

# Research on the Reform of Physics Classroom Teaching in Five-Year System Higher Vocational Education

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**Abstract:** *With the continuous progress of society, people pay more and more attention to education in the new era. Physics is a difficult subject, with certain complexity and systematicity, involving more theorems and formulas. With the advent of the information age, various kinds of multimedia-assisted instruction have gradually emerged and become powerful tools for people to learn. In the process of the new curriculum reform, we should pay attention to the effectiveness of teaching methods. Teachers should think about what students need and like from the standpoint of students, cultivate their computational thinking and understanding ability, adopt living teaching strategies, strengthen subject penetration, and constantly improve the effectiveness of Physics teaching in higher vocational colleges.*

**Keywords:** *Reflection; Physics; Teaching; Five-year system*

## 1. Introduction

At present, there are some problems in the teaching of Physics courses in five-year higher vocational colleges, such as the outdated teaching mode and the ineffective connection between the teaching content and the later professional courses. Therefore, we should discuss these problems, change the teaching mode and content, set up good teaching objectives, adopt diversified evaluation methods, and constantly improve teaching efficiency.

## 2. Main Problems in Physics Classroom Teaching of Five-year Higher Vocational Education

### 2.1. Single evaluation method

In the teaching process of physics courses in five-year higher vocational colleges, although the evaluation means have changed than before, compared with the general situation, the total score still depends on the final examination paper. In order to further improve the pass rate of students' learning, there is a process of focusing on review before the examination, while students have a poor foundation and are unqualified in a large area. This single examination evaluation method runs counter to the training objectives of higher vocational colleges.

### 2.2. Old teaching mode

In the new era, people pay more and more attention to education, and teachers are vulnerable to the influence of teaching concepts. In the teaching process, they rely on textbooks for teaching and fail to combine information technology for effective application. They also fail to expand students' learning ideas and content and pay insufficient attention to cultivating students' professional ability. This mode is based on the logical clues of textbooks. It does not conform to the concept of modern vocational education, As a result, the teaching quality cannot be effectively improved<sup>[1]</sup>.

### 2.3. Students' low interest in courses

The five-year higher vocational students are directly promoted by junior high school graduates who take the high school entrance examination. These students have a weak foundation and low interest in learning. If teachers adopt traditional teaching methods and do not expand teaching ideas, such as experimental teaching and multimedia teaching, students' interest in learning and initiative will be

reduced, and teaching will fall into a boring and passive situation.

#### ***2.4. The teaching content cannot be effectively connected with the later professional courses***

In the teaching process, teachers should change the traditional teaching concept. The five-year higher vocational education adopts the 2 + 3 model. In the first two years, secondary vocational physics is opened. No matter what the major is, secondary vocational physics textbooks can be used. However, according to many years of investigation and research, many colleges and universities deleted physics courses in the next three years, and most students could not understand them in the learning process. Students could not master the learning contents in the professional basic courses, and could not effectively connect with the follow-up professional courses.

### **3. New Ideas of Physics Teaching Reform in Five-year Higher Vocational Education**

#### ***3.1. Adopt a life-based teaching strategy***

Physics is a subject closely related to life. The life-based teaching strategy is mainly based on practical problems to constantly expand students' learning ideas and establish correct scenarios to solve physical problems. A lot of physical knowledge is based on life elements. Therefore, teachers should be good at expanding ideas and enriching teaching content in the teaching process. They should constantly improve students' interest in learning physics according to life practice, give play to students' subjective status, determine physical problems and events, and organically determine teaching contents and courses. In the process of living teaching, teachers can strengthen the mode of physical experiments, improve students' physical ability, introduce various teaching activities, and improve their participation. We should create reasonable scenarios, pay attention to physical phenomena in life, expand students' imagination in the process of classroom teaching, encourage students to boldly put forward common physical phenomena in life, stimulate students' interest in learning, and help students lead out the content of the class around basic physical concepts. In the process of discussion, it is necessary to identify corresponding problems in time, think around problems students raised, and learn to use big data, the Internet and other technologies to cultivate students' problem-centered consciousness<sup>[2]</sup>.

For example, in the teaching process of force synthesis and decomposition and free fall, teachers should analyze the key points and difficulties in teaching, analyze them in combination with common phenomena in life, and grasp the direction of students' discussion. On the basis of students' understanding of the laws of physics, they should deepen their understanding of practical activities, pay attention to the interaction between teachers and students from top to bottom, and then design solutions with teachers. Teachers can establish correct physical images and problem-solving paths by analyzing the key and difficult points. In the process of liquid pressure and buoyancy experiments, some students know nothing about pressure. In order to fully enable students to enter physics teaching, teachers should establish teaching scenes, actively carry out teaching in combination with common liquid pressure and buoyancy in life, guide students to carry out a comparative analysis, and introduce devices into the teaching process, such as bases, valves, guide pipes, etc. to carry out experiments with these devices. When the students change the pressure of the liquid, the liquid flows in. At this time, the water has pressure on the upper and lower surfaces of the floating body. Through effective practical activities, students can make their own experiments and summarize them. Students are encouraged to explain physical phenomena in life by using the obtained physical phenomena, laws and other knowledge, and learn by analogy. Teachers should do a good job in guidance and supervision, cultivate students' ability to think, consolidate the learning effect, and ensure the orderly progress of practical activities .

