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Curriculum System Design of Machinery Major in Higher Vocational Education Based on Big Data

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Abstract: With the development of higher education in our country, the quality of higher education has received increasing attention. The development of higher education emphasizes the need to transform from the construction of external conditions to the construction of education itself. Curriculum construction has become the focus of university teaching quality construction, and curriculum reform has become the top priority of universities. However, in the era of Big Data (BG), the "teaching plan" and "syllabus" that represent traditional elite education concepts can no longer meet the needs of popular education. In order to solve the construction of the college mechanical professional curriculum system in the BG era, this article takes the construction of the college mechanical professional curriculum standard in the BG era as the research object, take the construction of mechanical professional curriculum standards of a university as an example to conduct case studies and put forward relevant policy recommendations. This article first applies the literature analysis method to theoretical research. By browsing CNKI, government portal websites, university official websites and consulting related books to collect, organize, analyze and summarize the literature, grasp the current research process at home and abroad, and raise research questions. On this basis, through questionnaire survey and SWOT analysis, the pros and cons of the school's mechanical professional curriculum standard construction are summarized. Finally, combining theoretical research and investigation and analysis, drawing on the advanced experience of other universities, and combining with the background of the BG era, policy recommendations are put forward. The experimental results show that in the era of BG, the construction of the college vocational education machinery professional curriculum system needs to establish curriculum standards that adapt to the popularization stage. The construction of curriculum standards should make full use of information technology to achieve fruitful results in the era of BG and the construction of new curriculum standards and idea.

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1. Introduction

Machinery major is the production method of other economic sectors. Its scale and level are important indicators of a country's scientific and technological level and economic strength, as well as a key element of a country's degree of industrialization. As early as the early twentieth century, the famous American educator Dewey pointed out: "Modern industry is no longer accustomed to imparting experience, relatively speaking, it is the procedure of crude sugar. The current industrial technology is processing technology." Therefore, in today In the context of the era of BG, it is bound to put forward further requirements for the professional capabilities of mechanical talents. As a vocational education responsible for the training of mechanical technical personnel, under this development trend, we must strive to adjust the professional structure and strive to design a curriculum system that adapts to the development of the machinery industry. With the rapid development of Internet technology, the impact of information technology on social life heralds the arrival of the era of BG, and the rapid development of digital technology may play a revolutionary role in the construction of university courses. The collection, processing, conversion, modeling and application of educational data will be important means for university curriculum reform in the new era. In the era of BG, social competition is becoming increasingly fierce. For all walks of life, who can take the lead in realizing the application of BG and who can study BG more deeply will seize opportunities in the future. How the construction of mechanical professional curriculum standards should adapt to the era of BG is an important topic worthy of our deep consideration.

In the construction of mechanical professional courses in college vocational education, on the whole, it mainly focuses on the reform or optimization of the mechanical curriculum system. First of all, at the level of curriculum setting for mechanical majors, Zhou Zhongshan and others, through relevant investigations, analysis and induction of mechanical majors in secondary vocational schools, pointed out that the setting of vocational education curriculum system should start from the characteristics of vocational education, with knowledge application as the main line , According to the knowledge and ability of the professional post group as the core set up courses [1-4]; Bai Xuening started with the outstanding problems in the setting of higher vocational machinery majors, and put forward a plan to optimize the curriculum, that is, according to the changes in the talent market and the employment situation, the post group is required to maintain flexibility. The professional setting highlights professional characteristics, reasonable positioning and characteristic development [5]. Secondly, at the level of necessity for the construction of a mechanical professional curriculum system, Liu Chi and others proposed to build a mechanical professional curriculum system based on the work process, that is, based on the professional qualities and vocational skills required for the work process of professional positions (groups) in the mechanical industry. For the goal, determine the teaching content, design courses according to the relationship between activities and knowledge in the work process, and at the same time ensure that the constructed course system meets the educational goals of higher vocational education [6]; Liu Zhongwei has developed from modern manufacturing technology to machinery majors Starting from the challenges proposed, considering the changes in the nature, scope of work and work design principles of mechanical professionals, it is proposed to reconstruct the curriculum structure, strengthen the construction of training centers, and deepen teaching reforms [7]. In foreign countries, relatively mature theoretical systems and practical experience have been formed in the field of vocational education mechanical professional curriculum research, such as the curriculum system design with dual characteristics in Germany, the curriculum system design based on the American model, and the British certificate support Model curriculum system design. These

theories not only have an important influence on the development of vocational education in the country where they are located, but also have lessons for our country's vocational education curriculum reform [8].

