

Research on the Teaching Reform of Advanced Mathematics in Higher Vocational and Technical Colleges

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Abstract. For most of the students in higher vocational and technical colleges, it is difficult for them to study advanced mathematics. Teachers should do a good job in teaching reform to help students reduce the pressure of learning, so as to meet the students' learning needs in the future. Under this background, this paper first analyzes the necessity of mathematics teaching reform in higher vocational and technical colleges, then researches on the problems existing in higher mathematics teaching in higher vocational and technical colleges, and finally puts forward scientific solutions to the problems in order to improve the mathematics learning level of students in higher vocational and technical colleges.

Introduction

According to the training objectives of higher vocational and technical colleges and the characteristics of students, the task of mathematics teaching in higher vocational and technical colleges is, on the one hand, to provide the necessary mathematical basis for professional learning, on the other hand, to improve the students' cultural literacy to meet the needs of the mathematical basis of their job responsibilities [1]. The main objectives of the teaching reform of advanced mathematics in higher vocational and technical colleges are as follows: It should make students master the basic theory and operation of mathematics, master the basic knowledge of mathematics which is necessary to learn the follow-up courses, have the basic operation ability of calculations and preliminary application of mathematical software, master the idea of mathematical modeling, solve simple practical problems by using mathematical knowledge and form the ability of thinking and solving problems in a "mathematical way" [2-3].

Necessity of Mathematics Teaching Reform in Higher Vocational and Technical Colleges

At present, many higher vocational and technical colleges mainly take mathematics as a basic course and tool course, which serves for other subjects of students and cultivates students' logical thinking ability as well as comprehensive innovation ability. Therefore, the advanced mathematics teaching reform in higher vocational and technical colleges is very important, because it can serve for the development of students [4]. However, in the process of practical teaching, there are some problems in mathematics teaching in higher vocational and technical colleges influenced by various factors. Many students have misunderstanding in the mathematics knowledge and have no strong interest in learning; Some students do not find the correct learning method and lose their confidence in learning mathematics [5]. What is more, some teachers use traditional teaching methods, but lack interaction with students and the connection of mathematical theory and the practical life, thus increasing the difficulty of learning. In order to improve the students' ability of mathematics learning and application, the reform of mathematics teaching has become the most important task in teaching.

Problems of Advanced Mathematics Teaching in Higher Vocational and Technical Colleges

The mathematics foundation of higher vocational and technical college students is poor. The students in higher vocational and technical colleges are mainly vocational high school students and students with low scores of college entrance examination. With the development of higher vocational and technical education, the entrance threshold of students becomes lower and lower. Most of the mathematics scores are between 60 and 20 points, and some are even less than 10 points. After learning advanced mathematics for a semester, students can't solve many simple problems, and some students can't even get derivatives. Students' examination results are often low and many students fail in the exam, failing to meet the requirements of teaching. It shows that these students have not only poor foundation, but also bad learning attitude and learning habits. They show no interest in mathematics learning, and the initiative is insufficient. So how to build up self-confidence and cultivate learning interest is the urgent problem to be solved [6].

The connection between theory knowledge and practice application of mathematics teachers is insufficient. Mathematics teachers in higher vocational and technical colleges almost all major in mathematics, although they have a solid mathematical foundation and experienced mathematical research ability, they can not use the corresponding professional theory, methods or examples as the background or examples of teaching when they engage in vocational and technical education because of the limitation of their own knowledge structure. Mathematics teachers who major in mathematics often teach mathematics from the aspect of mathematics major, and only quote some formulas and conclusions in the specialized courses where mathematics is needed. The mathematics curriculum and the professional course are in a separate state and the two courses can not be integrated, even the students with excellent mathematics results are difficult to apply mathematical knowledge to their major to solve problems. How to set up a bridge between mathematics teaching and specialized courses is also an urgent problem to be solved.

