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Information Teaching Mode of Mechanical Drawing in Higher Vocational College Based on Big Data Technology

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Abstract: Mechanical drawing is one of the core courses of mechanical specialty in higher vocational and technical schools. Students learn the basic knowledge of mechanical drawing. Higher vocational students can basically achieve the basic ability of reading paper and using Auto CAD to draw graphics skillfully. In higher vocational and technical schools, the teaching of traditional mechanical drawing course generally adopts mechanical exercises to improve the reading ability and drawing ability of drawings. Students in higher vocational and technical schools lack the initiative to learn theoretical knowledge. In order to improve students' initiative in learning knowledge and improve teachers' teaching effect, the information teaching mode of mechanical drawing in higher vocational colleges based on big data technology is applied to the classroom. By using the video teaching of-micro-class under big data technology, the text content of the textbook is static and boring, which is presented through wonderful pictures, moving pictures or animation. Through the test and evaluation of the effect of mechanical students using micro-class teaching, this paper studies the method of using test questions and questionnaires to compare the results before (60 points) and after use (72 points).250 questionnaires were received to evaluate the effect of micro-class teaching and interview teachers. Finally, it is found that through the use of micro-class teaching, the students generally do not want to think, passive learning, waiting for teachers to learn habits, so that they are willing to learn, active learning, and finally make the quality of teaching and learning in secondary vocational schools can be substantially improved.

1. Introduction

Nowadays, with the infiltration of big data technology in the field of higher vocational and

technical machinery professional schools, the popularization of professional knowledge has been accelerated. Micro-learning, micro-video, micro-course and other "micro-" things are slowly integrated into higher vocational education [1-3]. Students can directly obtain the required resources and information from mobile devices at any time, place and space, and gradually develop into a unique" micro-age "learning model [4-5]. This course is one of the most important basic courses in higher mechanical vocational education. The influence of its teaching quality will affect the students' learning of the following courses, and also affect the ability to work in this major.

The theoretical and practical research on the teaching of Mechanical drawing in higher vocational education in China mainly focuses on the application of teaching methods, and the theoretical research is not deep enough [1-3]. At the level of multimedia application, the first-line teachers practice, analyze and summarize many methods based on multimedia teaching [4-5]. This paper discusses the advantages of multimedia system in teaching mechanical drawing course, summarizes some common methods of using multimedia system in mechanical drawing course, and combines the characteristics of mechanical drawing course, puts forward to break the traditional teaching mode, break through the optimization of education mode, and combine the traditional drawing with big data technology organically [6-7].

How to improve the teaching quality of higher vocational education according to the characteristics of mechanical drawing course and the new problems in the course teaching of mechanical drawing in higher vocational colleges in the current period has always been a hot issue. Therefore, by combining the "micro-lesson" under big data technology with "mechanical drawing" in senior high school, teaching scholars can choose micro-lesson material as their core teaching assistant tool to stimulate students' desire to acquire mechanical drawing knowledge and learn professional skills.

2. High Vocational Mechanical Drawing under Big Data Technology

2.1. Micro Course under Big Data Technology

For the concept of micro-class, different scholars have given different definitions, although different statements, but the core concepts are basically similar. After summing up the views of many scholars, this paper holds that micro-class is a network video resource which is based on the curriculum standard and takes the teaching video as the main carrier, and analyzes the key points and difficulties in the teaching process. The core content of this resource is the micro-teaching video which contains the teaching design, teaching scheme, student feedback and learning situation test of the relevant courses, and forms the semi-structured teaching unit with specific organizational structure and expression. In short, micro-class is a simple and complete interactive activities of teaching and learning resources organic composition of the whole.

Micro-course resources are diverse and rich in types, including micro-teaching cases, micro-teaching cases, micro-teaching, micro-video, micro-audio, micro-teaching, micro-training, micro-teaching evaluation, micro-teaching reflection and other teaching resources. The design of micro-course reorganizes, induces and combines them, and finally becomes a relatively complete teaching process. Because the duration of the micro-class is very short and the capacity of the video resources included is relatively small, students can watch the micro-class video smoothly online through mobile phones, computers and other electronic devices, and can also interact with teachers at any time to feedback the learning situation, so that teachers can understand the learning situation of the class.

