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Research on the Construction Strategies of Micro Majors in Engineering in Universities under the Background of Sustainable Development and Carbon Neutrality

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Abstract: The rapid change of global climate and environmental deterioration and other factors make environmental problems increasingly prominent, to achieve "sustainable development and carbon neutrality" has become the focus of global hot discussion and the main goal. Based on this, strengthening environmental education and training is particularly key to the construction of engineering micro-majors in colleges and universities. Under the national dual-carbon development strategy of "carbon peak, carbon neutrality," micro-majors focus on talent cultivation as the benchmark and become the best way to solve the employment difficulties of students and enterprises. There are still some problems in the construction of engineering micro-majors in colleges and universities. It is necessary to provide support through educational resources, talent cultivation and major construction to further enhance the enthusiasm of professional teachers to participate in discipline construction to help colleges and universities get rid of the dilemma of major construction through teaching mode construction based on the needs of industry, and help the sustainable development of micro-majors.

Keywords: Sustainable development and carbon neutrality; Engineering; Micro major construction

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1. Introduction

Under the background of "sustainable development and carbon neutrality" in the new era, the construction of engineering micro-majors in colleges and universities is quite important. This paper focuses on the problems existing in the construction of micro-major, and then analyzes the new demands and reform paths of micro-major construction under the goal of "carbon to peak carbon neutrality." Micro-major construction is the main path of industrial design curriculum construction and talent cultivation [1]. Based on the background of "sustainable development and carbon neutrality," this paper provides references for the construction of education resources,

curriculum system construction, teaching model construction and ecological research of engineering design micro-major [1]. This paper aims to help the development of discipline education, and then provide the necessary talent reserve for the realization of the goal of "carbon peak carbon neutrality," which has important theoretical value and practical significance for the reform and practice of the construction of engineering micro-majors [2].

2. The existing problems in the construction of engineering micro-majors in universities

The construction of micro-major in engineering colleges and universities should effectively meet the needs of the industry and set the name of the major on this basis. Ideally, the curriculum construction is centered around the front-line technical personnel of the enterprise, and they participate in the teaching activities throughout the whole process [3]. Strict requirements are put forward for financial security, site equipment, and enterprise enthusiasm. Due to the limited amount of funding in colleges and universities and the small number of outstanding alumni or social donations, the construction of engineering micro-majors is bound to face development difficulties, which are mostly reflected in the aspects of talent demand research, curriculum setting, teacher team, enterprise support and management system [4].

2.1. Based on talent demand research

The process of setting up micro-majors in colleges and universities is similar to that of other professional activities, which requires participation by enterprises and relevant colleges. Investigate and fully explore the potential sources of students, talent needs, teaching staff and other educational conditions. The basic characteristics of micro-majors are that each course is concise and concise, and different chapters and contents are precisely divided, which is closely related to the internal production and research and development of enterprises [5]. Without strengthening the internal investigation of the enterprise, the lack of in-depth exploration of the product research and development process, key technologies and technological evolution and other trends, it is difficult to set up a reasonable micro-major course. As far as the current situation is concerned, the research demand for micro majors in Chinese colleges and universities is not sufficient, and the formalization phenomenon is serious. All kinds of problems in the construction of micro majors are derived from insufficient research on talent needs [6].

2.2. Course content setting

Due to insufficient research on the needs of professional talents, many micro-professional courses are contrary to traditional professional teaching. The common practice is to select a few professional courses or cross-professional courses from the existing talent training programs, which is characterized by the fact that the course content is rarely innovative, most of the course names and class hours are modified, the teaching place is mostly in the classroom or the laboratory, the teaching form is mainly based on theory imparted and experimental demonstration, and the on-site teaching required by the professional setting tends to be more formal [7]. The combination of micro-major course content and industrial demand is too little and superficial, which is contrary to the purpose of micro-major construction. The main difficulty in the course setting of micro-major is that the teaching content is not targeted at the needs of industry, and the specific contents of chapters are not implemented in all aspects of industrial needs.