After research and analysis, the existing research has been more comprehensive and comprehensive in the design of the curriculum system of mechanical majors, but most of them are for a part of the curriculum, and seldom discuss the design of the curriculum system of mechanical majors as a whole. Based on the era of BG, this paper systematically analyzes the basic theory of mechanical professional curriculum system design, curriculum goal positioning, curriculum settings and curriculum content, so that the current college vocational education mechanical professional can meet the needs of the era of BG.

2. Method

In order to better study the construction of higher vocational education machinery major curriculum system in the era of BG, this article sequentially introduces the distinction and definition of the era of BG and the curriculum system.

2.1. The Era of BG

In recent years, social Internet information technology has developed rapidly, and we have entered the era of BG. With the rapid development of mobile Internet technology, data mining technology and cloud computing, BG technology has also become the most concerned topic in various fields. BG refers to information assets that are huge in scale and cannot be mined, classified, and used in a short period of time using current tools and software. Sometimes called massive data. BG has four characteristics, namely diversity, speed, volume, and value, which are usually summarized as "4V" [9]. BG technology can not only store massive amounts of data, but also help people mine useful information behind the data by processing massive amounts of data. In the era of BG, social competition is becoming increasingly fierce. For all walks of life, who can take the lead in realizing the application of BG, who can study BG more deeply, can seize the opportunities in the future, and the same is true for the education sector. Among them, there is a well-known formula in BG called Bayes' theorem formula. Calculated as follows:

$$P(B_i|A)=\frac{P(B_i)P(A|B_i)}{\sum_{j=1}^{n}P(B_j)P(A|B_j)} \tag{1}$$

Where P(A|B) is the probability that A will occur if B occurs. A1,…An are complete event groups, namely:

$$\bigcup_{i=1}^{n}A_i=\Omega, A_iA_j=\emptyset, P(A_1^2)>0 \tag{2}$$

When there are more than two variables, Bayes' theorem still holds:

$$P(A|B,C)=\frac{P(A)P(B|A)P(C|A,B)}{P(B)P(C|B)} \tag{3}$$

2.2. Course System

Curriculum learning is an important part of the training of vocational school students, and the curriculum system is the key to determining the knowledge structure and skill structure of vocational school students. With the rapid development of vocational education in my country in recent years, not only the training types of college students are diversified, but the training models also show diversified characteristics [10]. Therefore, based on the basic theoretical research of curriculum system design, it is necessary to analyze the characteristics of the curriculum system under the current situation, including the connotation, principles and ideas of the curriculum system design, in order to provide effective guidance for the subsequent mechanical professional curriculum system design. The connotation of the curriculum system at the micro level is a process of arranging the elements of the curriculum, while at the macro level it is the guidance for professional construction. The principles of the curriculum system include the four principles of taking the realization of talent training goals as the fundamental starting point, the principle of best interests of students, the principle of combining systemicity with the times, and the principle of timely revision. The idea of the curriculum system is to break the monopoly of theoretical knowledge in curriculum content and return practice to the world of life; establish a flexible curriculum selection and update mechanism to gradually optimize curriculum content; enrich curriculum structure and curriculum types, broaden curriculum system design connotation; broaden curriculum participants in system design, incorporate teaching into the course construction process; adhere to the five principles of practice-oriented vocational education curriculum theory.

3. Experiment

3.1. Experimental Purpose

This article is based on the theoretical results of the BG era, draws on the domestic and foreign theoretical research results, and uses methods such as theoretical analysis, literature research, participatory observation, and in-depth interviews. Then, through preliminary analysis and field research, we try to put forward the basic theory and technical standard research of the mechanical professional curriculum system design of college vocational education, and build the mechanical professional curriculum system through curriculum goal positioning, curriculum structure arrangement, and curriculum content design. The phased conclusion of this research provides a destination.

3.2. Experimental Design

This article uses the form of questionnaires. There are 25 questions in total, including 20 objective multiple-choice questions and 5 open-ended questions. Participants who participated in the questionnaire were mainly mechanical students from the university, and some teachers were interviewed and asked questions. The content of the questionnaire is based on the composition of curriculum elements, involving the concept of mechanical professional curriculum standards, curriculum objectives, curriculum content, curriculum implementation, curriculum evaluation, and the impact of the era of BG on the construction of curriculum standards. The number of questionnaires issued this time was 600, and after the collection, 500 questionnaires were statistically valid, and the recovery rate was 83.3%.

