

Analysis of mathematics teaching mode in higher vocational colleges based on core literacy

Yehong Miao

Suzhou Chien-Shiung Institute of Technology, Taicang, 215411, China

Keywords: Higher vocational mathematics; Core literacy; Model of instruction

Abstract: With the development of higher vocational education, the reform of higher mathematics teaching is imperative. Aiming at the problems existing in the teaching of advanced mathematics in higher vocational colleges, this paper puts forward some reform measures in the aspects of hierarchical teaching, teaching contents, teaching methods and means, and examination mode. Contemporary society puts forward higher requirements for higher skilled talents. As the main source of higher skilled talents, the core quality of vocational school students will directly affect the basic quality of the new generation of workers, so we must pay attention to it. Calculus knowledge contains a lot of mathematical ideas, which are important for students' abstract generalization ability, logical reasoning ability, Intuitive imagination ability, mathematical operation ability, etc. are required to be relatively high. Higher vocational education also needs to implement core literacy in all aspects of curriculum teaching. Starting from mathematics classroom teaching in higher vocational colleges, this paper explores how to realize the education and cultivation of "core literacy" in mathematics classroom.

1. Introduction

As an important basic course in higher vocational schools, higher mathematics, an accurate scientific language commonly used by many disciplines, plays an important role in the learning of students' subsequent courses and the cultivation of thinking quality [1]. The teaching of higher vocational colleges has always emphasized "professionalism" and attached importance to the cultivation of practical skills, but ignored the fundamental task of Building Morality and cultivating people, especially in higher vocational mathematics classroom teaching. Starting with the analysis of the current situation of Higher Vocational Students' mathematics learning, this paper realizes the cultivation of students' Mathematics "core literacy" by changing mathematics classroom teaching strategies and modes [2].

Advanced mathematics is an important basic course for all related majors in higher vocational colleges. It not only provides students with essential mathematics basic knowledge and mathematical methods for learning follow-up courses and solving practical problems, but also cultivates students' thinking ability, analysis and solution. The ability to question provides the necessary conditions [3]. With the progress of society, people's requirements for education are constantly improving. In the past, they only paid attention to the cultivation of knowledge and skills in the teaching field, but now they emphasize student-orientation, students' practice and innovation ability, and more emphasis on the infiltration and cultivation of students' core subject literacy in classroom teaching [4]. At the same time, the rapidly developing society puts forward higher requirements for contemporary workers. In addition to professional skills, it pays more attention to the comprehensive qualities of emotion, attitude and values, such as learning ability, communication ability, organization and coordination ability, will quality, enterprising spirit and thirst for knowledge, professionalism, sense of responsibility, team consciousness and so on [5]. Therefore, the effect of higher mathematics teaching and students' mastery of mathematics knowledge directly affect the teaching of follow-up courses and the cultivation of high-quality talents [6].

2. Measures of higher mathematics reform in Higher Vocational Colleges

2.1. Measures of higher mathematics reform in Higher Vocational Colleges

The source of students in higher vocational colleges includes the first batch and second batch of students admitted to the general college entrance examination, the students who enter the vocational high school and the secondary school, and the students of "3+2" and "five-year consistent system" [7]. This multi-level and multi-category enrollment brings uneven levels of students [8]. Layering can meet the special requirements of students for their own quality improvement and future career needs [9]. At present, there are some problems in higher vocational mathematics teaching, such as few teaching hours, nonstandard teaching materials, no scientific teaching materials, weak mathematical foundation and low learning enthusiasm of students in higher vocational colleges, which bring many difficulties to higher vocational mathematics teaching. At present, many higher vocational mathematics textbooks are basically a kind of shallowness, simplification and reduction of undergraduate mathematics textbooks [10]. The selected higher mathematics textbooks are highly theoretical and rarely connected with practical problems, so they are not suitable for higher vocational college students. In the teaching reform of higher vocational colleges, we have generally strengthened the learning of professional courses and reduced the class hours of basic courses. All colleges basically take measures to reduce the teaching content and reduce the teaching difficulty.