2.3. Professional teaching staff

At present, the teaching tasks of micro-professional courses are almost all undertaken by teachers on campus. In the view of the interdisciplinary nature of the course, the usual practice is to arrange 3–4 teachers to teach a course together. The teachers are highly qualified and experienced, but the teaching style and course assessment are still strictly in the traditional way [8]. At present, micro-professional teaching conducted by enterprise personnel mainly focuses on lecture reports, which can indeed broaden students' horizons, but the more critical enterprise product development technology is rarely involved, and the course content derived from the latest technology of the enterprise is delivered by teachers on campus, which shows that it is difficult to achieve the goal of micro-professional talent training. In essence, micro-major requires the formation of a teaching team mainly composed of first-line technical personnel in the enterprise and supplemented by backbone teachers in the school. However, objective factors such as low-class fees make it difficult for a large number of enterprise personnel to teach in the school, and it is difficult for enterprise personnel to stimulate their teaching enthusiasm and responsibility. The dilemma of micro-major teachers is that the number of teachers and class hours are too small, and the enthusiasm and sense of responsibility are not strong [9].

3. The construction of engineering micro-majors under the background of "sustainable development and carbon neutrality"

3.1. The overall goal of construction

(1) Set development goals for innovative talents according to the needs of the industry

To create high-quality products, we need to design should be the key factor. Through continuous improvement of industrial design methods, techniques and tools, the production efficiency and quality of design results can be improved. Users should be put first, their needs should be met, and efforts should be made to improve the user experience [10]. In this way, we can move from market - and technology-driven innovation to design-driven innovation. In order to meet the needs of industrial development, the construction of industrial design micro-major must focus on cultivating talents with high-quality and compound ability, talents must have the keen observation ability of new technology and new demand, and the ability to respond quickly to market changes.

(2) The content of technology-guided discipline creates the goal of educating talents

As a subject with far-reaching influence, industrial design is constantly promoted and improved by technology. With the continuous development of technology, the teaching content is constantly updated and improved, to meet the needs of today's society for high-quality talents, making industrial design education more contemporary and innovative." The deep integration model of "art + technology" can help professional teachers better understand the structure of knowledge needs and how to effectively integrate knowledge from different disciplines. This will help students better grasp the future trends of technology and industry, thus promoting reform and innovation in professional construction.

(3) Fun-driven teaching activities optimize subject objectives

Industrial design micro-major is a necessary means to train innovative talents and construct innovative education and teaching organization forms in the field of industrial design. It can not only train talents with innovative thinking but also meet the needs of all social strata for high-quality designers. Its audience is complex and diverse, therefore, we must take more active reforms, take interest as the guide, and strengthen the adaptability and acceptability of knowledge, to achieve better teaching results [11].

(4) Resources should be integrated into professional education ecology to build scientific development goals

Through the integration of resources, the knowledge system of industrial design micro-specialty has been expanded, and the knowledge network has also been improved. This kind of integration involves learning resources of multiple majors, fields and directions so that the course can better adapt to the needs of society and profession. In addition, teacher resources have become the core of the cultivation of innovative talents, and their multi-level and multi-field integration can improve the teaching quality and enable students to better grasp the knowledge they have learned. By organically combining the three resources, the long-term development of education and teaching can be realized and a complete and efficient education ecosystem can be built [12].

(5) Practice activities to optimize the educational mechanism and construct complete goals

The curriculum of industrial design micro-major is rich, including design competition and school-enterprise cooperation courses. It aims to improve students' creative thinking, design skills and comprehensive literacy through these activities to meet the needs of enterprises for high-quality professional and technical personnel. It is committed to providing a comprehensive, effective and diverse online and offline teaching mode so that every learner can obtain sufficient knowledge accumulation and exert their potential on this basis, to achieve better career development and achieve the perfect integration of personal dream and enterprise development [13].

(6) Take ability as the center to construct discipline education system goal

The talents of industrial design micro-major must have the following professional qualities: First, they should have the thinking beyond the conventional design concept, and they should have unique design practice and flexible design thinking to meet the ever-developing market demand; Secondly, they must have the ability to design design concepts that are in line with the current reality and can play a role in actual industrial design practice given today's increasingly complex environment; Finally, we should have good communication and coordination ability, be good at grasping the market trend, and adjust the design strategy in time to meet the actual requirements of customers. Having a comprehensive technical and management ability, can help enterprises to seize the market changes brought by business opportunities, and through improvement and creation to promote the development of enterprises.