4. Result

4.1. The Validity Test of the Questionnaire Design

In order to test the validity of this questionnaire, I use a qualitative method to test the design of the questionnaire. Ten experts were selected and divided into three levels: effective, more effective and ineffective according to the content and format of the questionnaire. The results are shown in Figure 1:

Table 1. Questionnaire validity survey

Position	Number	Effective	More effective	Invalid
Professor	2	1	1	0
Associate Professor	4	3	1	0
Lecturer	4	3	1	0
Total	10	7	3	0
Percentage	100%	70%	30%	0%

Judging from the results of the expert evaluation in the above table, 10 experts all believe that the questionnaire design is reasonable, and the number of people who think the questionnaire is invalid is 0, so it can more effectively reflect the content of the survey, indicating that the design of the questionnaire is effective Sex.

4.2. Awareness of the Objectives of Mechanical Professional Courses

The course goal is both the starting point and the end point of course teaching. As a student, if you don't understand the goal of the course, you don't know the direction of the course. As a teacher, if you don't know the goal of the course, you will have a deviation in the direction of teaching activities and directly affect the quality of teaching. It is precisely the determination of the course goal that can guide the choice of course content. The following figure is an analysis of the students' understanding of the course goal in the questionnaire:

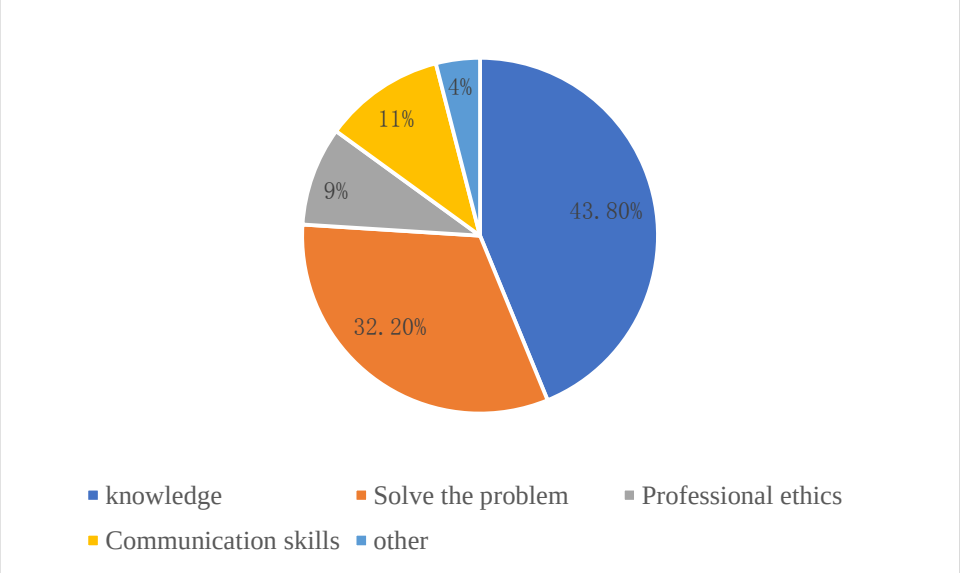

Figure 1. Cognitive map of course objectives

It can be seen from Figure 1 that among the 500 students surveyed, 219 students believe that the most important goal of the mechanical course is to solve practical problems, accounting for about 43.8% of the total. The 129 students in the mechanical course believe that the most important goal is to master professional knowledge, accounting for 32.2% of the total; 45 students believe that the most important goal of the mechanical professional course is to cultivate professional ethics and quality, accounting for 9% of the total; 55 students believed that the most important goal of mechanical professional courses is to cultivate the ability of communication, expression and cooperation, accounting for about 11% of the total number of students. Another 20 students put forward different views, accounting for about 4% of the total.

