

# The teaching and implementation path of mechanical foundation course from the perspective of “integration of science and practice”

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**Abstract:** For the mechanical field of vocational education, the basic course of mechanical is a very important and complex core subject, which contains a lot of basic knowledge and has strong practical and abstract nature, which brings challenges to teachers' teaching knowledge and students' understanding. The “integrated” method of integrating practical experience into classroom learning is considered to be an effective way of learning, which can promote the deep thinking of the subject and the opportunity to obtain the application skills training in the real environment; Therefore, teachers need to explore how to apply this concept to the teaching of the most important subject in the school, the mechanical foundation, in order to improve the quality of classroom teaching.

**Key words:** “integration of science and practice”; Mechanical basic course; Paths

In order to improve the practical effect of the mechanical basic course in secondary vocational schools, teachers should take the education mode combining theory and practice as the starting point to stimulate the positive impact of the education mode on students and teachers. At the same time, this method can help teachers to enhance their teaching skills and improve students' comprehensive quality. It is worth noting that teachers need to deeply understand and clearly explain the core concept and practical value of the “integration of science and practice” education model, so as to avoid or reduce the frequency of possible problems, so as to give full play to the substantive effect and social benefits of this education and teaching concept.

## I. The advantages of “integration of science and reality” teaching

1. To achieve the centralized presentation of mechanical basic course information

Due to the limitation of the teaching time and place of the mechanical basic course, the teacher cannot fully teach all the relevant content to the students in 45 minutes, resulting in the limited understanding and skills of the students on the mechanical basic course. For example, in the course of basic mechanical courses, teachers often only focus on the elaboration of a certain part of the knowledge point, which leads to the lack of practical operation opportunities for students. The same situation also happens when students are involved in the experiment and operation part of the mechanical foundation course, because there is no way to ensure the dissemination of theoretical content at the same time. However, “integration of science and practice” is a new teaching method and strategy, which emphasizes that in the process of teaching basic mechanical courses, it is not only necessary to pay attention to its theory and practice, but also to promote the integration and development of these two aspects through the formulation of appropriate course plans, so as to achieve a unified goal, that is, to sum up and integrate all the information of basic mechanical courses and display them together. In this way, it can ensure that students can fully understand and master such information, and then improve the teaching effectiveness of mechanical basic courses.

2. Change of teacher-student education and learning concept

In the practice of secondary vocational education, the educational concepts and learning attitudes of teachers and students play an important role in their absorption and mastery of knowledge. People with excellent educational methods and students' mentality can guide teachers and students to establish new educational ideas and learning thinking models, so as to promote the educational reform of mechanical basic courses in secondary vocational education. In the process of implementing the “integration of science and practice” in secondary vocational schools, it can inspire secondary vocational teachers and students to understand and accept novel educational viewpoints and strategies, and make students understand the significance of implementing educational activities integrating theory and practice, so as to promote the change of educational and learning views of secondary vocational teachers and students. Let teachers take the integration of theory and practice as their own teaching or learning guidelines, and ensure that the secondary vocational mechanical basic courses to achieve the best results of student training, improve the quality of secondary vocational mechanical students.

## II. The problems existing in the traditional teaching mode of mechanical basic course

1. “cramming” teaching

Many teachers still adhere to the traditional concept, which makes the teaching method of teachers different from the physiological and psychological growth process of students. The “spoon-feeding” mode of education weakens students' enthusiasm for learning and limits their ability to acquire new cognitive abilities and develop practical skills. It can be seen that the mechanical basic course for the healthy development of students is actually only a superficial phenomenon, and the teaching and communication effect for the classroom is not obvious. If we can't solve this problem, the effectiveness of basic subject education in secondary vocational schools will be affected. In addition, teachers and students have entered the era of information technology, and the application of information technology in education and teaching has become increasingly popular and continues to bring innovative power. However, in terms of the current situation of basic theoretical subjects in secondary vocational schools, although modern means such as network tools are used in teaching, the real effect of

information technology tools is not fully utilized: in most cases, teachers just copy and paste the fixed content of textbooks. In the course of teaching, they rely too much on the use of modern equipment (such as multimedia teaching equipment), which distracts students from paying attention to the animated images instead of listening to the content itself.

#### 2. Emphasis on theory over practice

For the mechanical major of secondary vocational school, the basic knowledge in its core curriculum must be proficiently understood. However, the things in books are always not deep enough. Some teachers only teach such abstract concepts step by step, sometimes supplemented with examples, but there is always a lack of practical support. Because theory and practice are not closely linked, it is difficult for students to establish a complete and systematic concept of learning. In addition, students may be confused about what they have learned, about what is important and what can be understood, and about the connections between professional skills that are most applicable in the workplace.

#### 3. Students' interest in learning is not stimulated

Most traditional teaching models contain some problem points, which require teachers to make appropriate choices. However, because teachers' rigid ideas are so deeply rooted, it is not easy to completely get rid of these ideas. Through careful analysis of classroom teaching, we can see: Instead of respecting students' dominant position, teachers' teaching focuses on themselves and adopt the spoon-feeding teaching mode, which does not fully consider students' understanding ability and acceptance of knowledge, resulting in a huge gap between knowledge imparting and knowledge internalization. Students find it difficult to independently explore the fun of new knowledge and maintain continuous curiosity, and are in a passive state of seeking for a long time. It is detrimental to the growth and progress of students and their future development prospects. In this way, not only will students' interest in their studies gradually diminish until it is exhausted, but also their enterprising spirit will gradually weaken. In order to grasp the solid mechanical basic principle concept must have a high imagination and inference power.

