

# Research and Practice of Mathematics Teaching in Higher Vocational College

Ying Liu

Foundation Department  
Jilin Technology College of Electronic Information  
Jilin City, 132021, China

**Abstract**—The rapid development of higher vocational education has become one of the hot social concerns. The discipline of mathematics is an essential foundation in vocational education. In order to innovate in the Higher Mathematics Teaching Model for vocational colleges, and help vocational students who originally have poor mathematical basis to get rid of the fear of mathematics learning, then learn to use mathematical methods to solve practical problems encountered in professional learning. In this paper, it mix the actual vocational mathematics teaching content, methods, means to analyze the outstanding issues that currently exist in vocational mathematics teaching, and aims to change ideas of mathematics teachers, and hold useful discussions to improve teaching methods and means to improve the quality of teaching mathematics vocational colleges

**Keywords**—*Mathematics; Teaching; Higher Vocational College*

## I. PREFACE

Our vocational education started relatively late, but in recent years the development is faster; despite the rapid development, but compared with some of the educational development of foreign occupation, we actually have a big gap. Nowadays higher vocational education is an important part of the higher education, has both dual attributes of higher education and vocational education. The goal is career-oriented education, regard vocational ability development as the core, featuring quality education, and training practical composite talents, who have high-quality and needed by the society, and in this, higher mathematics is seemed as a cornerstone of higher mathematics, it lays the foundation of the students who chase after success. The higher mathematics not only act as a bridge among people, but also plays a very important role in improving the quality of students' accomplishments in mathematics, logical thinking ability, personality development of students, and others. Follow these objective principles, teaching advanced mathematics should regard applications for the purpose, enable students to have some ability to analyze and solve abstract problems through learning mathematics and cultivating their own logic thought.

## II. STATUS ANALYSIS OF VOCATIONAL MATHEMATICS TEACHING METHODS AND MEANS

In recent years, the teaching of vocational math class has carried out a series of reforms in order to adapt to the rapid economic developmental needs of talents. However, under the influence of traditional teaching concepts, math class still have some dissatisfactory places on teaching methods and means, the main contents are as follows :

### A. *single teaching methods, outdated and backward*

Currently, teaching methods of math class aim to cultivate students' ability to explore new teaching methods and innovative use is still not widespread, traditional teaching methods of indoctrination still play the dominating role. This single, outdated teaching methods and backwardness, due entirely to the teacher-led classroom teachers chalk and talk, and did not give the students plenty of time and space to think, resulting in the students' thinking inert, so that students' learning potential is suppressed, is not conducive to the cultivation of students' innovative spirit.

### B. *Pay much attention to the theoretical explanation and look down upon the ability cultivation*

Currently, some teachers in the teaching process overemphasize the construction of mathematical theory, but pay little attention to teaching practice, resulting in the theory and practice disconnect, so that students have a more comprehensive and more solid mathematical theory, but lack the comprehensive ability to combine theory with practice, and the use of mathematical knowledge to solve problems.

### C. *There are some drawbacks in evaluation methods*

Most types of vocational school mathematics or traditional written exam, test questions are basically a replica of the examples and exercises in the book, which lack openness, applicability and doesn't involve the questions which can test students' flexible use of knowledge to solve practical problems, so it is difficult to examine students' ability of the application of knowledge, and problem-solving . Affected by this evaluation method, students do not understand the profound importance in learning and problem-solving methods to refine the concept, and not pay much attention to the practice and application of mathematical theory, only blindly solve problems, mechanically induct questions, immerge into the large amount of questions , strayed into mathematics learning wrong way.

### III. REFORM MATH TEACHING METHODS AND MEANS

The existing teaching methods and means existing in mathematic class in vocational schools seriously hampered the pace of reform in mathematics teaching, and hampered the realization of the objectives concerning vocational personnel training, and thus, increase the reform of teaching methods means is urgent.