A distinctive feature of higher vocational education is that the career direction is clear, the teaching objectives are highly targeted, and the students trained have the basic theory and proficient practical ability and strong innovation ability necessary for a certain occupational position (or position group). Therefore, the teaching content needs to adopt the methods of strengthening the foundation, highlighting the application, broadening the content and increasing the flexibility of choice, so as to ensure the overall realization of its three functions in talent cultivation in higher vocational education. The aim is to cultivate advanced applied technical talents, and academic and theoretical talents should not be taken as the training objectives. Therefore, in Higher Mathematics Education in higher vocational colleges, we should not emphasize too much on the strictness of logic and thinking, but should take it as the basis of professional courses, emphasizing its applicability, the openness of students' thinking and the consciousness of solving practical problems. Therefore, in the teaching process of Higher Mathematics in higher vocational colleges, we should change the past concept, take "application" as the basis, adhere to the degree of "necessary and sufficient", and do not emphasize the integrity of theory.

2.2. Reform of teaching methods and means

As an important cultural basic course, mathematics plays an important role in students' future development. After graduation, due to the limitations of knowledge and the need to solve problems in work, most students must further study or go back to university for further study after graduation. Therefore, on the basis of adhering to the far side of "necessary and sufficient", higher vocational mathematics teaching should also make students have a certain foundation of sustainable development. The reform of teaching content follows the following basic principles: first, focus on the connection with elementary mathematics, and delete non-basic knowledge and difficult and complicated content and exercises; second, simplify the more difficult content in basic knowledge and weaken the theory. The system and rigor of the system and the application of basic knowledge are highlighted; third, the content and examples related to the professional practice are added, and case teaching is implemented; fourth, the modules of mathematical modeling and mathematical practice are added to cultivate students' ability to solve practical problems.

To introduce the teaching mode centered on "problem solving", we can adopt the methods of problem teaching, discussion and communication, etc. Problem-based teaching method, by creating situations-asking questions-exploring and guessing-making assumptions-reasoning and verifying-draws a conclusion. This teaching method enables students to discover knowledge by themselves under the guidance of teachers, not through teachers' explanations, in the process of learning mathematics knowledge. After the integration of higher mathematics courses and information technology, students can preview independently and complete the test questions independently

before class according to the videos and micro courses provided on the network teaching platform. Group members can also analyze, discuss and solve problems according to the cooperative tasks of the group, which will fully mobilize students' enthusiasm and participation and cultivate their cooperative spirit of mutual inspiration, unity and cooperation. In the teaching process, teachers should change their teaching concepts and focus on improving students' core mathematical literacy. Only by fully understanding and paying attention to the core literacy, and having a deep identity in the heart, can we truly guide and influence students.

3. Implementation Strategy of Mathematics "Core Literacy" Teaching in Higher Vocational Colleges

3.1. The Connotation of Core Literacy and Mathematical Core Literacy

The so-called "core literacy" refers to the knowledge, ability and attitude that people should have to adapt to their current life and face future challenges. It is also the literacy that modern people need to achieve a successful life and a functional society. Moreover, the "core literacy" is an important foundation for cultivating high-quality people and world citizens who can realize themselves and maintain the sound development of society. Change and create a new teaching environment, adopt advanced teaching means, improve higher vocational mathematics teaching contents, improve teaching modes and methods, and improve the education and teaching ability of mathematics teachers. The current higher mathematics courses are facing many practical difficulties, such as less curriculum hours, inconsistent curriculum standards, and diverse student sources. The development of information technology provides an effective means to solve these contradictions. The integration and penetration of information technology in curriculum teaching must It will further improve the existing higher mathematics curriculum system, optimize the teaching content of the curriculum, enrich the connotation of the curriculum, and provide support for the promotion of curriculum reform and the quality of personnel training. As can be seen from Figure 1, 62.50% of math teachers and 57.99% of students think that the existing math classroom teaching methods have little effect on cultivating students' math core literacy, and another 1.18% of students think that they have no effect. As shown in Figure 1:

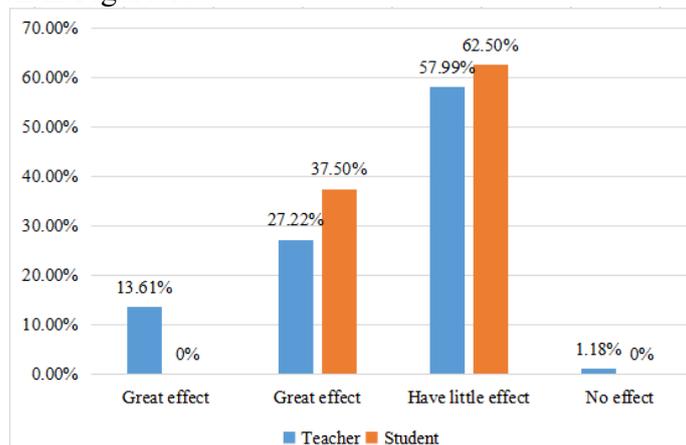


Figure 1 The role of current mathematics classroom teaching methods in improving and developing students' mathematics core literacy

The core quality of mathematics is not a specific mathematical knowledge, nor is it a specific way of thinking. Mathematics core literacy is a by-product of mathematics teaching. It will be specific after students forget specific mathematics knowledge and thinking mode. Analyze the profound connotation of mathematical literacy such as "mathematical abstraction, logical reasoning, mathematical modeling, mathematical operation, intuitive imagination and data analysis", and guide students to think about mathematical thoughts and experience the methods of mathematical analysis, so as to form the core mathematical literacy in students' hearts. In order to solve the common problems in vocational colleges that focus on skill training, neglect core literacy education and the

separation of educational content from students' actuality, it is necessary to select and reconstruct course content around core literacy, and create some typical task situations in the classroom. Realize knowledge structuring, contextualization and conditioning. As far as possible, the complex and abstract mathematical theories are illustrated visually, so that teaching can be widely used and interesting, students' interest in learning mathematics can be improved, and the classroom teaching effect of mathematics can be improved. Understanding and Analysis of Teachers' and Students' Mathematics Core Literacy The survey results of mathematics teachers' and students' understanding of mathematics core literacy are shown in Figure 2:

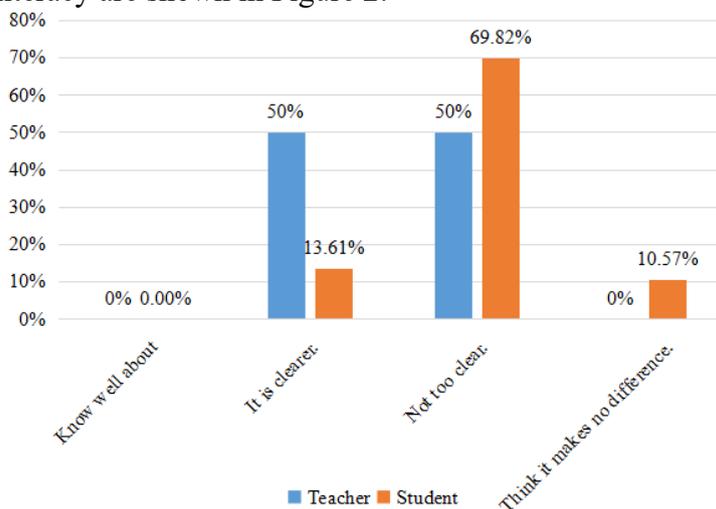


Figure 2 Statistics of teachers and students' understanding of mathematics core literacy in five-year higher vocational colleges

3.2. Using flexible modern teaching technology to tap students' innovative thinking ability

Students' mathematics core literacy is developed in the process of learning mathematics knowledge, so teaching design is particularly important for teachers. The principle of Mathematicalization mainly emphasizes that in the process of mathematics teaching, learners can experience the actual problem situation in life, abstract the actual problem situation into mathematical problems, and then solve mathematical problems to further application. In the high school derivative teaching design based on the core literacy of mathematics, teachers create interesting and personalized life situations, allowing students to solve practical problems through their own observation, perception, discovery, experience, operation, and inquiry, so that the original boring and abstract derivative Knowledge becomes vivid and concrete, which effectively stimulates students' interest in derivative learning. In derivative teaching design based on mathematics core literacy, teachers should make corresponding changes to traditional educational concepts and teaching methods, and actively and reasonably use information technology in teaching, so as to make students understand mathematics knowledge more conveniently, stimulate students' interest in learning mathematics, and improve the efficiency of mathematics classroom teaching. Especially for some abstract mathematical knowledge and images that are difficult to draw, teachers had better use information-based teaching, which can not only save time but also enable students to understand mathematical knowledge more quickly.

