Current Situation and Reform of Higher Mathematics Teaching in Higher Vocational Colleges

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Abstract: Higher mathematics is a compulsory basic course for science and technology majors in Colleges and universities, which mainly provides important theoretical analysis basis and calculation methods for the follow-up professional courses. In view of the present situation of Higher Vocational Colleges and the characteristics of students, this paper mainly analyses some problems of higher mathematics teaching in Higher Vocational colleges. Combining with the reality of Higher Vocational colleges, starting from changing educational ideas, we should construct a mathematics curriculum system, reform teaching methods and create a new model of higher mathematics teaching in Higher Vocational colleges.

1. Introduction

Higher vocational education has become an important part of China's higher education. Its goal is to cultivate high-level applied talents urgently needed in all field of society. Mathematics, as a public basic course for all specialties in Higher Vocational education, has an irreplaceable significance for the study of follow-up professional courses and the cultivation of students' thinking ability. Its teaching quality directly affects the teaching quality of higher vocational education and the comprehensive quality level of students. Combining with the present situation of higher mathematics teaching in Higher Vocational colleges, this paper probes into the reform of higher mathematics teaching in Higher Vocational Colleges from the aspects of teaching ideas, teaching contents, teaching methods and evaluation methods.

2. The Present Situation of Higher Mathematics in Higher Vocational Colleges

2.1 Knowledge is out of touch, students' quality is poor, and their learning enthusiasm is not high.

Because our country's middle school mathematics teaching is also carrying on the curriculum reform unceasingly, in the high school mathematics education stage, it has deleted some old knowledge, and added some new knowledge, the deleted contents was put in the University curriculum, but many university teachers have not paid attention to these changes, they thought that some knowledge has already learned in middle school stage. Therefore, teachers no longer teach these knowledge, which resulting in students learning hard, gradually, students' enthusiasm is getting lower and lower, they lack initiative and creativity. In addition, the expansion of university enrollment has transformed the past elite education into the current popular education. Some students with poor cultural achievements have entered higher vocational colleges, which has increased the teaching difficulty.

2.2 Teachers' professional skills and teaching level are not high

Teachers do not know enough about the content of mathematics knowledge required by different majors. In teaching, they usually teach according to the inherent rules of learning mathematics, but neglect the application of mathematics in professional courses of Engineering specialty, which leads

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to students still unable to understand professional courses after learning higher mathematics, and also causes various complaints from teachers of professional courses. Higher Mathematics is the life of Engineering specialties. In learning advanced mathematics, students should not only learn the basic knowledge, calculation method and basic skills, but also apply advanced mathematics knowledge to analyze engineering problems and solve practical engineering problems. Therefore, teachers' teaching skills are crucial. Teachers play a central role in the teaching process. Classroom teaching is an important link to improve the quality of teaching, to some extent, it may affect the success of students.

3. The Change of Educational Ideas in Higher Vocational Mathematics Teaching

Higher vocational and technical education aims at training higher technical application-oriented talents for service and management. Therefore, vocational and technical education should take ability teaching as the core and technology application as the leading factor. This makes higher vocational and technical education different from ordinary higher education in type. The training of talents in higher vocational colleges should follow the path of "practical" rather than "academic" and "theoretical" as the training objectives. Higher mathematics education in higher vocational colleges should not emphasize too much the rigor of logic and thinking, but should regard it as a tool course of professional courses, attaching importance to its applicability and students' ability to solve practical problems. The main task of mathematics teaching in higher vocational colleges is to improve students' comprehensive literacy and provide the necessary basic knowledge of mathematics after employment. Therefore, after defining the basic characteristics of Higher Vocational education, we should establish a modern teaching concept with practical purpose and students as the main body, and carry out teaching activities that are more conducive to training practical talents.

4. Reform of Mathematics Course Structure and Teaching Content

In view of the characteristics of Higher Vocational education, we should complete the construction of curriculum system according to the principle of "practicality, practicality and practice". In terms of curriculum design, we should ensure that students' employment in the near future "must be sufficient" and future development "migration is available". We should scientifically build a curriculum structure with strong pertinence, which can cultivate higher practical talents. In the specific teaching, we should adhere to the principle that the teaching content must be combined with the specialty. According to the need of the specialty, we should reasonably "choose" the teaching content and formulate the corresponding teaching module (select series, differential equation, matrix, probability theory and mathematical statistics according to the specialty) so as to enable students to have the training objectives of the specialty. Higher mathematics knowledge should be closely integrated to highlight the purpose of training professional talents.

For example, in the teaching of communication major, because the content of marginal analysis and elastic analysis has little relation with major, and does not affect the continuity of the course, teachers can delete this part of the content, focusing on the Fourier series, Laplace transformation and other content. For the students majoring in business management or finance, they have little contact with the concave and convex curves and the depiction of functional graphics in their future work, so that they can understand this part of the knowledge students. The knowledge points of simple interest, compound interest, tax, minimum input, maximum income, best scheme and marginal analysis are the necessary basic knowledge for this kind of students in their future work. Teachers should focus on explaining them. This kind of curriculum arrangement will make them more useful and valuable in their future jobs.

