Study and Practice of Product Design Course Construction

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Abstract: In order to better meet the professional talents training program of high-level materials forming and control technology, and adapt to the current social industry development needs, the product design curriculum is reformed. The purpose of the product design curriculum teaching reform is to enable students to apply what they have learned, to implement effective teaching for corporate positions, to closely integrate with production practices, job requirements and social services, to develop reasonable projects, to improve the efficiency of student learning, and to effectively integrate with enterprises. . Reverse engineering and 3D printing are used throughout the product design course to develop a new model for rapid development of new products, thereby enhancing the teaching effect of product design courses and achieving sustainable development of product design courses.

The 19th National Congress of the Communist Party of China was successfully held in Beijing. At the meeting, General Secretary Xi Jinping comprehensively and profoundly summarized the development process of the past five years and deployed the next five years of development. In the section "Improving the level of security and improving people's livelihood and strengthening and innovating social governance", the first thing to talk about is "prioritizing the development of education." The original report pointed out: Improve the vocational education and training system, deepen the integration of production and education, and school-enterprise cooperation. Accelerate the construction of first-class universities and first-class disciplines, and realize the connotative development of higher education. Private colleges and universities are an important part of China's higher education. With the rapid development of China's economy and society and the continuous advancement of the popularization of higher education, private undergraduate education has developed rapidly in line with the trend of the times. Private colleges and universities were only a useful supplement to public universities, but they have become an important part of China's higher education, because it has profoundly changed the structure of China's higher education concentrated in large cities, in the process of popularization of higher education in China. Played a vital role.

In response to the call for “Popular Innovation and Entrepreneurship”, it is crucial to quickly develop and design new products in the field of product design. According to the positioning and planning of the school, the material molding and control technology (3D molding direction) has been positioned to actively adapt to “Made in China” since its establishment, and is geared to the 3D printing industry in the northwest region to cultivate knowledge and skills in 3D modeling and 3D printing. With high-quality skills and application talents capable of 3D printing technology application and 3D printing product design.

Xijing College's material forming and control technology (3D) is a new professional. How to combine the rapid prototyping expertise and product development is crucial. In order to adapt to the changes of the times, the creativity and economy of products, the use of reverse engineering technology has become an inevitable trend. In many industrial fields, reverse engineering technology uses a combination of reverse engineering and 3D printing technology to achieve rapid manufacturing of products. The existing object or model is processed and measured by a three-dimensional scanning device, and the measured data on the surface of the model is reconstructed by a corresponding reverse software to obtain a 3D digital model of the physical model, which is continuously cycled until the standard-compliant product is obtained. Model for

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subsequent computer-aided analysis and manufacturing.

"Product Design" is the core course of industrial design and product design. It has more class hours, longer teaching period and heavy teaching tasks. Its purpose is to enable students to master the general processes and methods of product design and to cultivate innovative capabilities in product design. The course runs in three phases, namely entry, improved design, and innovative design. From the perspective of the setting of the teaching mode, the performance is simulated by imitation and breakthrough by accumulation, which is in line with the general law of higher education. However, in the specific implementation process, it is gradually restricted to the stylized mode and cannot be extricated. Due to the constraints of equipment, technology and cost, in the traditional teaching process, the mode of “teacher theory (or case) teaching – arranging related proposition tasks – students completing homework” is often adopted. This stylized model is unfavorable for the cultivation of innovative spirit and needs to be boldly broken. Cultivation of innovative spirit

1. Course Teaching Problem Solving

In the traditional product design course, after summarizing, it will be found that in the rapid prototyping profession, how to solve the problem of lack of scientific and rationality in curriculum setting and teaching plan; solve the problem of reverse engineering and separation of 3D printing and product design; In the teaching process, students have less time for hands-on training and less practical opportunities for enterprises; strengthen the product design teaching mode and teaching method reform of reverse engineering and 3D printing dual-drive to adapt to the training goal of rapid prototyping and development. In response to the above problems, the product design curriculum reform is hereby launched, and reverse engineering and 3D printing are integrated to meet the needs of professional development and to cultivate students' ability to innovate and start a business.

Many university product design majors have a product design course, but in general, the content set is a series of theoretical knowledge already discussed in other basic courses, and at most the model production in the laboratory. This kind of practice often makes this practical course a theoretical lesson. Students can't have a deep understanding of the process and actual operation of product design. Most of the school's homework content is also unified according to the department, which can not fully stimulate the individuality of students. And creativity. This has led to the cultivation of students with theoretical knowledge and ignorance of production practices, resulting in a serious disconnect between talent training and actual social needs. This kind of status quo has led to the great pressure of private college graduates who have not been valued in their job hunting, and has also affected the rapid development of private colleges and universities.

2. Product Design Curriculum Reform Measures

Product design is the core curriculum of the discipline. The purpose of the course is to lay the foundation for subsequent product development and graduation design, and to cultivate students' comprehensive ability to design products, mainly focusing on rapid product formation. The product design course is characterized by a large amount of class hours, and the course content is more complicated. The concept of product design curriculum reform is to promote a short and fast platform for students. Classroom activities should be a process of exploration, initiative and personality development. The teaching reform of this course combines 3D printing and reverse engineering to explore the model of rapid product development. Starting from the three aspects of curriculum resource system, curriculum teaching feedback and curriculum teaching achievements, the current curriculum teaching is reformed, the curriculum teaching objectives of product design courses are established, and effective teaching reform measures are implemented.

