

Research on the Construction of CAD Characteristic Teaching Materials Based on the Integration of Production and Education in Higher Vocational Colleges

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ABSTRACT

The integration of production and education is a new integration of innovation and development of higher vocational education and transformation and upgrading of enterprises. While teaching Material CAD is the key to the development of intelligent manufacturing Vocational Education under the background of industry education integration. This paper takes the characteristic textbook of CAD as an example, Based on the analysis of the development of industry education integration and the policy basis, First, analyzed the ideas of the construction of CAD teaching materials, specifically from the aspects of compiling teaching materials combined with CAD skill level examination, adopting case teaching method, integrating textbook knowledge key points and combining case teaching method, so as to improve students' innovation ability; Secondly, it analyzed how to strengthen the integration of production and education In order to promote the construction and application of teaching materials, promote curriculum reform, improve teaching quality, and explore the teaching material construction under the new mode of school-enterprise cooperation. It provides exploration and practice for the practical path of the integration of production and education.

Keywords: *Teaching material construction, production and teaching integration, case teaching, Higher vocational education, CAD*

1. INTRODUCTION

For the practical experience of industry education integration and school-enterprise cooperation, some European countries with earlier development of higher education have had more than 100 years of experience. In terms of the connotation and characteristics of the combination of production and education, Allan klingstrom [1] proposed that the integration of production and education is a talent training mode that closely links educational activities with social production activities in 1987. It has the characteristics of work study integration and two-way participation and social service.

There are many differences influencing factors of industry education integration. Santoro & Chakrabarti [2] and Y. Austin Chang [3] found that the conditions of vocational schools are the main factors affecting the integration of production and education. In addition, the specialty setting, the level of teachers and the executive power of colleges and universities will affect the capture and understanding of the information of industry education integration, and then affect the implementation power of industry education integration.

Muhammad & Ansari [4] and John & Rupert [5] and other studies found that the some courses offered by higher vocational colleges are not consistent with the requirements of enterprises, resulting in students still

spending a lot of time to adapt to the post of enterprises. Higher vocational colleges and enterprises jointly run a school, which is conducive to the school to obtain enterprise support, adjust the professional setting and teaching mode according to the requirements of enterprises, and improve the quality of personnel training. In 2015, Kari Laine [6] and other scholars proposed that schools should establish industries corresponding to their specialties according to their advantageous majors, and provide training base and internship posts for teachers and students relying on school-run industries.

There is no unified explanation for the connotation of the integration of production and education. In 2010, Zhou Jinsong [7] believed that "production and education" have two meanings. In 2014, Yang Shanjiang [8] defined the integration of industry and education as an organic whole formed by the integration of industrial system and education system.

However, few kinds of literature mention the research on teaching materials under the integration of industry and education. In 2016, Zhu Hongping [9] proposed that under the background of industry education integration and school-enterprise cooperation, how to make enterprises better integrate into the whole process of school personnel training and realize school-enterprise collaborative education is a problem that enterprises and schools need to consider.

2. POLICY BASIS OF INDUSTRY EDUCATION INTEGRATION

In 2017, several opinions of the general office of the State Council on deepening the integration of production and education required that strengthening the construction of teaching resource library, developing integrated teaching resources and building digital teaching platform are important contents of teaching reform of "Integration of teaching and learning".

On November 14, 2018, the State Council issued the national vocational education reform implementation plan (hereinafter referred to as the "20 articles of vocational education"), in which the first article "improving the national vocational education system framework" clearly requires the establishment and improvement of school teaching materials and other school running standards.

Recently, in January 2019, the State Council issued the implementation plan of national vocational education reform, Article 3 of which is to promote the integration of production and education, school-enterprise "dual" education, adhere to the integration of knowledge and practice, work and study, and clearly pointed out that in principle, the professional catalog of vocational colleges should be revised every five years, the specialty should be adjusted once a year, and the teaching materials should be revised every three years. Teaching material is the carrier of curriculum implementation, and also an important bridge connecting teachers and students, which directly affects students' acquisition of professional knowledge and skills and teaching efficiency. The development of characteristic teaching materials under the integration of production and education plays an important role in promoting the reform of vocational education.

