

# Exploration on online and offline mixed teaching of physics course in higher vocational colleges

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**Abstract:** With the continuous advancement of the reform of vocational education, educational informatization has become an important reform direction of the teaching of various disciplines in higher vocational colleges. In this context, the online and offline mixed teaching mode has been widely used, and has shown a huge role in improving the effectiveness of teaching and promoting the quality of talent training, which also provides a basis for the reform of physics teaching in higher vocational colleges. Physics is the basis for higher vocational students to learn all professional courses well. Innovating physics teaching by relying on the online and offline mixed teaching mode is an effective way to improve the quality of physics teaching and promote students' professional learning. This paper analyzes the application value and practical strategies of online and offline hybrid teaching of physics courses in higher vocational colleges, which is only for teachers' reference.

**Key words:** Physics in higher vocational colleges; Online and offline; Blended teaching; Application value; Practical strategy

At present, with the development of science and technology, vocational education has also set off a wave of informatization reform. The Ministry of Education has also launched a series of informatization reform guidance documents such as the Ten-year Development Plan for Education Informatization, advocating that vocational education should take the road of informatization reform well, so as to improve the quality of talent training. As an important teaching mode under the background of vocational education informatization, the online and offline hybrid teaching mode refers to the effective integration of offline and online education resources. It pays attention to the advantages of rich resources of online teaching and the educational guidance advantages of offline teaching, so as to create a "mixed" teaching new normal. To promote students' all-round, high-quality and personalized learning and promote the development of their comprehensive ability. Therefore, it is high time to apply the online and offline mixed teaching mode to the physics teaching in higher vocational colleges.

## 1. The application value of online and offline mixed teaching of physics courses in higher vocational colleges

### 1.1 Expanding capacity and enriching teaching resources

With the help of the mixed teaching mode of online, online and offline, physics teaching in higher vocational colleges has also obtained more rich and diverse resources. In the specific teaching process, we can not only draw materials from textbooks and life, guide students to learn through verbal guidance and explanation, but also combine some audiovisual resources on the Internet to guide students to watch, think and practice, and create an audiovisual integrated physics classroom. For example, from the perspective of teaching content, we can use online technology to display some micro-lessons, courseware and other resources, so as to effectively supplement the textbook resources, expand the class capacity, improve the interest and effectiveness of course teaching, stimulate the enthusiasm and autonomy of students' physics learning, so that they can learn more, harvest more and grow up more!

### 1.2 Multi-dimensional interaction to cultivate students' ability

Any course teaching can be regarded as a process of teacher-student interaction, and physics teaching in higher vocational colleges is no exception. In this regard, we must pay attention to lead the interaction between teachers and students and students in the teaching process, in order to stimulate the vitality and potential of students in learning, and effectively improve the quality of teaching. However, the traditional physics teaching in higher vocational colleges is relatively lacking in interaction, teachers and students usually just "you talk and I listen" in class, the lack of interaction between each other, which also greatly affects the quality of physics teaching. In this regard, how to promote classroom interaction through the innovation of educational ideas and forms has become an urgent problem for every physics teacher to think about. The application of hybrid teaching can effectively change this problem, so that the "interaction" of physics teaching can be fully promoted. We can rely on the integration of online and offline to create a three-dimensional and personalized interactive classroom, promote the offline and online interaction between teachers and students, students and students, and promote students' thinking and practice, so as to stimulate students' enthusiasm for learning, so that they can acquire the cultivation of thinking, cooperation and practice and other abilities in learning through fun.

### 1.3 Extend the path to promote employment development

In the traditional educational concept, physics teaching in higher vocational colleges is mainly based on classroom teaching, and all teaching activities are carried out around classroom teaching, and when students leave the classroom, they can rarely get teaching services and guidance, which also makes the teaching effect unsatisfactory. Under the mixed teaching mode, physics teaching can realize the extension of teaching path by means of Internet +, promote the expansion of physics teaching from classroom to extracurricular direction, and create a "second classroom" of physics, so that physics teaching can break through the teaching barriers of real class, so that students can learn without limitation of time and place. At the same time, in this mode, we can also guide students to carry out blended after-school practice based on their learning ability, interests and professional learning needs, which can not only promote the improvement of their

physics learning effect, but also lay a foundation for their professional learning and future employment and development, which can be said to be multiple birds with one stone.

## **2. The practice strategy of online and offline mixed teaching of physics courses in higher vocational colleges**

### **2.1 Mixing before class to achieve effective preview**

As the saying goes, forewarned makes good, unforewarned makes bad. In higher vocational physics teaching, it is necessary to guide students to carry out effective pre-class review. Its significance is not only to let students understand the course teaching content, to lay the groundwork for its follow-up teaching, but also to let students in the preview process of independent thinking, independent learning and independent problem solving, which has an important role in promoting their learning and growth. In the face of the absence of preview link in higher vocational physics teaching in the past, we may wish to start from the mixed perspective, through the combination of online and offline to guide students to carry out mixed preview, so that they can get more growth in personalized and high-quality preview.

