Application and Practice of Teaching Methods of Mathematics Information in Higher Vocational Education

Yuxia Song
Dalian Vocational and Technical College
2003512256@dlvtc.edu.cn

Abstract: Since 2019, in response to the requirements of the 2019 government work report, higher vocational colleges have implemented an expansion of 1 million people. Higher vocational mathematics teaching exists and faces new problems and challenges. This article briefly introduces some informatization teaching tools and platforms. On this basis, a reasonable informatization teaching plan is formulated, and teaching materials are integrated and optimized. The specific application and practice of informatization teaching are carried out in the teaching classroom, and an effective feedback mechanism is proposed. The results have greater sharing and promotion value. Eventually realize the goal of training high-level, high-quality and high-skilled talents.

1. Definition of information teaching
Informatization teaching refers to the application of modern information technology means and teaching methods to carry out teaching activities in the teaching process, guided by modern educational concepts and supported by information technology. [1] The main goal is to make the teaching content more contemporary and rich. It also better meets the learning characteristics and needs of contemporary students, so as to achieve the teaching goals and improve the quality and efficiency of teaching.

Higher vocational mathematics is a necessary condition for mastering higher vocational education skills. Good mathematics literacy lays a good foundation for students' professional course study, which is beneficial for students to fully master their vocational skills. In the context of educational modernization, instead of a blackboard, a chalk, and boring symbol and formula derivation in traditional teaching, the rapid development of modern information technology and network technology in higher vocational mathematics information teaching is an important tool and platform. It takes typical realistic problems as prototypes, fully integrates and optimizes many links in mathematics teaching, develops channels for information exchange between teachers and students, breaks through the difficulties of mathematics teaching, and conducts practical teaching. It can greatly stimulate students' interest and enthusiasm in learning, and enhance students' comprehensive qualities such as learning ability, application ability, and ability to solve practical problems.

2. Problems in higher vocational mathematics teaching
(1) Higher mathematics is often abstract in concept and strong in theory, but relatively weak in application and practice. This makes students' cognition of mathematics without a deeper understanding and experience except calculation and proof. At the same time, it is easy to make students feel afraid of difficulties and learning, let alone application. In fact, higher vocational mathematics is not only a basic subject needed by students in the future, but also plays a pivotal role in all walks of life in modern life.

(2) Higher vocational students generally have a weak mathematical foundation. Especially with the
massive expansion of vocational colleges, most of the students' weaknesses are mathematics. In combination with actual academic conditions, higher vocational students generally have a weak ability to accept theoretical knowledge, but their advantage lies in their good manual and practical skills.

(3) The teaching format is single. The traditional mathematics teaching mode is often that teachers speak and students listen. In the entire teaching process, teachers dominate, and the proportion of students who are willing and active to learn is not large. However, the entire teaching content is interlocking, which makes it difficult for students to keep up with the progress of teaching once they fall behind, and the enthusiasm for learning is greatly reduced.

(4) The final decision on the student's performance is still a test paper. In fact, it is not enough to use the memory and calculation ability of the students as the criterion for higher vocational students. It is often more important to attach importance to students' understanding of knowledge, manual practice ability and application ability. Of course, factors such as learning enthusiasm, learning attitude and teamwork cannot be ignored. Therefore, teachers should pay more attention to the evaluation and assessment of students' learning process.[1]

3. Introduction to information teaching tools

3.1. Geogebra
Geogebra is a mathematics software that integrates algebra, geometry, statistics, drawing and other functions with one piece. There are currently millions of users worldwide. In particular, Geogebra has powerful graphics rendering capabilities for dynamic presentations. Compared with the geometric sketchpad, it also adds many functions such as calculus symbol calculation, linear algebra calculation and statistics. It is an effective assistant for mathematics teaching and learning. Geogebra also supports mobile devices equipped with Android and IOS systems. It can be operated on smart phones and tablet computers, which is convenient and simple.

In the process of higher vocational mathematics teaching, abstract concepts such as limit, derivative, definite integral, etc., are demonstrated through dynamic images to help students understand thoroughly and enhance memory.[2] Knowledge about the volume of the rotating body and spatial analysis geometry can be used in the 3D drawing area to allow students to visually see the spatial geometry and construct spatial thinking.[3] Geogebra is easy to operate, and it is also convenient for teachers to practice at any time in class, and students with basic mathematical knowledge can also operate it. It is a simple, easy-to-understand, convenient and fast information teaching assistant.