The teaching periods of mathematics in higher vocational and technical colleges are short. The higher vocational and technical education emphasizes the students' mastery of the corresponding vocational technology and the students' practical abilities. Therefore, the teaching emphasis is placed on the teaching and practical training of the specialized courses. Teaching hours of political lessons, foreign language lessons, and physical lessons are guaranteed in basic theory classes except mathematics [7]. It is because the education department in charge of education has always made clear provisions on the teaching hours of political and physical education. Foreign language is paid more attention to in the aspect of both teaching and learning because of the examination level. In this case, the teaching periods of mathematics lessons are decreasing. Some majors have less than 70 teaching hours of advanced mathematics, and the most of them are only about 140. However, the teaching contents should cover limits, derivatives, integrals, ordinary differential equations, calculus, series, linear algebra, probability theory and so on, so the teaching hours are obviously insufficient. How to solve the problem of insufficient teaching periods is also an urgent problem.

Suggestions on the Teaching Reform of Mathematics in Higher Vocational and Technical Colleges

Establishing students' self-confidence in learning and improving teaching efficiency overall. Several years' teaching practice shows that if students lack confidence in advanced mathematics learning, they will feel more difficult to learn. To enhance students' self-confidence in learning: Firstly, stimulating students' interest in learning mathematics and eliminating the fear of students. According to the characteristics and individual differences of students' development, teachers should put forward tasks and requirements suitable for their levels, set an appropriate goal that enables them to accomplish through hard work, pay attention to mobilizing students' initiative and enthusiasm in learning and create opportunities for students to experience success. Teachers should be good at discovering and affirming students, so that students have self-confidence at all times. Secondly, guiding students to develop good study habits. Students should cultivate good habits at

the bar and stick to them [8-9]. Many habits are embodied in the details, such as sitting posture in class and reading posture. Teachers must start with little things when guiding students to develop good learning habits. It is widely acknowledged that habits are formed by repetition or practice, but not formed overnight and needs to be strengthened. In the process of cultivating students' good learning habits, teachers should pay attention to arousing students' interest. Interest is the intrinsic motivation of learning. If students are stimulated, they will be proactive and learn efficiently. Especially for students in higher vocational and technical colleges, they should cultivate good learning habits, form a rigorous mathematical thinking, preview and review when they study advanced mathematics, so as to improve their learning level of advanced mathematics, and achieve the objectives of advanced mathematics teaching reform in higher vocational and technical colleges.

Paying attention to the connection with the major and the combination between theory and practice. In addition to satisfying the development demand of higher education and embodying the basic function of mathematics, advanced mathematics should also meet the needs of students' major and serve the specialty. In the process of teaching, teachers should make full use of the instrumental role of mathematics to clear the obstacles for students to follow-up professional courses and pave the way for them. The mathematics teacher should change the traditional teaching idea, establish the communication channel with the specialized course teachers and pay attention to the cultivation of student's calculation ability and application ability [10]. In the process of teaching, teachers should emphasize and dilute two aspects respectively: Emphasizing the introduction of mathematical concepts and the formation of mathematical ideas, emphasizing the mathematical contents required by professional application, diluting the complicated mathematical calculations and skills, and diluting the knowledge system of mathematics itself. Teachers should make clear the concepts of mathematics, pay attention to the introduction of practical background, emphasize the formation and application of mathematical methods. Students should understand the concept correctly, master the following theorems, formulas and practical application methods. In the limited teaching periods, the complicated and difficult calculation explanation should be deleted, and the students should be encouraged to study and use the existing mathematical software to solve the calculation problems. Mathematical teachers should downplay the theoretical reasoning and pure mathematics proof and communicate with professional teachers according to the specific teaching contents. Starting from students' major and existing knowledge background, teachers should select appropriate practical problems, so that students can learn with problems and experience mathematics in person. It can make preparation for the formation of knowledge emotionally, and provide a full opportunity for students to carry on mathematical practice and exchange.

Optimizing and integrating mathematics teaching contents and reforming teaching methods and means. In order to cultivate innovative talents with broad knowledge, thick foundation, strong ability and high quality, higher vocational and technical colleges should optimize and integrate mathematics teaching contents to solve the problem of insufficient teaching hours. Following the principle of "teaching less contents but teaching more methods", advanced mathematics should be divided into mechanical and electrical mathematics, architectural mathematics, financial mathematics, agroforestry, animal husbandry and veterinary mathematics according to the college specialty, and the syllabus should be drawn up according to the professional types. In addition, in order to complete the teaching task, mathematics teachers should reform teaching methods and means [11]. Teachers should realize the importance of modern educational technology to improve the teaching efficiency of advanced mathematics, and actively use mathematical tool software to carry on teaching, helping students reduce the difficulty of advanced mathematics learning; When making the course slides, teachers can refer to the experience of neighbor colleges and learn other people's ideas. In the process of teaching, teachers should completely break the teaching mode of "knowledge imparting-example-practice" and adopt the teaching mode of "starting with practical problems-transforming them into mathematical problems-imparting mathematical knowledge-applying mathematical knowledge to solve practical problems", so that it can achieve the implementation of "double subjects and interactive" learning atmosphere. Teachers in higher vocational and technical colleges should make mathematics

