ISSN 2663-8169 Vol. 4, Issue 14: 96-99, DOI: 10.25236/IJNDE.2022.041418

Thinking on the Construction of Teaching Form of the Course Fundamentals of Mechanical Manufacturing Technology in Higher Vocational Education

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Abstract: *To maintain the steady improvement of the teaching quality of machinery major in higher vocational colleges and adapt to the needs of society and enterprise development, the mechanical manufacturing technology curriculum reform is of positive significance. In the process of specific reform, relevant departments and staff can put forward solutions to specific teaching problems from the perspective of textbooks, teaching content, etc. Based on the actual teaching situation, this paper summarizes the characteristics and teaching objectives of the course Fundamentals of Mechanical Manufacturing Technology in higher vocational education, and discusses the teaching strategies of this course in higher vocational education according to the specific problems existing in the teaching process.*

Keywords: *Vocational school; Fundamentals of Machinery Manufacturing Technology; Teaching form*

1. Introduction

Fundamentals of Mechanical Manufacturing Technology in higher vocational colleges is a required course for students majoring in machinery, with 64 class hours, including 6 class hours of experimental courses. From the perspective of professional course learning, this course in higher vocational education is the basis of follow-up learning. In teaching practice, teachers can understand students' practical ability according to the analysis of the learning situation. Due to the limited practical experience of students, those content with strong practical requirements will increase the learning difficulty of students. Higher vocational colleges should do a good job in the reform of curriculum teaching and guide students to master more professional skills through the combination of theory and practice.

2. Characteristics and Teaching Objectives of the Course Fundamentals of Mechanical Manufacturing Technology in Higher Vocational Education

There are many teaching contents involved in the Fundamentals of Mechanical Manufacturing Technology. In addition to the contents of mechanical parts processing and process procedures, it also includes metal cutting, numerical control machining, etc. The main teaching contents are closely related to the actual mechanical production and manufacturing. The characteristics of comprehensiveness and practicality are obvious, and the teaching difficulty is high. Teachers should have strong professional qualities and rich teaching experience. Through this course, students in higher vocational colleges can understand the steps of mechanical production and parts processing. Through basic knowledge learning, students can understand professional skills and relevant equipment use methods, strengthen their own operation ability, understand the key points of workpiece installation and distribution, and also contact some workpiece design contents. With the help of the professional course content, students' operation ability and comprehensive quality can be greatly improved. After encountering problems in life and production, they can also understand the specific solutions, recognize the future trend of China's equipment manufacturing field, and make their own contributions to the development of the entire industry [1].

ISSN 2663-8169 Vol. 4, Issue 14: 96-99, DOI: 10.25236/IJNDE.2022.041418

3. Problems in the Teaching of the Course Fundamentals of Mechanical Manufacturing Technology in Higher Vocational Colleges

3.1. Old teaching content

At present, the teaching material Fundamentals of Mechanical Manufacturing Technology used by most vocational colleges is a general teaching material, mainly including metal cutting principles, metal cutting tools, mechanical manufacturing technology, etc. Although the class hour design has been reduced reasonably, the design of the knowledge structure still fails to present orderly and reasonable characteristics, especially after the application of new technologies and equipment. It is not presented in the teaching materials, resulting in the lack of forward-looking characteristics of the entire teaching work. Subsequent students need to relearn in the face of new situations after entering the work post, which is difficult to meet the post requirements in a short time.

3.2. The effectiveness of the practice link is not obvious enough

Higher vocational colleges have developed a lot of teaching methods for the course Fundamentals of Mechanical Manufacturing Technology, such as situational teaching method, development teaching method, etc. In contrast, these teaching models have one thing in common, that is, to enhance students' interest in learning through the guidance of new ideas, thereby reflecting the students' dominant position in the classroom. However, from another perspective, this kind of teaching mode is more suitable for discipline teaching. The teaching process mainly focuses on the explanation of theoretical knowledge, which requires students to carry out mechanical memory and focuses on written practice. At the same time, no matter the teaching link or the practice link, the prominent characteristics of effectiveness are not obvious, and the theory and practice content cannot be fully integrated. Affected by this, teachers cannot show the teaching objectives in the classroom, thus affecting the students' learning effect.

3.3. Single evaluation method

It can be seen from the previous study and inspection of students majoring in machinery that the focus is on the basic knowledge and professional theory inspection, and the performance of students in the practice and training courses has not been included, which leads to the imperfect evaluation work and the inability to combine theoretical learning with practical evaluation. To show students' skill level and professional quality, teachers should pay attention to students' use of tools in the classroom, innovative design ability and other content. The effectiveness of the evaluation model can only be determined if students have a deep understanding of their personal skill proficiency, so as to ensure the implementation of vocational education objectives [2].

3.4. Unreasonable curriculum

There are many basic contents in the Fundamentals of Mechanical Manufacturing Technology in higher vocational education, and teachers and students are under great pressure in teaching and learning. In addition, in the teaching process, the teacher's teaching design did not reflect the specific characteristics, and it is difficult to reflect the key points of the curriculum. In the long run, students will feel that the course does not have much learning value, and will also delay the time to learn other professional courses, leading to the difficulty in improving the basic level of students in higher vocational colleges. In addition, Fundamentals of Mechanical Manufacturing Technology covers a wide range of contents. If students want to learn this professional course well, they should have good practical ability and innovative thinking. Many students said that in the class of Fundamentals of Mechanical Manufacturing Technology, the teacher's explanation was too abstract, which was difficult for most students to understand, and ultimately affected their enthusiasm for learning. In order to solve such problems, higher vocational colleges should ensure the reasonable design of the course Fundamentals of Mechanical Manufacturing Technology according to the actual situation, and restimulate students' interest in learning.