3.2. MOOC and micro-class learning platform
With the continuous development of the Internet, massive online resources can provide people with many learning platforms and learning opportunities. However, due to the weak mathematical foundation of vocational students, the quality of online courses is uneven. These factors will hinder students' opportunities to expand their learning. Teachers can provide targeted guidance and recommendations to students through selection, or recording MOOCs and micro-classes.

Such as "MOOC: Massive Open Online Course", an online education platform jointly launched by NetEase and Higher Education. It undertakes the task of the Ministry of Education's National Excellent Open Courses and provides the public with MOOC courses from well-known Chinese universities. Most of the course resources are open source and free.

3.3. Cloud classes and Chaoxing Xuexitong
Cloud Class is a service platform for mobile cloud teaching. In the network environment, it uses computers or mobile devices to carry out teaching activities.[4] Not limited to higher vocational mathematics teaching, classroom teaching of other subjects can be realized through the platform of cloud class, online and offline hybrid teaching. Teacher-student interaction can be carried out anytime and anywhere. The platform includes a variety of teaching activities such as sharing of teaching resources, group cooperation, problem discussions, after-class exercises, and learning evaluation feedback.
mechanisms. It is an effective tool for higher vocational mathematics information teaching.

Xuexitong is a platform based on microservice architecture. It has the functions of curriculum learning, knowledge dissemination and management sharing. It is similar to the cloud class and recognized by most universities in China.

3.4. Application of mathematical modeling

The concept of mathematical modeling is already familiar. For nearly half a century, with the rapid development of computer technology, the application of mathematics has not only played an increasingly important role in the fields of engineering and natural sciences. Moreover, it has penetrated into economic, management, biology, environment and other fields with unprecedented breadth and depth. Mathematical modeling has become an important part of contemporary high-tech.

In the process of teaching higher vocational mathematics, students are trained to use the mathematical knowledge they have learned to solve practical problems. It can enhance students' self-confidence in learning, help motivate students to have a desire to learn, and be able to face the gap between their own level and actual needs. Encourage students to learn to use mathematical ideas and methods to solve professional theoretical problems they have learned, or practical problems encountered in future jobs.

4. The specific application of information teaching methods in higher vocational mathematics

4.1. Develop an informatization teaching plan and choose suitable teaching materials

Traditional higher mathematics textbooks emphasize theoretical analysis, but ignore the applicability and reality of practical problems. This is inconsistent with the weak theoretical foundation and good practical ability of students in vocational colleges. Therefore, attention should be paid to selecting textbooks suitable for higher vocational students of "weaken the concept and focus on application".

When formulating teaching plans and curriculum design, we should closely follow the characteristics of higher vocational students, make full use of modern information technology, and introduce intuitive, vivid, and specific application cases.

4.2. Use information-based teaching tools to make curriculum design and teaching documents

In the context of educational modernization, the use of information-based teaching methods is by no means simply using PPT for teaching [5].

First, carefully design the curriculum. In accordance with the ideas of finding, asking, analyzing, and solving problems, the learning of mathematical concepts and calculation techniques are integrated into practical problems. Establish mathematical models, extract mathematical concepts, and then feed back mathematical concepts with practical problems to deepen understanding.

Secondly, in the whole course design, make full use of the teaching software such as Xuexitong, cloud class, Geogebra, and course resources such as MOOC and micro-class. And then make scientific and reasonable planning for students' knowledge preparation, knowledge learning, knowledge integration, knowledge storage, and follow-up learning.

4.3. The use of information-based teaching methods in the classroom

From a narrow perspective, the whole process of mathematics teaching roughly includes three major links: lesson preparation, class (two-way interaction between teaching and learning), testing and feedback.