#### A. *Update concepts of education, strengthen the application consciousness*

Transform teaching concept is the key idea of the reform of math teaching methods and means. The focus on vocational mathematics teaching form is to transform from the concept to the teaching of mathematics application, from imparting knowledge to the teaching of spirit of innovation, creativity and innovation as the core of quality education transformation.

The traditional mathematic teaching emphasize on teaching mathematics knowledge, regard the imparting of basic concepts, basic theory and methods as the main purpose, it too much emphasize on the mathematical system completeness itself, focus on the theory derivation and proof theory, focusing on the skill of the operator, which not only takes a lot of math teaching time, and pay much attention to mathematical theory of teaching, look down upon math skills training, which restricts the quality of talent cultivation of modern higher education. The purpose of vocational students to learn mathematics is not to study mathematics, but to apply mathematical knowledge in modern economic management, the use of mathematical knowledge to solve practical problems.

#### B. *Reform content, ideas and methods*

The main contents of the reform are teaching content and teaching mode of vocational higher mathematics. Investigate requirements into the course of higher mathematics, gather graduates' suggestions for teaching mathematics curriculum about content and teaching methods, to determine the current curriculum content and system, the selection of classical teaching content, teaching is much more refined, the introduction of new technological achievements, make the teaching content more modern, a comprehensive restructuring of the course content, form a new system of harmony, and to establish harmonious multimedia teaching system in accordance with curriculum content. Creating a culture of mathematics, with mathematics cultural education and culture of technical mathematics education, so that students can understand the true meaning and values of mathematics, determine the correct application thought of the mathematical concept and mathematical application concept.

The existing higher Mathematics Teaching content and systems, is difficult to meet all the face of ever-increasing demands of mathematics, we intend to carry out reforms from the following three aspects: First, you must clear the basic position of higher mathematics courses in vocational education and its basic role. Make clear the mathematics curriculum itself and various other programs and engineering requirements for mathematics trends and use it as the main basis of higher mathematics to determine the course content.

Second, from the application point of view or the need to solve practical problems, starting from the actual needs of the community needs and the subsequent course of the professional way, to consider and determine the teaching content system. Third, from the perspective of application-oriented talents to update teaching content and teaching system reform, higher mathematics curriculum not only means to teach students some practical mathematical tools, but also is the important carrier to develop students' mathematical thinking, mathematical qualities, applications and innovative ability. Mathematics education is a quality education on the nature, we can say the quality of vocational education and training of personnel is largely dependent on the level of quality and accomplishment of its mathematics, and the mathematics ability is mainly reflected in the quality of teaching and curriculum. Then, in higher mathematics teaching, teaching content should renewal and handles the relationship between tradition and modernity content, that is to explain the contents of the classic knowledge, on the other hand pay attention to the penetration of modern mathematics ideas, concepts and methods of modern mathematics, then provide interface display window and extend development to improve students' ability to acquire modern knowledge. To strive to push the boundaries of the original curriculum system, and promote relevant courses and combine relevant content and mutual penetration, promote the integration of different disciplines content, strengthen the cultivation of students' ability of application, reduce complex math skills training, and focused on engineering techniques commonly used in a variety of mathematical thinking.

### IV. TEACHING MODEL REFORM AND DEVELOPMENT OF HIGHER VOCATIONAL COLLEGES MATHEMATICS

#### A. *Actively promote constructivist teaching methods*

Constructivist idea is put forward in the 1950s by the Swiss psychologist Piyajiet, is the theory of human knowledge learning. It emphasizes the perception of the subject. Mathematical knowledge can not simply mechanically move from teacher to student, it must be based on students' prior knowledge and experience, construct them in the environment and the exchange of others. That is, each person has their own mathematical structure, mathematics teachers teach, students must perceive, digest and transform to fit their own mathematical structure, in order to be understood, mastered, and after application, reflection and exchange environment to further optimize and improve their mathematical structure, in order to achieve the realm of creativity.