However, some teachers turn a blind eye to this phenomenon or are indifferent to it, and pay more attention to the concepts of mechanical fundamentals or the content related to test scores. In addition, some teachers choose a single teaching mode to participate in classroom teaching, which will present a dull and boring situation of secondary vocational education, unable to improve the classroom teaching atmosphere. As a result, the interaction between teachers and students is not smooth and the classroom learning is not interesting. Although some excellent teachers try to apply the teaching mode of "integration of science and reality" in mechanical basic courses and integrate basic knowledge in practical teaching, the teachers fail to grasp this teaching essence and cannot correctly use multimedia teaching equipment to present teaching content. Nor can they highlight the importance of their teaching. In addition, educational evaluation is a key part of classroom teaching and must be paid attention to and valued by teachers. It can provide students with accurate, real-time and efficient educational evaluation results. However, in the past, teachers used to assess students' performance on tests and whether they were improving or regressing. This simplistic approach is likely to lead to self-denial in students, thereby losing confidence and passion in learning basic subject knowledge.

### **III. The implementation path of "integration of science and practice" teaching in mechanical basic courses**

#### 1. The change of educational concept of mechanical basic course

For mechanical basic courses, teachers need to actively implement the combination of practical operation and theoretical knowledge learning, innovate and change their traditional learning ideas and optimize the form and strategy of classroom teaching. First, the secondary vocational school, which ADAPTS to the development trend of The Times, should apply this new teaching mode according to the existing actual situation and the characteristics of mechanical basic subjects. Second, it is necessary to promote this new and effective teaching mode within the school, so that all students can understand its practical significance, and integrate it into daily life, so as to improve the comprehensive ability of students. Third, in the mechanical basic classroom teaching, teachers should adopt this new teaching mode to make the content of the textbook more close to the reality, and at the same time, it can better cultivate the talent reserve with high-quality skills, and improve the educational effectiveness of the mechanical basic course.

#### 2. Clear educational objectives of mechanical basic courses

For the education of basic mechanical courses, the overall goal of education is to guide the learning methods and contents of all courses. Therefore, when teachers want to integrate practical operation into basic mechanical courses, teachers need to have a clear understanding of the educational purpose of this subject, so as to promote the knowledge update of this subject and emphasize the importance of practical learning. The first step is to determine the practical teaching objectives of the mechanical basic course in the secondary vocational school. In this process, teachers will refine the theoretical learning objectives and practical learning objectives, and then make the two to maintain a high degree of consistency, so as to establish a unified educational objectives of the mechanical basic course, which is helpful to promote the reform of the mechanical basic course. The second step is to improve the content of basic machinery course based on the educational goal of basic machinery course as a guide. In this process, teachers will adjust the content of the textbook of basic machinery according to the principle of practicality, and pay attention to the integration proportion and importance of theoretical and practical information. At the same time, teachers will also consider how to enrich the content of basic machinery courses through new perspectives or rich forms. For example, teachers can try to expose students to more theoretical and practical elements in classroom teaching, so as to form a way in which theory and practice are taught simultaneously. At the same time, the reform of mechanical basic knowledge needs to match the actual operation in

their career, and according to the changes of the market, add relevant position knowledge, skills and examples, etc., in order to expand the scope of education of mechanical basic knowledge, so as to achieve a truly integrated teaching method and improve the cultivation level of mechanical professional talents in secondary vocational schools.

### 3. The innovation of the educational method of the mechanical basic course

In order to promote the mechanical basic education of secondary vocational schools to be more practical and effective, teachers must adopt a new teaching mode, that is, the “integration of science and practice” teaching mode to reform the traditional teaching strategy and concept. This new way requires teachers to abandon the traditional single teaching mode when teaching basic knowledge, and pay more attention to the application and promotion of new education. For example, teachers can guide students to participate in this process by setting practical operation scenes and combining classroom learning content, so that they can better understand these basic concepts and related principles, and further strengthen students’ practical experience in practical links. In addition, teachers should also use some means such as simulation exercise to transform teachers as the main body of classroom teaching into guides, introduce relevant basic skills or technical points to students, and actively encourage students to explore and solve corresponding problems independently under the guidance of teachers, which can improve students’ independent thinking ability and self-problem-solving consciousness. At the same time, it can also create a better environment for teacher-student interaction, which is conducive to stimulating students’ desire for knowledge and improving the overall learning effect.

## IV. Conclusion

In short, the teaching mode of “integration of science and practice” is like a guiding light, which can lead the basic education of secondary vocational machinery to move in the right direction, so as to promote the substantial improvement of education and teaching effect in this field. Therefore, teachers must attach importance to and understand the importance of “integration of science and practice” teaching and its practicability and innovation for secondary vocational mechanical basic courses, and then encourage students to learn theoretical knowledge and practical operation skills, find out their knowledge defects and other problems, and take appropriate measures to solve these problems, so as to enhance students’ learning experience and practical skills.

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