For example, when talking about the knowledge point of “electromagnetic induction”, we can use the combination of online and offline ways to guide students to carry out “mixed” preview. Specifically, on the one hand, we can guide students to read and analyze the content of Xuesudi textbooks, so that they can form an effective cognition of electromagnetic induction phenomenon, Lenz’s Law and other knowledge points; on the other hand, we can guide students to carry out personalized online preview. First, we can design online preview resources such as micro-lessons and preview courseware by combining network technology. The resources can include some knowledge points related to the teaching of this chapter and some supplementary pictures and video materials, such as the life introduction of Faraday, the “father of electricity”, the discovery video of electromagnetic induction, etc., so as to provide students with more usable and referable materials to help them preview and think. At the same time, in the preview materials, we can also design some preview questions, such as “What are the electromagnetic induction phenomena in life?” “What are the conditions for induction current generation?” And so on, through the design of these questions so that students can preview at the same time can also “deep” thinking, to further improve their preview effect. On this basis, we can use QQ, Dingtuo and wechat chat software to distribute preview resources to students, promote the combination of online preview and offline preview, and effectively improve the preview effect of students. In addition, we can also design a “preview task list” for students to write down their doubts and gains while preview and evaluate the preview effect. In the task list, we can design some specific preview tasks, such as “drawing electromagnetic induction mind map”, etc., in order to obtain accurate feedback and lay the foundation for the effective development of our subsequent teaching plan.

### **2.2 Mixing in the class to promote flipping practice**

Classroom is the main position of physics teaching in higher vocational colleges. In the process of promoting the online and offline hybrid teaching mode, it is necessary to do a good job in classroom hybrid teaching, focus on combining the characteristics of physics curriculum, build a hybrid teaching mode based on flipped classroom, so that students can realize mixed learning in flipped classroom, and promote them to learn by doing and do while learning. To provide effective help for the development of their physics comprehensive ability and accomplishment.

For example, in the teaching process of “electrical experiment”, we can build a flipped classroom based on micro-lessons from the perspective of “hybrid”, so that students can flip learning in the mix, think and practice in the flip, and effectively cultivate their learning ability, thinking ability, cooperation ability and practical ability. First of all, we can combine the feedback of pre-class preview to do a good job of explaining difficult knowledge, timely help students to answer the confusion in preview, so that they can clear up the knowledge points of electrical experiment part, and lay a foundation for their subsequent study and experiment. Secondly, we can show the “electrical experiment” by means of micro-class, so as to provide students with flipped learning opportunities. In this process, in order to effectively improve the teaching quality, we can start from the perspective of students’ learning situation, combined with their actual ability and foundation in physics learning, in the class divided into a number of 4 people and internal strength balance physics groups, in order to promote the competition between groups and mutual communication within the group, and trigger the overall participation and improvement of students. On this basis, we can guide the members of each group to observe the micro-lesson to understand the steps and key points of the relevant experiments, analyze the physical principles and so on. At the same time, we can ask each group to think about and answer the harvest of their own micro-lesson flipped learning, so as to promote students’ thinking and discussion and improve the teaching quality. In addition, we can design a “flip experiment task”, that is, students can carry out group-style flip experiment while watching and thinking about the content of micro-lesson. During this period, we should give full play to our auxiliary and guiding role in teaching, enter the group flipping learning, and provide students with certain encouragement and guidance. For example, if a group is not doing well in the experiment, we can give them certain Pointers to help them better carry out the experiment. Finally, we can let each group show their experimental results and share their experimental harvest, and then make comments and education based on their shortcomings and bright points, or let each group make comments and analysis, and guide them to learn from each other and communicate with each other while summarizing. This can not only stimulate students’ learning potential and learning interest, but also stimulate students’ learning. In addition, it can promote the cultivation of their cooperation ability, thinking ability and exploration ability, which is of great benefit to the cultivation of their comprehensive physical ability and accomplishment.

### **2.3 Mixing after class to improve the teaching effect**

Many educational practices have proved that the improvement of physics teaching effect in higher vocational colleges not only depends

on classroom teaching, but also has a great relationship with students' learning and practice after class. This also requires that we must do a good job in after-school review and practice work, especially relying on modern means, through the combination of online and offline "hybrid" ideas to optimize after-school review and practice, so that students can better grasp and understand the physics knowledge, the knowledge of the integration, effectively train their ability and quality, improve the quality of teaching. For example, after talking about the "magnetic field" part of the knowledge, on the one hand, we can guide students to carry out the corresponding experiment after class, such as students can combine the content of learning, complete the "electromagnetic experiment" after class, and so on, effectively stimulate their physics interest and comprehensive ability. At the same time, we can also ask students to take photos or record the experiment content into a small video, and then share it in the class QQ group or wechat group to guide students to watch and evaluate, so as to further increase the interest of after-school experiments and stimulate students' enthusiasm for learning and practicing after class. In addition, we can also design corresponding review micro-lessons based on some difficult knowledge in physics teaching, so that students can review micro-lessons at any time and place. In this process, we can also use wechat public platform to guide students to carry out "digital assessment" and use digital software to analyze students' shortcomings and grasp their prone mistakes. And then through the combination of online teaching guidance and offline teaching solutions to help them answer doubts and puzzles, effectively solve their physics learning problems, so that the teaching effect can be a higher level.

In short, in the new period, it is of good practical significance to optimize the teaching of physics courses in higher vocational colleges and innovate the teaching mode of physics in higher vocational colleges with the mixed teaching mode of online and offline. Therefore, we should grasp its application value at the same time, combined with all aspects of teaching to construct the mixed teaching mode, so that students can gain more growth and harvest under the guidance of the new mode, and lay a solid foundation for the cultivation of their comprehensive ability of physics.

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