4.3. Selection of Course Content

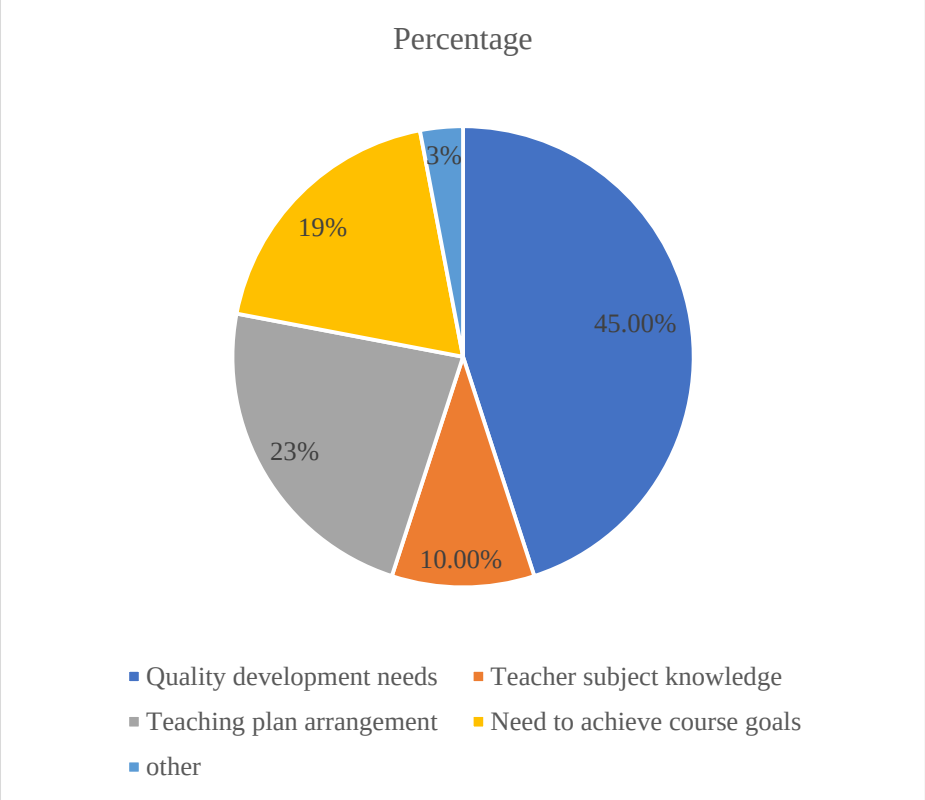

Figure 2. Course content selection cognitive map

According to statistics (Figure 2), among the 500 students surveyed, 225 students believe that the content of mechanical majors should be based on the needs of mechanical majors' quality development, accounting for about 45% of the total; secondly, 115 students It is believed that the content of mechanical professional courses should be based on the arrangement of the teaching plan, which accounts for about 23% of the total; there are 95 students who believe that the content of mechanical professional courses should focus on the need to achieve the course goals, that is, the set courses based on the mechanical professional curriculum goals, accounting for about 19% of the total number of students; 50 students thought that the content of the mechanical professional course should be based on the teacher's subject knowledge, accounting for about 10% of the total number; another 15 students added some opinions, accounting for about 3% of the total number %.

4.4. Choice of Teaching Methods

Teaching method is an important aspect of completing teaching activities.

Table 2. Teaching method statistics

Teaching method	Number	Percentage
Theory Teaching Method	500	100%
Classroom discussion	260	52%
Case teaching	175	35%
Experimental Method	350	70%
Autonomous learning	0	0%
Visiting teaching method	50	10%
Other	5	1%

From Table 2, we can see that all 500 students have chosen the teaching method; the second is the experimental method. The number of students who choose this teaching method is 350, accounting for about 70% of the total; the next is the classroom discussion method. Approximately 260 students were exposed to classroom discussion methods in their daily courses, accounting for about 52% of the total; there were 175 students who chose the case teaching method, accounting for about 35%; 10% of the students who visited the teaching method chose this item; there are 5 students who chose other methods; in addition, the independent study method did not choose from students.

5. Conclusion

In the era of BG, our country has entered the stage of popularization of higher education. Many colleges and universities have greatly expanded their enrollment scope. Domestic colleges and universities cannot escape the dilemma of low quality of business teaching. This has also led to the weakening of the competitiveness of domestic business students. Fundamentally speaking, this is because the mechanical education of universities has not escaped the shackles of the elite education model. Therefore, the construction of the mechanical professional curriculum system of college vocational education should follow the following viewpoints. One is to establish a mechanical professional curriculum standard that adapts to the popularization stage. The second is to make full use of information technology in the construction of mechanical professional curriculum standards. The third is the ideological dimension of the construction of curriculum standards for innovative machinery majors.

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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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