

**THE BASIC MATHEMATICS TEACHING BASED ON THE CULTIVATION OF CREATIVE TALENTS IN NEW ENGINEERING DISCIPLINES**

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**ABSTRACT**

The construction of new engineering disciplines is a reform plan for the higher education that was born out of a new round of technological and industrial revolution. In the classroom teaching, as teachers of science and basic mathematics, they must deeply explore and show the beauty of mathematics, innovative thinking methods and humanities. They must combine the mathematical models of robotics or other industries, and mathematics-related knowledge points, so that engineering students like mathematics and robotics industries. At the same time, teachers must comprehensively improve their various abilities and levels, better guide university students in mathematical modeling and other innovation competitions, and make engineering sciences become excellent engineering and technical innovation talents with comprehensive theoretical and practical abilities.

**KEYWORDS:** New engineering, Beauty of mathematics, Critical thinking, Intuition

**1. INTRODUCTION**

The “new engineering disciplines construction” is an important measure taken by countries to actively respond to a new round of scientific and technological revolution and industrial change, and to promote innovation in higher education. In just a few years, robotics and other industries have achieved large-scale development and become "the pearl of the crown of the manufacturing industry." Advancement in engineering science and technology leads to innovation in higher education concepts, professional innovation and model innovation. The "new engineering disciplines construction" to create first-class engineering education and outstanding engineering talents will surely lay a solid foundation for national development.

**2. QUESTION RAISED**

In recent years, the tide of new technological revolution and industrial transformation has rushed forward, calling for top-notch innovative talents in engineering technology. Engineering students are the main force for future technology and industrial construction. They are eager to grow into outstanding talents for future engineering and technological innovation. They need extensive accumulation of mathematics and professional knowledge. They need to continue to inspire curiosity and interest. They need continuous incentives for innovation. They need cooperation and Practical promotion training. “Advanced Mathematics”, “Linear Algebra”, and “Probability and Mathematical Statistics” are compulsory and postgraduate courses in basic mathematics for freshmen and sophomores, and are important foundations for follow-up majors. However, when studying these

courses, students often question why they should study these three math courses? Is it useful to study these contents? The confusion of freshmen in university studies seriously affect their learning interest and motivation. Robots and cars in daily life are the favorite of engineering students. They are the products that everyone loves. Whether we can start from the first-year "Advanced Mathematics" of the university, increase the content of robots in artificial intelligence as soon as possible, integrate the content of abstract and rigorous mathematics curriculum with industry-related content that students love to see robots, strengthen cross-disciplinary integration, strengthen the awareness of innovation and the guidance of innovative thinking is one of the key issues in our "new engineering disciplines construction". This article mainly expounds the important contents of the training of innovative talents in new engineering subjects in the following four aspects.

### **3. CULTIVATE COLLEGE STUDENTS' STRONG PASSION FOR METHEMATICS**

The construction of new engineering disciplines requires the training of many outstanding technology industry engineers. Achieving this goal requires engineering college students to devote themselves to mathematics learning and industrial development, and to be tireless. Therefore, teachers need to effectively stimulate students' interest in learning mathematics in classroom teaching, and pay attention to show the beauty of mathematics and mathematics culture.

#### **3.1 Dig Deep and Appreciate the Beauty of Mathematics.**

There are many beautiful materials in mathematics. For example, integrals have symbolic beauty. Maclaurin and other formulas contain cold and serious order beauty. Matrices have neat beauty. The formulas of mathematical expectation for discrete and continuous random variable implied unified beauty (Sheng 2018). Practice has shown that appreciation of mathematics in the classroom is an important reason for teachers and students to love mathematics.

#### **3.2 Appropriate Introduction of Mathematical Culture.**

Innovative talents not only need to have a strong desire for innovation, the most important thing is to have a noble moral sentiment and perseverance. A proper introduction to the profound background of mathematics culture, its historical origins, and the patriotism and innovative spirit of mathematicians will surely inspire students to love mathematics and move forward.