3. IDEAS OF CAD TEXTBOOK CONSTRUCTION

3.1. Compiling Teaching Materials Combined with CAD Skill Level Examination

The implementation plan of national vocational education reform points out the direction and framework of vocational education construction, and puts forward the 1 + X certificate system. Through the 1 + X certificate system, vocational college students are encouraged to actively obtain various vocational skill level certificates, so as to broaden employment and entrepreneurship channels [10]. The implementation direction of 1 + X certificate system is the organic connection of "1" and "X", and the teaching material is the basis for the implementation of 1 + X certificate system. The knowledge points contained in the vocational skill level certificate standard are corresponding to the content knowledge points of teaching materials. What kind of cases are selected to support the transformation of 1 + X certificate standard is very important. Bringing CAD skill

level certificate into teaching can improve students' learning enthusiasm, improve teaching quality and cultivate innovative talents to meet the needs of society. Teaching material is the key for students to take part in the examination of CAD skill level. According to the standard of CAD skill certificate, we edited and published UGNX10.0 case course for the 13th five-year plan in 2019, which includes two parts of 2D and 3D CAD. 3D CAD is a typical example in engineering field, which introduces the modeling, assembly and drawing of each part in detail. Through the complete explanation steps, it can provide students with CAD self-study or online learning help. This teaching material is also the CAD teaching material and CAD skill level examination training material for manufacturing students in our school. It is deeply loved by students and teachers, and provides a good example for students' certificate examination.

3.2. Using Case Teaching Method to Integrate the Knowledge Focus of Teaching Materials

Because teaching material construction is the basis of vocational education teaching reform, is an important teaching resource, is the main source of teaching content, so we should carry out vocational education teaching reform, deepen the integration of production and education and 2025 intelligent manufacturing strategy, Which teaching material is one of the key links. In addition, the optimization of professional setting and the construction of curriculum system need to be realized through the construction of teaching materials.

Case teaching method is a widely used and effective teaching method. In terms of teaching, it is a method that teachers do not have to teach in strict accordance with the contents of the teaching materials one by one, but through careful selection or design of cases, the operation and application of each knowledge point are integrated into the case, and the relevant knowledge points and their application are taught through cases, so that students can learn relevant knowledge and application to master operation skills in the process of drawing cases. The whole teaching process is a method of operating skills. The whole teaching process is the process of "taking case as the center, learning while using, learning while using".

3.2.1. Combining with the practice of production teaching integration in our school, we should formulate the teaching syllabus reasonably

When making the curriculum outline, we should connect with the production and teaching integration enterprises of our university, integrate the enterprise needs with the actual situation of the school, and fully consider the characteristics of the students majoring in manufacturing. The selected cases should be pertinence and typicality, and the difficulty should be gradual from shallow to deep,

with a certain progressive relationship. Remove the obscure theoretical content and highlight the key points, otherwise, students will feel that it is difficult everywhere and lose interest in learning. The compilation of teaching materials should reflect the students' cognitive rules. Starting from the most basic concepts and knowledge points, reasonable cases should be selected to make them master the core content of the course, so as to lay a solid foundation for students to engage in industrial design and research work in the future.

3.2.2. The content of the textbook is concise and easy to understand

(1) Invite industry and enterprise experts with the participating teachers to discuss, carefully analyze job demand of the major, extract the typical work tasks involved in this course, and transform to action and learning fields, and discuss ideas for compiling teaching material.

(2) The compilers of teaching materials go to the front line of enterprises for investigation, refine and reprocess them to make them conform to the teaching rules, be familiar with the design process and master the key skills.

(3) Complete the compilation of the teaching materials, invite enterprise experts to review the draft together, and finalize the draft after the revision.

3.2.3. Setting reasonable thinking questions after class in teaching materials

After class, reasonable thinking questions should be arranged according to the order from theory to practice, so that students can put them into practice on the basis of mastering basic concept knowledge. To achieve the educational effect of "guiding practice with theory and re-understanding theory with practice".