#### ***3.2. Reform the teaching mode and strengthen the physics thought***

In the process of Physics teaching in five-year higher vocational education, we should strengthen the education of physics ideas and methods, constantly reform the teaching mode, and cultivate students' professional ability. Modern vocational education is mainly oriented by vocational activities. The physics teaching content of five-year higher vocational education includes mathematical methods, physical methods, logical methods, etc. Schools should take the work process as the guide, and change the teaching mode that achieves professional ability from the logical clue of support to the mode based on the work process of professional activities. We should emphasize goal orientation and design reasonable course content. In the teaching process, teachers should be good at using unique teaching methods, constantly transmitting teaching thinking, infiltrating scientific ideas, creating a virtual reality

environment, and realizing the organic combination and integration of various ideas. Teachers should change their roles. In the teaching process, they should introduce students' professional activity cases into classroom simulation, help students design experimental tables in combination with physical experiments, and learn through scientific methods such as the control variable method and induction method, so as to improve the effectiveness of the class.

### ***3.3. Strengthen the infiltration of various disciplines***

Today's society demands more and more talents, and the talent resources gradually show the characteristics of specialization and compounding. With the development of the times, the teaching activities in the physics teaching class show the characteristics of informatization. In the teaching process, in order to train students to have a strong understanding ability and professional skills, teachers should strengthen the penetration of various disciplines, including physics and Chinese which show strong logical thinking ability, literal expression ability and contextual understanding ability. In the process of learning and physics knowledge, students' ability of information capture and analysis should be continuously improved. In addition, based on the employment orientation of students, we should constantly reform the teaching content, solve the specific problems of the course content, consider the connection with professional courses, focus on process knowledge, and respect the learning needs of students. Some students of professional courses require the quantitative calculation of physical quantities with calculus. Some professional courses require students to use other knowledge to solve problems. Therefore, in the specific teaching process, teachers should make different choices for knowledge points, follow the principle of appropriate and sufficient, consider the characteristics of vocational education, and supplement the content related to professional courses appropriately.

For example, in physics, the relationship between the image of alternating current and sine curve, the connection between vibration and electroencephalography, etc. teachers should further infiltrate the connection between disciplines in the teaching process, cultivate students' comprehensive ability, and add modern physics content in the form of special lectures. Combining with the space technology currently developed in China, the rocket launch technology is introduced, and laser technology and nanotechnology are emphasized, so that students can improve their interest in physics and stimulate their enthusiasm.

### ***3.4. Adopt multiple evaluation methods to investigate the comprehensive quality***

The teaching of higher vocational colleges highlights the cultivation of ability objectives. In the context of the new era, we should constantly establish diversified evaluation means and change the traditional single evaluation method. We should follow the requirements of the new curriculum reform, follow the principle of integrating knowledge and ability in the evaluation process, and adapt to the development direction of higher vocational colleges. In the process of evaluation, the main content of process assessment can be practical assessment, written examination and process assessment, which can be fully combined with students' usual homework and classroom performance. The written examination should focus on students' application of practical knowledge from theory to expansion. In the process of practical assessment, we should pay attention to students' ability to do experiments. We should conduct a comprehensive assessment system on students through diversified evaluation mechanisms.

### ***3.5. Strengthen experimental efficacy and improve students' interest***

Students are the main body of the physics classroom. In the teaching process, we should establish a good knowledge structure and system, change the traditional teaching process, and let students learn independently. Teachers should do a good job in hierarchical teaching according to the different situations of students, encourage students to grasp the learning content in the teaching process through observation, let students use their hands, brains and heads, cultivate students' creative thinking, expand teaching activities, and ensure students' physical skills. With the development of the times, the teaching process is characterized by informatization. Teachers can use micro classes to strengthen students' impression of physical content and promote teaching reform. In terms of experimental content, we should highlight the times, be close to the current hot scientific practice and life technology, constantly expand students' imagination, expand their knowledge in combination with various extracurricular books and magazines. Students should take learning notes and reading notes for all kinds of physics learning knowledge involved, pay attention to the application of numerical control technology, new sensing technology and other new technologies around us. Teachers should develop some small experiments

close to real life and encourage students to learn actively through multiple channels <sup>[3]</sup>.

For example, in the process of teaching electromagnetic induction, teachers can use a micro-class introduction to ask what the phenomena of electromagnetic induction include, let students enter the course process with an active attitude, and implement all aspects of physical experiments. Then, the teacher should encourage students to summarize the conditions of electromagnetic induction phenomena independently, prepare experimental reports, and summarize the learning contents in time.

### ***3.6. Using various technical means to improve the effectiveness of classroom teaching***

In the teaching process, teachers should be good at integrating classroom teaching with modern technology. The content formed in textbooks belongs to the micro field, and cannot be demonstrated in class. For example, Brownian motion combined with multimedia technology can solve this phenomenon well. We should pay attention to the application of technology, combine three-dimensional simulation animation to turn the expanded content into vivid and interesting things, change static into dynamic, and use flat throwing movement to show experiments to make students pay attention to the process of practice and clear the phenomenon of movement. In addition, network technology can be used to answer questions, narrow the relationship between students and teachers, improve students' interest in learning, and enhance learning effects.

## **4. Conclusions**

To sum up, the reform of Physics teaching in higher vocational colleges is the trend of the times, as a practical subject. Teachers should encourage students to learn independently and find suitable learning methods. Teachers should change their teaching concepts, make use of various information, start from students' interests, innovate boldly, reform teaching contents, pay attention to connecting with professional courses, cultivate professional abilities, strengthen experimental efficacy, and improve students' interests. They should adopt diversified evaluation means, apply multi-media technology, improve teaching effectiveness, ensure students' physical skills in teaching activities, and do a good job in teaching and researching on physics in five-year higher vocational education.

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