Before carrying out inquiry teaching, teachers should strive to study teaching materials, clarify teaching objectives according to teaching contents, and create a harmonious and democratic learning atmosphere for students. At the end of inquiry-based teaching, teachers should guide students to conduct induction, summarization and reflection, help students sort out and clarify the context of derivative knowledge, re-perceive and experience the formation process of mathematical ideas, improve students' mathematical thinking and ability, and promote students' mathematical core. The development of literacy should fully mobilize the enthusiasm and subjective initiative of students in learning, let students learn and explore independently, exercise their ability in exploration and problem-solving activities, and cultivate literacy.

4. Conclusions

Teachers are the forerunners and executors of teaching reform. Only by continuously improving the comprehensive quality of teachers' professional theory and practical application skills can we talk about improving the quality of students, so that students can still have the ability to use modern mathematical thinking methods to solve practical problems in their major after they step out of school. For example, derivative knowledge occupies a very important position in the content of mathematics in high school. It is the key content of the college entrance examination. As an important part of higher mathematics, it is also a bridge between elementary mathematics and advanced mathematics. It contains a lot of mathematical ideas, which are important for students' abstract generalization ability, logical reasoning ability, intuitive imagination ability, mathematical operation ability, etc. are required to be relatively high. The construction of mathematics classroom in higher vocational colleges is a long-term research topic. To change the existing teaching and learning status, cultivate students' professional quality and adaptability to the future society, and achieve the teaching goal of "cultivating morality and cultivating people", teachers need to constantly improve classroom teaching. In order to reform and innovate, schools, teachers and students also need to realize the important role of mathematics education in "whole person education". In teaching, teachers should take students' core literacy as the guidance to conduct teaching practice research, improve teaching level and quality, and cultivate technical and technical talents with solid foundation, high mathematical literacy and excellent comprehensive quality.

References

- [1] Zhang Juan, Sun Shaoping Improving students' core literacy based on the reform of higher mathematics teaching mode in Higher Vocational Colleges [J] New curriculum research: late 2019 (2): 3.
- [2] Hu Guoxing, Zheng Li Exploration on role exchange teaching mode of higher vocational mathematics curriculum from the perspective of core literacy [J] Science and education guide, 2020 (35): 3.
- [3] Wang Yanzhen Practical research on the flipped classroom teaching mode of mathematics in Higher Vocational Colleges Guided by core literacy -- Taking the "dihedral angle" course as an example [J] Journal of Yantai Vocational College, 2020 (2): 5.
- [4] Hang Haixia Exploration on the cultivation mode of Higher Vocational Mathematics core literacy ability under the concept of Ideological and Political Education [J] Literary youth, 2021 (6): 0262-0263.
- [5] Zhang Yuanyuan On the training mode of mathematics core literacy in Higher Vocational Colleges [J] Intelligence, 2020 (04): 38-39.
- Zhao Gang Research on higher vocational mathematics classroom teaching based on core literacy [J] Good parents: innovative education, 2018 (9): 1.
- [6] Rowe On the cultivation strategy of minority students' core literacy in Higher Vocational Mathematics Teaching [J] Mathematics learning and research, 2021 (20): 2.
- [7] Zhang Xiayu, Yu Ping Compilation of "Mathematics Teachers' core Literacy Scale in Higher Vocational Colleges" [J] Journal of mathematics education, 2018,27 (6): 10.
- [8] Asia, Europe and South Korea On the reform of higher vocational mathematics curriculum based on the cultivation of core literacy [J] Innovation and practice of teaching methods, 2019,2 (5): 108.
- [9] Chen Jun Analysis of higher vocational mathematics classroom teaching under core literacy [J] Truth, 2021 (2): 2
- [10] Cheng Changsheng, Liang Haipeng, Li Xiaohui Research and practice of Higher Vocational Mathematics Teaching under the background of core literacy [J] International public relations, 2020 (3): 1.