3.3. Improving Students' Innovation Ability by Combining Case Teaching Method

After the state put forward the strategic goal of "intelligent manufacturing 2025", the social demand for manufacturing talents is higher, especially in the innovation ability. In classroom teaching, teachers should focus on cultivating students' ability in innovation. For students, we should not only stay on the students' academic performance, first of all, we should stimulate students' enthusiasm, create some scenes, mobilize students' learning enthusiasm and initiative; secondly, we should cultivate students' innovative consciousness, give students some hints, innovative methods and ideas; finally, let students observe more real things in life, find out problems, solve problems and design with CAD come out with your own work. Therefore, in the process of CAD teaching, it is very important for teachers to strengthen the

cultivation of students' ability. Through the combination of strength teaching methods can develop students' thinking, effectively improve students' ability to use knowledge, practice ability, innovative thinking ability and so on.

4. STRENGTHEN THE INTEGRATION OF PRODUCTION AND TEACHING IN CAD TEACHING STRATEGY

According to the current situation of CAD course teaching in higher vocational colleges, this paper analyzes the teaching strategies of CAD course in Higher Vocational Colleges with the integration of production and education, formulates corresponding curriculum standards according to the needs of enterprises, increases engineering practice cases, realizes seamless connection, creates new curriculum evaluation system, improves students' ability, and improves the teaching quality of CAD course.

4.1. Formulating Curriculum Standards According to the Needs of Enterprises

Under the talent training mode based on the integration of production and education, enterprise cases should be introduced to the classroom, CAD classroom should be designed as enterprise workplace, actual cases of enterprises should be taught to students according to enterprise design process and method, product structure should be designed according to design requirements and production situation, and students should be led to participate in enterprise design and development through apprenticeship. Students can truly feel the atmosphere of enterprise design and production, promote students to complete the design task with the emotion and mentality of enterprise employees, and improve their professional knowledge and design skills in the process of following the enterprise rules and regulations and management, and finally realize the seamless connection between the school and the enterprise.

4.2. Creating a New Curriculum Evaluation System

Through the 1 + X certificate evaluation system, during the actual teaching, teachers first create a multi-level evaluation system according to the students' ability to analyze problems, sense of participation and mastery of knowledge and skills level, so as to evaluate the knowledge structure of each student; secondly, the enterprise evaluates the effectiveness of the students' work according to the work completed by the students, and at the same time, it also evaluates the students' knowledge structure in the enterprise work. Professional dedication, ideological and moral character and work attitude are evaluated to reflect each student's ability to do things and

conduct a person's situation. It can make students realize their own shortcomings and make corresponding changes. Finally, it can make correct evaluations on students' learning results and better reflect students' mastery and use of knowledge.

4.3. Innovating in Teaching Material Construction Content

(1) In terms of the content arrangement, it changes the framework of knowledge ability as the system, and organizes and arranges teaching materials with cases as the main line. In each lesson, combined with professional characteristics, a case is a typical engineering example. Closely around the case, lead out the task, put forward the design ideas and provide the command required to complete the task, provide the necessary technical support and help for students to complete the work. This arrangement is conducive to the realization of lively, active and personalized teaching activities.

(2) Case life

The knowledge learned closely combined with living examples, a lot of daily necessities in life have different shapes. CAD software can be used to design, and the knowledge points to be mastered can be taught to students through examples. Being close to life often brings out the best effect, which can not only improve the life experience but also increase the fun of learning. In the process of learning, students can master them All kinds of CAD operation methods improve their CAD design ability. Through the daily life examples, can fully stimulate the enthusiasm of students and learning enthusiasm, let students feel that CAD design is not only in the classroom and teaching materials, but also feel that it is closely related to our life.

(3) Cooperate with making multimedia courseware and network platform

In the process of compiling, we cooperated with making multimedia courseware and experimental platform based on virtual reality. In the multimedia courseware, vivid graphics, images, sounds, video images and animations are used to enhance the interest and vividness of the teaching content; the actual operation process of the case is demonstrated on the network platform to make the teaching process more intuitive and vivid.

teachers should carefully design teaching cases, stimulate learning interest, maximize autonomy, creativity and flexibility, so as to enable students to explore and apply what they have learned.

5. CONCLUSION

In a word, the integration of vocational education and vocational education is the only way to realize the integration of vocational education and post vocational education. Teaching material is the core of higher vocational education integration education reform, but

also the internal driving force of the implementation of integration of production and education. It is an important factor to determine the development level of higher vocational education. The implementation of application-oriented curriculum plays an important role in improving the teaching level and talent training quality of higher vocational colleges.

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