teaching become an important way to enlighten students' wisdom, develop students' potential and creative ability, fully mobilize students' subjective initiative and thinking enthusiasm, and cultivate students' innovative consciousness and ability.

Summary

In conclusion, in order to enable students to learn mathematics well and make good use of mathematics, higher vocational and technical colleges should do a good job in the reform of advanced mathematics education. They should not only change teaching methods, but also change teaching ideas. In the process of teaching, teachers should continue thinking and trying, be good at finding problems and improving in time, dare to jump out of the traditional mode of thinking, set up a teaching mode that adapts to the goal of talent cultivation in higher vocational and technical colleges, implement stratified teaching, modular teaching and practical teaching, and pay attention to the cultivation of students' applied ability and autonomous learning ability. In addition, teachers in higher vocational and technical colleges should be brave to explore, innovate and summarize scriptures. In order to find an effective way for advanced mathematics teaching in higher vocational and technical colleges, teachers should make efforts to improve their teaching ability.

References

- [1] Wang Lingzhi. Exploration and Reflection on the Construction of Teaching Team of "Mathematics Experiment" in Higher Vocational and Technical Colleges[J]. Journal of Liuzhou Teachers College, 2012, 27(02): 95-98.
- [2] Zhang Youmei. Research on the Effective Teaching Strategies of Advanced Mathematics in Higher Vocational and Technical Education[J]. Journal of Jilin Radio and Television University, 2012(08): 63-64.
- [3] Hu Jingbo, An Zhongmeng. Research on the Reform Scheme of Advanced Mathematics Teaching in Higher Vocational and Technical Colleges[J]. Journal of Huaihai Institute of Technology (Humanities and Social Sciences Edition), 2012, 10(17): 109-112.
- [4] Huang Shunfa, Hu Yongjun, Wu Qiuming. Research on the Teaching Syllabus Setting of the "Advanced Mathematics Foundation" for Non-Science and Technology Majors in Higher Vocational and Technical Colleges[J]. Jingdezhen Comprehensive College Journal, 2007(02): 23-24.
- [5] Piao Chunzi. Research on the Effectiveness of Mathematics Classroom Teaching in Higher Vocational and Technical Colleges[J]. Journal of Liaoning Agriculture Technical College, 2015, 17(04): 44-45.
- [6] Xie Guojun. Double-Directional Analysis on the Connection Between Advanced Mathematics and Elementary Mathematics Teaching in Higher Vocational and Technical Colleges[J]. Journal of Guilin University of Aerospace Technology[J]. 2011, 16(01): 84-86.
- [7] He Meng, Zuo Yanfang, Wu Wuqin. Research on the Construction of Advanced Mathematics Excellent Curriculum in Higher Vocational and Technical Colleges[J]. Journal of Kunming Metallurgy College, 2008(01): 69-73.
- [8] Kong Qingyan, Geng Xiurong. A Preliminary Research on Mathematics Cognition and Belief of Students in Higher Vocational and Technical Colleges[J]. Journal of Guilin University of Aerospace Technology, 2009, 14(04): 489-491.
- [9] Guo Jianmin, Kang Shugui, Guo Caixia, Tian Haiyan, Sun Liping. Reform of Advanced Mathematics Teaching in Higher Vocational Colleges Based on Hybrid Classroom Teaching[J]. Journal of Tonghua Normal University, 2018, 39(04): 69-72.
- [10] Zhang Xiuying. Research on the Teaching Reform of Applied Mathematics in Higher Vocational and Technical Colleges[J]. Journal of Zhengzhou Railway Vocational and Technical College, 2018, 30(02): 45-46+49.
- [11] Li Dongmei. The Theory and Practice of Teaching Reform of Advanced Mathematics in Higher Vocational Education[J]. Journal of Liaoning Higher Vocational, 2004(01): 45-46.