4. Teaching Strategies of the Course Fundamentals of Mechanical Manufacturing Technology in Higher Vocational Colleges

From the perspective of teaching system design, the main contents include curriculum content setting,

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determination of teaching mode, formulation of assessment standards, etc. When implementing the teaching reform of Fundamentals of Mechanical Manufacturing Technology in higher vocational colleges, they should take modular teaching as the goal and formulate a reasonable teaching mode.

4.1. Optimize knowledge content and curriculum structure

4.1.1. Optimize content with modules as units

For the selection of course content, teachers can focus on the basic knowledge of metal cutting, workpiece clamping, product assembly and other aspects, so that it can be displayed to students as an independent module. After that, the module units are integrated according to different majors to achieve targeted training of students' professional abilities and meet the learning needs of students in different majors. For new technologies and processes, teachers can also integrate them into separate modules for professional knowledge expansion. For the learning of the content of this department, teachers can formulate requirements according to the specific situation of students, and make flexible choices in content to help students clarify the future development direction of China's machinery industry. In addition, teachers can also incorporate mechanical processing training, curriculum design, etc. into the scope of curriculum teaching to improve the practical ability of secondary vocational students [3].

4.1.2. Take the process as the main line to explain the structure one by one

In higher vocational colleges, the course Fundamentals of Mechanical Manufacturing Technology will also involve cutting tools, technology and mechanical principles. When explaining this part, teachers should take product production as the basis, introduce metal cutting principles, machine tools, parts and other processing sequences to students, and ensure that relevant professional knowledge is integrated with the production process of mechanical products. For the organization of teaching content, it also needs to be linked with the manufacturing process of mechanical products, such as raw material selection, blank manufacturing, product quality inspection, etc. With the help of this teaching process, students can have more opportunities to contact with mechanical products and manufacturing processes. With the help of contact thinking, they can understand the key points of each process and carry out targeted learning later.

4.2. Adjust the teaching mode

In order to change the teaching mode of Fundamentals of Mechanical Manufacturing Technology, teachers should fully connect theoretical teaching with practical training, and establish a complete teaching idea based on "three steps and three integrations".

4.2.1. Understand the integration method of practice and course teaching

There are many internship opportunities for students majoring in machinery in higher vocational colleges, which is also an important part of the practical curriculum and provides help for the follow-up study. In essence, the practice process belongs to the category of mechanical processing and is closely related to mechanical manufacturing. It can be used as the opening practice of the course Fundamentals of Mechanical Manufacturing Technology. Through this practice process, students can understand the contents of machine tools and cutters, and master their operation methods and functions. When students master some basic contents, they can make the theory and the physical appearance perfectly connected, which is also the basis for the integration of theory and practice.

4.2.2. Integration of classroom teaching and work training

In the process of explaining the conventional machining technology, there are also many contents involved, such as drilling, grinding, etc. Students should focus on the operation methods of different links and the application characteristics of these machining technologies. In the process of combining theory with practice, teachers can guide students to combine with the previous practice through theory teaching, and help students recall the specific operation process through the introduction of turning, milling and other contents, so as to ensure that the mechanical manufacturing and processing theory and practice are carried out at the same time. With the help of such teaching methods, abstract professional knowledge can become more specific. It also helps students master more process use methods [4].

4.2.3. Integration of curriculum design and theoretical content

The course Fundamentals of Mechanical Manufacturing Technology involves many typical parts processing processes, which can lead students to understand the structure of common parts. In terms of

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theoretical teaching, teachers can introduce common parts processing methods to students through case teaching and project teaching methods. In order to strengthen the students' understanding ability, the teacher can set up a production practice activity with the theme of "part machining process design" after the course explanation. Through this teaching mode, the part processing technology can be combined with the curriculum design to achieve the transformation of professional theoretical knowledge into practical links.

4.3. Comprehensive evaluation of students

In order to show students' comprehensive abilities, teachers should carry out an objective evaluation, and ensure that the design of the evaluation system is more systematic based on modular teaching requirements. In general, the specific assessment content should include practice, training, design and theory. The specific assessment weight score proportion can be designed as 10%, 20%, 20% and 50%. For the evaluation of the practice part, we can adopt the oral examination mode, focusing on students' practice effect and practice performance, and solving the problem of "what should we do". In the training link, we can choose a simple operation mode to understand the students' practical effects in turning, mold making and other aspects, so that students can know "what they should do". For the theoretical part, the examination can be conducted to understand the students' mastery of basic knowledge and clarify "what students know".

4.4. Optimize curriculum setting

From the perspective of practical curriculum, higher vocational teachers should focus on cognitive practice. In order to achieve better teaching results, teachers need to have a comprehensive understanding of the practice base, guide students to recognize the composition of mechanical equipment, manufacturing form and their own structure, and feel the real production and manufacturing environment. If students have problems in understanding the above environment, subsequent theoretical learning will be difficult because students think that knowledge is too abstract, and it is difficult to achieve better learning results. In addition, in the process of practice, teachers should focus on teaching of difficult knowledge points, constantly improve students' understanding of the difficulties of mechanical manufacturing technology based on intensive training, and highlight the scientific characteristics of the curriculum setting [5].

5. Conclusions

The development of the teaching work of Fundamentals of Mechanical Manufacturing Technology in higher vocational education is closely related to the training and development plan of overall mechanical students. Therefore, teachers should deeply understand the key points of the course Fundamentals of Mechanical Manufacturing Technology in higher vocational education, understand the actual teaching needs of students through correct teaching methods, and design teaching objectives according to teaching objects and actual conditions to provide more skilled talents for the country.

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