Carried out in accordance with constructivist mathematics teaching, it must carry out first in the premise of "teacher- led", carry out mathematical cognitive activity. To reform the traditional teaching model, focusing on heuristic teaching, guiding students to think, change from passive acceptance of knowledge to independently explore activities, and fully mobilize the enthusiasm of students to participate in the teaching process. Second, pay attention to the important role of the "environment" of the construction. Math teachers should fully understand the students in the

cognitive structure of current mathematical premise, and design for students to independently explore the teaching situation, to focus on mathematical knowledge reproduction, development and application of the process, also focus on creating the application environment of mathematics for students. By interactions of teaching environment and application environment, it can not only enable students to achieve the construction of knowledge, but also makes the construction more solid. Third, pay attention to the establishment of the students' learning portfolios, have a dynamic tracking of students. Students are different in mathematics learning, teachers should establish students' learning profile according to their difference, then give appropriate and individualized guidance. Fourth, we must play the role of learning communities. Students often organize panel discussions, give full play to the role of groups, observe from different angles the breadth and depth of practical problems and theoretical issues, compare various perspectives and approaches to solve the problem, complement and enlighten each other, in these way can effectively improve students' math thinking skills. Fifth, we should encourage students to have exploratory research. Few young students stick to conservative thinking, they are full of innovative spirit. Therefore, teachers should make the best effort to encourage students to explore new mathematical problems, establish a new mathematical point of view, the creation of new mathematical methods, and create new mathematical achievements.

#### *B. Clarifying the concept combined with profession*

In the math class, we must first make clear that mathematical concepts, and this is where students' learning difficulties. When explaining mathematical concepts, if can lead the concept from the daily instances of student or professional life combined, the effect will be better. For example : When you talk about the concept of the derivative, in addition to speed the rate of change on the issue presented in the book include speed linear motion, teacher should as much as possible give some examples related with the rate of change. To electromechanical major students, teachers should introduce a non- uniform distribution of fine quality wire rod density, non-constant current rate of change of the current strength. To teach with the students already know or to be of a lot of contact with the professions instance can encourage students to establish the correct mathematical concepts and improve overall teaching effectiveness, but also to broaden the students' ideas, help students to improve the ability to practical problems into to mathematical problems.

#### *C. Good at the reasonable application of multimedia*

Good at the reasonable application of multimedia teaching, lead the computer-aided instruction into the classroom, you can use the powerful computer information processing capabilities and simulation teaching characteristics, to complete part of the work of teachers, and can be used to demonstrate how the geometry used be animated, with some important slides to introduce the history of mathematics, mathematician and abstractive concept which traditional mathematical teaching can not visually

represented. These vividly manifested through charts, images, animation and other multimedia can largely deepen the impression of students, so it can enable students to understand quickly and easy to grasp, then to stimulate students' enthusiasm for learning. But it is merely a means and methods of teaching, play a supporting role of teaching, teachers can not be used as the main body of the multimedia teaching, it should be remembered that the subject is always to be the students, the most important is through the explanation of teachers to inspire students, rather than just instill the knowledge by multimedia students because teaching is a complex process of bilateral activities, a unified effect combine with teachers' teaching and students' learning, only did teachers and students participate with efforts can be well achieved. Teachers are familiar with their students, and understand the proficiency of students to acquire knowledge, teachers can focus on the weak knowledge points to explain, rather than turn multimedia classroom into a simple appreciation place, and if so, in the teaching process teachers will become an operator, responsible for playing and stopping, or occasionally also commentary, student learn along with the computer, schools became lectures, this kind of doing lack of communication, teaching and learning disconnect, naturally it can not reach the desired results. The excessive use of multimedia would make students produce visual fatigue, while ignoring some key knowledge teachers explained, they may unilateral understood and learned through multimedia but it is really just a shallow understanding of the original, so, it greatly reducing the efficiency of classroom study, teachers' interaction with students will be greatly reduced. And some mathematical content can achieve good results through speaking and practice, without the use of multimedia presentations, some of the content are made into courseware through multimedia courseware, but the actual effect is not as good as a real example. So good rational use of multimedia in teaching mathematics is very important, not abused, otherwise, it would be counterproductive.

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