Before class, the teacher searches and produces a large amount of information and resources according to the content of the class, and fully prepares the class. Online cases, course previews, teaching courseware, classroom exercises, homework and other teaching resources are released in advance in the class of the cloud class. Cultivate students' good habit of previewing in advance, so that they can find problems, ask questions, and communicate and discuss with teachers and classmates in real time. It also guarantees that students are able to learn independently anytime and anywhere in their own learning methods.
In class, appropriate cases and related animation presentations of mathematical concepts are made into short videos, and micro-classes are used to guide the teaching process to attract students' attention. The ggb software was demonstrated in the class, replacing complicated theoretical derivation with intuitive graphics. The boring, abstract, and complex conceptual theorems in traditional advanced mathematics have become intuitive and easy to understand. At the same time, the use of various mathematics software can better play the main role of students in the classroom. The students' hands-on work can enhance their manual skills and information technology application ability, and truly achieve the effect of applying what they have learned.

After class, students can use platforms such as Xuexitong and Cloud Class to communicate with teachers anytime and anywhere without being restricted by time and space. The setting of discussion groups in the cloud class also helps students to discuss and communicate with each other, and enhance the sense of team responsibility and ability. In the test and feedback link, homework, exercises, and tests can be generated based on the established question bank on platforms such as Xueexitong and Cloud Class. In the end, the platform independently corrects objective questions and gives the process of solving them.

In addition, the recommendation and use of video courses such as micro-courses and MOOCs can provide students with a sustainable learning platform for future continuing education, and meet the needs of students for undergraduate studies after graduation or some courses after work.

4.4. Informatization teaching assessment method
Although information technology and Internet technology are becoming more mature. High-quality information resources are relatively complete. But for some vocational students, self-discipline is poor. The use of information-based teaching tools for math learning still needs to be strengthened.

Therefore, with the help of informatization methods, a scientific and reasonable teaching evaluation mechanism helps to urge students to use the established informatization teaching methods and platforms for pre-class preview and after-class review. In particular, the cloud class and the learning platform can automatically accumulate points according to the students' forums, readings, exercises, homework and other links throughout the learning process, thereby forming a reasonable evaluation mechanism.

5. Application effect and promotion value of informatization teaching methods
Abstract concepts can make students easy to understand through dynamic presentations, taught by Geogebra. Some students are even more interested in software, and take the initiative to search and download mathematics software online. The resource library in the cloud class gives students the opportunity to preview before class and learn after class. At the same time, the data can be fed back to the teacher so that the teacher can understand the student's learning situation in time.

Students’ learning patterns summarized through cloud class data will provide early warning and guidance to students’ performance before the final grade is given. Students’ learning patterns summarized through cloud class data will provide early warning and guidance to students’ performance before the final grade is given. The application of Geogebra software and blue ink cloud classes is extremely easy to promote and use. For Geogebra, after the dynamic software is completed, it can be carried by a U disk or saved in the cloud. Demonstrations can be carried out at any time through software, web pages or even mobile devices such as smart phones and tablets, and the operation is simple. It has great sharing value. In terms of cloud classes, using the function of copying classes, you can also copy classes that have been built. The included resources, activities and other in-teaching activities can also be copied at the same time. Just re-set the time for each resource to re-learn. In addition, the content of the resource bank and question bank can also be added, deleted or modified in class at any time. Because of its simple operation and strong portability, it has great promotion and application value.

6. The importance of the application of informatized teaching methods in teaching
Higher vocational mathematics is one of the important basic courses offered by various majors in modern higher vocational colleges. However, due to the low starting point and weak mathematical
foundation of higher vocational students, it is difficult to accept pure theoretical mathematical content. The goal of higher vocational education is to cultivate technical application talents. Based on "weakening the concept and focusing on application", distinguish the content, methods and methods of higher vocational mathematics and undergraduate higher mathematics teaching.

The function and focus of higher vocational mathematics teaching are mainly to cultivate and train students' numerical calculation ability, data processing ability, and the ability to apply mathematical models to solve practical problems. So that students can truly integrate the mathematical knowledge they have learned into various professional subjects.

Good mathematical literacy can cultivate students' rigorous and logical thinking qualities, and comprehensively enhance students' scientific and cultural heritage. The innovation of information technology in mathematics teaching can more stimulate students' fun in learning mathematics. It can improve students' ability to apply information technology, adapt to the progress and development of the times, and provide necessary conditions for students to continue their studies. Ultimately, the goal of cultivating high-level, high-quality, and high-skilled talents will be realized.

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