### **4. CULTIVATE COLLEGE STUDENTS' STRONG LOVE OF SCIENCE AND THCHNOLOGY INDUSTRY.**

The new engineering disciplines construction aims to train top-notch innovative talents in science technology and industry. In classroom teaching, teachers should pay attention to interdisciplinary and humanistic feelings.

#### **4.1 Focus on The Integration of Industrial Technology, Interdisciplinary and Applied Mathematics.**

Cars are the favorite of most engineering boys. During the running forward, the wheels can only roll back and forth, and no side slip can occur. A constraint equation with zero velocity perpendicular to the direction of the wheel axis can be established to obtain the kinematic differential equation of the robot. The equation cannot use the integral to obtain an analytical expression about the position. We call this constraint a non-holonomic constraint, and the robot is called a non-holonomic mobile robot. The mathematical model of a multi-joint robotic arm in an industrial robot can be expressed and calculated using matrices. Including robot content in the explanation of corresponding knowledge points in mathematics and highlighting interdisciplinary, teachers can stimulate students' interest in mathematics and industrial technology. Then, students can strengthen their confidence and determination to engage in the development of robots and other emerging fields.

## **4.2 Introduction of Science and Technology Anecdotes, Engineering Masters and Their Challenging Spirit.**

In the classroom, mathematics teachers should often introduce the latest achievements to students in the technology industry, robots that are popular with them, artificial intelligence cases, patriotism of world-class domestic and international scientists, and indomitable scientific and technological innovations. They can train students to dare to break through traditional ideas, and dare to try and explore.

## **5. FOCUS ON TRAINING COLLEGE STUDENT' INNOVATIVE CONSCIOUSNESS AND CREATIVE THINKING ABILITY.**

In the era of artificial intelligence and industrial revolution, innovation is an eternal topic. Teachers pay attention to cultivate students' scientific aesthetics, divergent thinking and critical thinking in the classroom, which will inevitably improve students' creative ability.

### **5.1 Pay Attention to Cultivate the Aesthetic Sense of College Students.**

Aesthetic sense is also called "aesthetic consciousness" or mathematical intuition, which is an intuitive consciousness of the subtle harmonious relationship and order existing between things (Ding 2018). Research shows that people who can make discoveries are those who feel harmonious, symmetrical, and beautiful.

### **5.2 Cultivate the Creative Thinking of College Students.**

Creative thinking, also called divergent thinking, is a form of thinking that obtains theoretical evidence or conjecture, including imagination, simulation, association, analogy, and reasoning (Shen 2019). It and aesthetics play an important role in innovation.

### **5.3 Cultivate Critical Thinking.**

Critical thinking is the process of abandoning appearances and seeing the essence through analysis and evaluation (Feng, 2019). Its two characteristics are questioning and unconventionality. Questioning is a form of question that drives people to think and explore. Without reasonable doubt,

there is no critique of thinking. Unconventionality is good at using analytical, creative, and constructive methods to put forward new explanations and new judgments on questions and challenges (Qian, 2012). It is required for teachers to cultivate engineering innovation talents to guide students to cultivate aesthetics, dare to question and correct inference.

#### **5.4 Instruct Students to Actively Participate in Innovation Practice**

Human innovation ability is gradually cultivated on the basis of continuous learning, accumulation and repeated practice. Participating in mathematical modeling competitions and mathematical competitions, etc., students focus on training related knowledge. They also use aesthetic perspectives to define and describe practical problems, collect relevant information, give full play to imagination, association and other divergent thinking, analyze actual problems, establish mathematical models, and computer programming and simulation. All those can quickly accumulate scientific theoretical knowledge and improve the comprehensive ability of innovation for the students.

#### **6. CONCLUSION**

Top students need top teachers. In order to train outstanding engineering technicians for the future, mathematics teachers must comprehensively improve their own innovation ability and mathematical modeling guidance level, so that the engineering students can grow faster and better. In the mathematics classroom, through the guidance of teachers' aesthetic, innovative thinking, through the nourishment of interdisciplinary, humanistic care and patriotism, engineering college students will be inevitably inspired love for science and robotics industries. They also can strengthen the confidence in the technology industry. Therefore, they can become the main force of comprehensive innovative top-notch talents in the future technology industry.

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