5. Reform of Mathematics Teaching Method in Higher Vocational Colleges

5.1 Differentiated teaching according to students 'differences

Firstly, it is classified according to the needs of various majors. The teaching content of higher mathematics courses in various majors should be somewhat biased and different. Teachers of various types should be relatively fixed, so that they can understand and study the teaching content of the major in depth, and lay a good foundation for professional teaching. Secondly, on the basis of classification, the same kind of stratification is carried out. According to the actual situation of students' mathematics foundation, students of the same kind are divided into three levels: A, B and C. Different teaching modules are made for students of different levels: basic module, Application module and improvement module. Real-time follow-up survey is carried out on the learning situation and attitude of students at different levels, dynamic flow is made, the teaching effect of teaching at different levels is well investigated, and teaching strategies are adjusted in time. Finally, according to different evaluation criteria, the corresponding evaluation system is established for students at different levels.

5.2 Pay attention to teaching design

In learning a new concept of mathematics, if the teacher throws the concept directly to the students, it will be very difficult for the students to understand, but it will be more difficult to feel the practicality and charm of mathematics. For example, in explaining the concept of definite integral, we can introduce this way: "In elementary functions, we have calculated the area of triangles, trapezoids, rectangles and so on, but these are regular and simple graphics. So how to calculate the area of an irregular figure? The interest of students is stimulated, and then students can be guided: for irregular graphics, we can establish appropriate Cartesian coordinate system. The analysis shows that the area of irregular figure can be transformed into the difference of the area of two curved trapezoids. At this time, the key of the problem is to find curved trapezoids. By solving the area of curved trapezoid, we naturally introduce the concept of definite integral. Such introduction not only helps students to master new knowledge, but also fully reflects that mathematics comes from reality and serves life. For example, when explaining Fourier transform, through discussion with professional teachers, we can take the spectrum analysis of typical aperiodic signals such as unilateral exponential signal and rectangular pulse signal as examples to guide students to understand the concept and realize the practicability of Fourier transform.

In order to introduce concepts from students' familiar life examples or examples combined with specialties, teachers must pay attention to collecting life examples and mathematical knowledge involved in professional courses. For schools, in terms of course arrangement, mathematics teachers who teach a certain specialty should be relatively fixed, so that teachers can accumulate cases of using high-number knowledge in professional courses to enrich teaching, and gradually establish a database of teaching questions for different specialties. By introducing examples related to specialty to explain concepts, we can improve the teaching effect, broaden students' thinking, and improve students' enthusiasm in learning mathematics and ability to solve practical problems.

5.3 Speaking concisely and practicing more and reducing unnecessary theoretical deduction

The orientation of training talents in higher vocational colleges determines that they do not need to have a clear understanding of the origin and development of mathematical formulas and theorems, but can use these formulas to solve practical problems. Therefore, in classroom teaching, unnecessary and time-consuming theoretical deduction can be deleted. For example, when we talk about the four operation rules of derivation, we can only derive the derivation formula of function product in class, and the derivation rules of sum, difference and quotient will not be deduced one by one. The time used for derivation is used to let students repeatedly use these formulas for more exercises to solve specific problems. The effect will be better and more in line with the requirements of training objectives.

5.4 Setting up Mathematics Experiment Course

The traditional higher mathematics course pays more attention to the theory teaching. It pays attention to the systematic and integrity of students' theory and the cultivation of students' logical thinking ability, which is different from our training goal. Like professional courses, mathematics should also introduce practical teaching links. Mathematics experiment is a good carrier.

The establishment of mathematics experiment course first changed the traditional teaching mode of one-way transmission of knowledge by teachers. It improved the participation of students in the teaching process and the enthusiasm of students in learning mathematics. Secondly, it trains students' ability to solve practical problems with mathematical knowledge and methods, comprehends the spiritual essence and ideological methods of mathematics, and grasps the essence of mathematics. Thirdly, I am proficient in mathematic software and experience the idea of modeling.

5.5 Making full use of modern information teaching technology

In view of the wide application of computers, in order to improve the students' consciousness and ability to solve mathematical problems by using computers, we can try to make courseware of the contents. This can stimulate students' interest in learning, and can better help them understand what they have learned. For example, the study of definite integral is the key and difficult point in Higher Mathematics teaching. Using multimedia to demonstrate the process of "segmentation, approximation, substitution, summation and limit" dynamically can make students have a profound understanding of definite integral thought. At the same time, we should also pay attention to the misunderstanding that multimedia teaching is easy to enter: the content of courseware does not match the rhythm of teaching, and the speed of demonstration is too fast. In short, the use of multimedia teaching, not only to give full play to its vivid, intuitive, time-saving, large capacity advantages, but also to avoid its disadvantages.

5.6 Improving the evaluation system to meet the training objectives

With the reform of teaching ideas, teaching contents and teaching methods, the assessment methods of students' achievements should also be paid attention to and improved. In the study of higher mathematics, we don't aim at taking exams. We should change the past assessment methods of simply examining students' mathematical knowledge, increase the assessment of students' ability to solve practical problems with mathematical knowledge, and truly embody "learning mathematics and using mathematics". Specifically, the teacher's assessment of students' performance should include two parts: one is basic theoretical knowledge; the other is project questions to assess students' ability to apply mathematics. Set the corresponding proportion of the two parts of the assessment content, and formulate a perfect assessment method. Such an evaluation system has greatly stimulated the enthusiasm of students to apply mathematical knowledge to solve practical problems, and laid a solid foundation for students to go to work in the future.

6. Conclusion

This paper mainly elaborates and analyses the current situation and existing problems of higher mathematics teaching in Higher Vocational colleges, and gives the author's viewpoints from the aspects of teaching concept, teaching content, teaching methods and assessment methods, aiming at giving some suggestions and references to colleagues.

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