2.2. Mechanical Drawing

Mechanical drawing is an early and rapidly developing course, which aims to require students to master the projection law between 3 D and plane view, and to require students to have spatial imagination and analytical ability. Skilled use of drawings to accurately represent the size and structure of the machine, operating principles and technical requirements. Big data has a large number of information materials, with a large number of complex structures and other characteristics; through the existing software tools to collect a large number of information materials, and classification, integration, analysis, the purpose is to provide sufficient information guarantee for the course of mechanical drawing. Under the mode of data application and processing under modern big data technology, through the integration and sharing of big data, we can obtain high quality resources and knowledge services [8-10]. The most prominent feature is that when students come into contact with the rapid growth of information data, their way of thinking has also undergone tremendous changes. In the context of today's big data era, mechanical courses should be reformed in traditional teaching. For the future better comply with the development of society, mechanical drawing teaching changes to provide new conditions. Calculation formula —— gear in mechanical drawing:

Gear modulus:

$$m = p / \pi \tag{1}$$

m is modulus, p is tooth distance.

Simple calculations in surveying and mapping:

$$\mathrm{m} = \mathrm{d}/(\mathrm{z}+2) \tag{2}$$

d is the outer diameter of the tooth top circle; z is the number of teeth

Gear number:

$$k = z\alpha/180 + 0.5 \tag{3}$$

z is the number of teeth ,α is the pressure angle

The formula of straight tooth length of common line of gear:

$$Wk = m\cos\alpha[(k-0.5)\pi + zinv\alpha] \tag{4}$$

k is the number of teeth ,α is the pressure angle, m is the modulus,

Slanting formula:

$$Wk = m\cos\alpha[(k-0.5)\pi + zinv\alpha + 2x\tan\alpha \tag{5}$$

k is the number of teeth span ,α is the pressure angle, m is the modulus, x is the displacement coefficient

3. Information Teaching Mode of Mechanical Drawing in Higher Vocational College under Data Technology

3.1. Experimental Subjects

This paper, based on the-micro-class under big data technology, combines the characteristics of "mechanical drawing" course in higher vocational education, provides a reliable carrier for the teaching process, refines the key points and difficulties, changes the students' fixed thinking,

stimulates their initiative and desire to acquire knowledge. To actively promote the diversified development of educational means for educators in higher vocational and technical schools, to enhance students' initiative, and to consider the rationality and pertinence of teaching from the practical point of view of students; To improve the quality of mechanical drawing education and teaching information.

3.2. Experimental Design

Based on —— big data technology, this paper analyzes the integration effect of micro-class and mechanical drawing, compares and analyzes the teaching cases and teachers' experience of using micro-class. In this test, 250 people majoring in mechanical design and manufacture (shipbuilding process and equipment), physical and chemical test and quality inspection technology (welding quality inspection technology) and mechanical design and manufacture and automation participated in the test. The title type is a comprehensive question. The test volume has a total of 1 comprehensive problem, the test time is 15 minutes.

After the completion of the test, calculate the mechanical design and manufacturing (ship machine manufacturing process and equipment) and physical and chemical testing and quality inspection technology (welding quality testing technology) and mechanical design and manufacturing and automation students test results. The results showed that after ignoring the difference between the difficulty of the test problem and the change of students' knowledge, the average score of the three majors was 72, compared with the test (average score of 60 points) before the use of micro-class. It can be seen that the use of micro-course "mechanical drawing" learning, the teaching effect is more obvious.

