social needs, so that students can master the latest professional knowledge and skills. Application-oriented universities emphasize the cultivation of innovation and entrepreneurship ability, and teaching research should focus on how to integrate innovative elements into teaching to stimulate students' creativity and entrepreneurial spirit. Teaching research should focus on the effective integration of information technology, including online education, virtual experiments, remote collaboration, etc., to improve the teaching effect and students' digital literacy. Teaching research should establish a scientific education evaluation system, monitor and evaluate the teaching effect, ensure the teaching quality, and provide data support for the teaching improvement. Teaching research should also pay attention to how to strengthen educational scientific research, promote discipline construction, and promote the interactive development of academic and teaching. All these studies will help application-oriented universities to continuously improve their teaching models, adapt to the development of the society and the industry, and cultivate high-quality talents more in line with their practical needs.

2.7. Graduation Design

The research on the graduation design of application-oriented universities mainly focuses on how to cultivate students' practical application ability, problem-solving ability and innovative and entrepreneurial spirit through the graduation design. Therefore, we should integrate the actual projects into the graduation design, and cultivate students' problem solving and practical operation ability through real project experience. We should strengthen the cooperation between the school and the industry to make the graduation design more close to the actual needs. At the same time, study the guiding role of the tutor in the graduation design to improve the design level of students. We should promote cross-cooperation in different professional fields through interdisciplinary design and cultivate students' comprehensive literacy.

We should guide students to pay attention to innovation and entrepreneurial thinking in their graduation design, and cultivate their innovative and entrepreneurial ability. We should pay attention to the training of students' practical skills, so that they have the ability to adapt quickly in the workplace. We should establish a scientific graduation design evaluation system, to ensure the quality of the graduation design, and to provide a reference basis for the school to improve the teaching. We should guide students to pay attention to social issues, cultivate students' sense of social responsibility and the sense of contribution to social development. These studies are conducive to continuously optimizing the graduation design system of application-oriented universities, so that they can better serve the cultivation of students' comprehensive literacy and social needs.

3. Conclusion

To sum up, the construction of application-oriented university is a system engineering, and is an important part of national innovation system. It has an important position in the national development strategy. It is necessary to build in many aspects from talent training, specialty construction, curriculum setting, laboratory construction, school-enterprise cooperation, teaching and research, graduation design and other aspects. Only by strengthening practical teaching and improving students' practical ability[4], can we better meet the social needs for practical talents, and provide various support and contributions for the country, and promote the country's economic and social development, and improve the country's comprehensive competitiveness and sustainable development.

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