3.2. Construction ideas

At present, the development trend of industrial design micro-major has attracted the attention of all walks of life. At this stage, the development modes of micro-major include: the education mode with network education as the core, the education mode led by colleges and universities, and the education mode based on the school-enterprise linkage. The curriculum of the industrial design micro-major includes basic knowledge, professional skills, and comprehensive application. To build a perfect training system for industrial design talents, it is necessary to combine the actual situation, adopt a variety of methods, such as practical teaching, innovation and entrepreneurship, and give different solutions according to different roles, environments and cultural backgrounds. By breaking through traditional academic boundaries, exploring innovative thinking that crosses boundaries, and promote the global vision that crosses the boundaries. To clarify the focus and direction of training according to different industry needs, colleges should strengthen the reform of educational content, constantly improve the education system, and promote the reform of education and teaching. Besides, cross-border collaborative education can be promoted and the vitality of education and teaching can be enhanced [14]. Under the vision of "sustainable development and carbon neutrality," the construction of industrial design micro-

major should be based on solving existing problems, combined with the training needs of new engineering talents, and strive to achieve the goal of micro-major construction, give full play to its unique advantages to achieve better education results.

3.3. Specific measures for the construction of micro-major

(1) The construction of educational resources

Through the study of micro-major, it can be found that there are two different definitions of micro-major: one is professional, which depends on professional knowledge. The other is based on the online classroom and aims to strengthen the training of professional skills. Both definitions are based on different needs, and both are based on the results of research on target users [15]. Through cross-border cooperation, the cooperation between universities and enterprises is closer, which not only provides more abundant courses but also more effectively meets the requirements of enterprises' technology, market and talents. In addition, various social resources can be used to create a complete training center and a campus mutual aid classroom to improve the quality of the entire education system.

(2) The construction of the curriculum system

The success of micro-majors cannot be achieved without a sound curriculum system, which includes both basic knowledge and complex skills, aiming to help students better adapt to the current social requirements on skills, knowledge and ability. Industrial design should start from the whole industrial chain, and adopt fine, precise positioning, elaborate design and other methods so that micro-majors can better meet the needs of enterprises for talents. Through the construction of four micro-major course sets, namely design basis, design theory, design engineering and design practice, the aim is to cultivate comprehensive talents with unique thinking direction, and under the ever-developing market demand, through the introduction of tutor guidance, improve the comprehensive quality of students, so that they can stand out in the ever-changing market competition, and finally achieve a win-win situation with the enterprise.

(3) The construction of the teaching model

By setting up micro-majors, the change of industrial design education can be greatly promoted. In order to completely change the original passive input based on "teaching", improve students' design ability. In addition, students' design quality can be improved by setting up shared cooperative experiment room, computer room, thematic studio and so on. By adopting cross-border cooperation between campus and enterprises, combining traditional education mode with emerging Internet technology, learning resources can be better distributed and used, and the limitation of time and space can be overcome at the same time. In addition, two-way exchanges between corporate practice activities and expert reviews are also adopted to mobilize students' enthusiasm and enhance their creativity.

(4) The ecological construction of education

The educational ecological construction of industrial design micro-major is crucial to building a healthy environment for social development. It can not only promote the development of the economy and society, but also improve people's comprehensive quality, enhance the cohesive energy of the entire economy and society, improve people's ideological and moral level, and enhance the cohesive energy of the entire economy and society to achieve sustainable development of the society. Through strengthening cooperation in all aspects, such as industry, enterprises, universities, experts, teachers, etc., a complete ecology of production, study and research that integrates teaching, research and practice can be formed,

thus promoting the development of education.

4. Conclusion

The Central Committee of the Communist Party of China points out that the carbon-neutral goal includes all kinds of new energy development strategies. Under the background of "sustainable development and carbon neutrality" in the new era, the construction of engineering micro-majors in colleges and universities needs to strengthen the emphasis on professional content and gradually improve the cultivation of high-quality talents for micro-majors. Based on the advantages of teaching research and teaching in the field of micro majors, in-depth grasp of the development opportunities of micro majors education, and an analysis of the construction mode of engineering micro majors under the background of "sustainable development and carbon neutrality." Based on this, it puts forward the talent training requirements under the background of "sustainable development and carbon neutrality" and the construction advantages, construction objectives, construction ideas and specific construction measures of industrial design micro-major, to provide certain strategic support for the teaching upgrade of industrial design major in China.

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