4. Effect and Evaluation Micro course and Mechanical Drawing Course Integration under Big Data Technology

4.1. Questionnaire for Students

Micro class can provide students with learning resources. Teachers guide students to complete the task of mechanical drawing by watching the micro class of Mechanical drawing. Table 1 is a survey of the satisfaction of higher vocational students after using micro-class. According to the difference of satisfaction degree, the questionnaire design of this part sets up five options:" especially satisfied, satisfied, not feeling, dissatisfied, especially dissatisfied "according to the difference of satisfaction degree. Students are given choices and the results are as follows:

Table 1. Experience of the use of micro-class users

	Special satisfaction (%)	Satisfaction (%)	No feeling (%)	Discontent (%)	Special dissatisfaction (%)
Increased interest in Mechanical Drawing	23.1	50.5	14.6	11.8	0
Let me focus more	26.5	54.8	12	6.7	0
Improve review efficiency	18.5	51.5	12.8	16.2	0
Improve my autonomous learning ability	19.2	63.9	12.5	4.4	0
Help me understand and master the knowledge of Mechanical drawing	19.5	64.7	11.6	4.2	0

By looking at Table 1, For "the satisfaction of using micro-classes to make me more interested in" mechanical drawing ", 73.6% of higher vocational students chose "satisfied" or "very satisfied ", which can be regarded as positive. Satisfaction with the fact that micro-classes make me more focused, 54.8% were satisfied, 26.5% total, as you can see, Most students agree that micro-class can improve attention; In terms of satisfaction with "micro lessons can improve my review efficiency, 70% of students believe that micro-classes can improve their autonomous learning ability. But at the same time, as high as 16.2% of the students think that micro-class can not improve the efficiency of review, this phenomenon deserves attention, there was therefore a need for an in-depth understanding of the issue. In terms of “micro-classes can improve my self-learning ability”, 83.1% of the students believe that micro-classes can improve self-learning ability. Among them, 19.2% are particularly satisfied, which shows that the advantages of micro-classes are more prominent in improving the ability of independent learning. In addition, most students think that through micro-class can help themselves to strengthen the understanding and mastery of knowledge points.

4.2. Interviews with Teachers

Through the questionnaire survey of students majoring in computational machinery design and manufacture (shipbuilding process and equipment), physical and chemical testing and quality inspection technology (welding quality testing technology) and mechanical design and manufacture and automation. Although students do not have a particularly in-depth understanding of the micro-course form, they generally welcome micro-lessons. Most students believe that this novel and short course helps consolidate and expand the knowledge that has been acquired. They also think that micro-class can improve learning efficiency and learning ability. In addition, after completing the student questionnaire, the author also collected the teachers' opinions and opinions on the application of micro-class teaching through interviews. The age of the teachers surveyed was counted, and the results are shown in Figure 1:

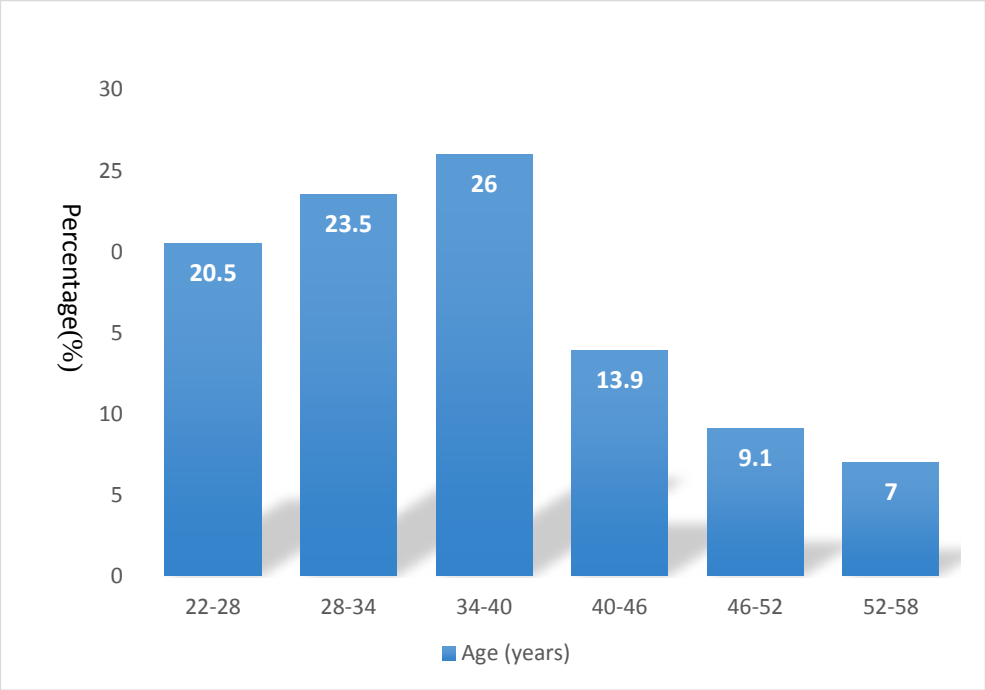

Figure 1. A survey with teachers of different age groups

4.3. Evaluation of the use Advantage of Micro-Class by Professional Teachers in Higher Vocational Colleges

Most teachers believe that micro-curriculum is conducive to the vocational reform of vocational secondary education, to the reform of traditional teaching models, and that micro-course application is conducive to improving teaching efficiency. More than 87% of teachers believe that "micro-course application emphasizes the subjective position of students ", nearly 52% believe that" applying micro-course is beneficial to teachers' development ",60% believe that "it is beneficial to reform and innovate the traditional teaching mode and teaching methods ", and 65% believe that" it is beneficial to improve teaching efficiency ". As shown in Figure 2:

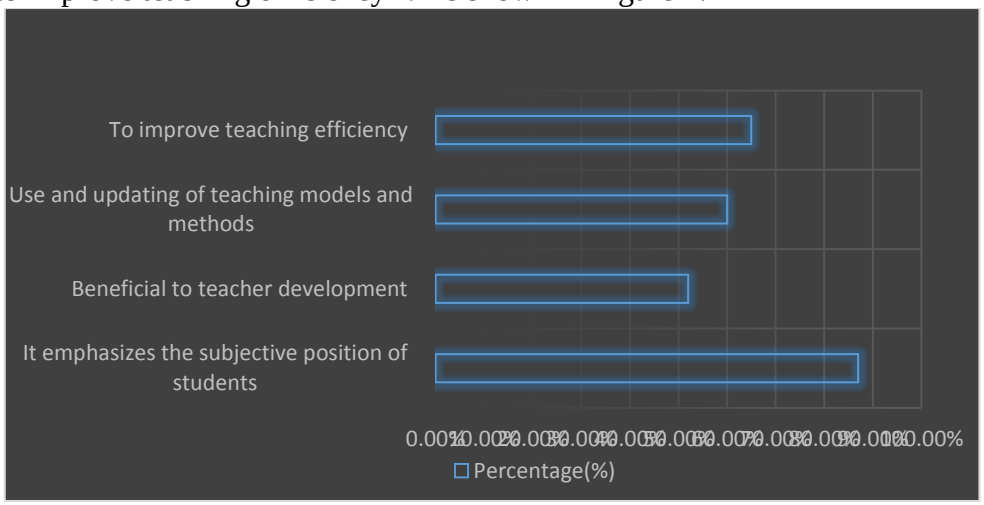

Figure 2. Role of micro-curriculum in the reform of vocational secondary education

5. Conclusion

As far as the information teaching mode of mechanical drawing in higher vocational colleges is concerned, in the past teaching process of "mechanical drawing ", educators have not combined the students' scarce knowledge structure, have not done a good job in the psychological construction of students. Therefore, this paper mainly studies to solve the immediate problems. Educators should always care about students' ability to accept knowledge and use big data technology, especially micro-lessons as an important auxiliary tool. At the same time, it effectively alleviates the typical problems of students' low enthusiasm, low self-control and lack of concentration in higher vocational teaching class, so as to lighten the burden of teachers' discipline, so that teachers can focus more attention and energy on the teaching of knowledge and skills, and improve the efficiency of classroom teaching.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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