Study the development of the product design syllabus: product design, reverse engineering, and 3D printing class assignment

The product design curriculum reform combines reverse engineering with 3D printing. How to

allocate 3D printing and reverse engineering in a limited class time is a major focus of this research. Because the students are in the direction of rapid prototyping, they have a certain professional foundation, and they have contact with the 3D printing and reverse engineering in the classroom, which also shortens the cycle of students' new content. At the same time, we pass the students and professional teachers. Conduct research and finally get an effective class assignment.

Study the construction of the rapid development model of new products under the dual engineering of reverse engineering and 3D printing in Product Design

The whole curriculum reform focuses on the rapid development of new products. Under the environment and platform of intelligent manufacturing 2025, it is particularly important to require rapid product development to shorten the product development cycle. Exploring the rapid development of new products will also be product design. The focus of the curriculum reform. In the course design, combined with rapid prototyping equipment (3D printing equipment, scanning equipment) to assist product design, to achieve rapid development.

Study students' innovative ability and cultivate students' personalized product development

Under the environment of mass innovation and entrepreneurship, we will enhance students' awareness of innovation and entrepreneurship, use their professional knowledge to customize and develop personalized products, cultivate students' entrepreneurial thinking, and integrate design thinking into product design.

3. The Effectiveness and Significance of Product Design Curriculum Reform

3.1 The Effectiveness of Teaching Reform in Product Design Curriculum.

The product design course teaching reform fully fits the high-level talent training program and professional characteristics, integrates rapid prototyping technology into the product design curriculum, shortens the product development cycle, enables students to truly learn the basic process of product rapid development, and integrates teaching and practice. It is not limited to one aspect, and it can effectively use teaching measures in design practice to ensure the good function of course teaching:

Through the research and practice of product design course construction, we have effectively achieved effective teaching results, obtained more results, and integrated the competition with the curriculum to achieve the transformation of results.

The students' practical ability has been improved, making the original boring teaching content vivid, which has stimulated students' interest in learning. Students are free to play and have confidence, which makes students change from passive passive acceptance to active learning, which enhances the teaching effect and reaches the curriculum. Teaching reform and practice are coordinated.

In the context of mass innovation and entrepreneurship, the product design curriculum teaching reform measures through the practical platform, from the combination of curriculum theory and design practice, guide students to start their own businesses, develop personalized customized products, and enhance students' entrepreneurial ability!

3.2 Realistic Meaning.

Product innovation design is in a very important position in the national strategy. The cultivation of rapid prototyping professionals is the key to making China “manufacturing” to “creation”, which will greatly enhance the “Made in China” world image and promote the autonomy of Chinese manufacturing enterprises. Creativity and industrial competitiveness, accelerate the comprehensive transformation of China's economic structure. Deepening the reform practice of product design course teaching has very important significance for rapid proficiency teaching and talent training: 1Building a strong curriculum system and course content, effectively improving students' professional ability and level; 23D printing, Reverse engineering and product design combine to create a new product rapid development process, shorten the new product development cycle, and integrate with the enterprise; 3 under the trend of mass innovation and entrepreneurship, guide

students to start their own businesses, develop personalized customized products, and enhance students' Entrepreneurial ability!

In order to change the status quo of product design courses, emphasize the application of theory in real life, and at the same time focus on cultivating students' ability to discover-analyze-solve problems. It summarizes and analyzes many problems in this course, and comprehensively introduces the "reverse design process" into its practical teaching, and discusses the reform content and reform results based on the reverse design process. Students master the reverse design process approach and discovery-analysis-the ability to solve real-world human-machine problems. The method can effectively enhance students' independent thinking ability, improve their innovation ability and design level, and has a positive effect on the later professional thematic design courses.

New role positioning. The new positioning of the role mentioned here mainly refers to the positioning of teachers and students. College full-time teachers have their own advantages and disadvantages, and must have a clear understanding of this point. From colleges to colleges, practical skills are relatively weak. This is the biggest flaw of college teachers. How to develop strengths and avoid weaknesses requires a modest attitude. Combined with the characteristics of the course, during the implementation process, the teacher can position himself as the manager of the project, and let the students and users become the leader of the class. Students can be divided into teams of several sizes, led by the students themselves, coordinated by team members and users, and led the team to design together.

4. Conclusion

Product design course teaching is the most important position for industrial design talent training and teaching reform. The goal of the product design curriculum teaching reform is to enable students to apply what they have learned and achieve success. According to the professional characteristics and professional teaching plan, combined with the current social industry development needs, in the course of teaching, the application of the social industry is highlighted, and the post-specific features are implemented to implement effective teaching. The teaching reform of product design course takes teaching results as an important reference, enhances the teaching effect of product design courses, and achieves the sustainable development of product design course teaching results.

In the process of reforming the teaching of product design courses, reverse engineering and 3D printing are effectively integrated into the curriculum, the teaching is more systematic and complete, the rapid development model of products is built, and the overall improvement of the comprehensive literacy of rapid proficiency students is promoted.

Improving the quality of classroom teaching in product design courses is the key to improving the quality of product design professionals. Using the platform of school-enterprise cooperation to introduce the company's projects to classroom teaching selectively, not only can improve students' enthusiasm for learning, help students master professional knowledge and actual needs of enterprises, lay a good foundation for their future employment, and cooperate in school-enterprise cooperation. On the level, it can make enterprises rely more on the school's creative resources and professional resources, and give priority to accepting the graduates of our school, improve the employment rate of our students, and achieve the training goal of applied talents for enterprises and schools. A win-win situation contributes.

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