Exploration and Application of Teaching Mode of Innovative Informatization in Higher Vocational Colleges

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**Abstract.** With the development of science technology and network technology, the teaching mode of using information technology is gradually popularized in the major vocational colleges, but from the practical effect, there are more or less problems in the exploration and application of teaching mode in many vocational colleges. According to the current situation of information-based teaching mode in our country and abroad, combined with the common problems of information-based teaching in domestic higher vocational colleges, this paper studies and explores a "five steps" information-based innovative teaching mode, analyzes the design ideas of the innovative mode, and finally evaluates the teaching practice and effect of the innovative mode.

**Introduction**

At present, the information-based teaching in the network era has become the focus of the educational field and the trend of the development of teaching mode. In the classroom teaching of vocational colleges, we pay attention to the cultivation of primary technical talents with practical operation and innovative ability through information-based teaching [1]. We need to connect the teaching content with the production and life reality, integrate with the major students have learned, and give full play to the students' professional ability. In addition, we need a lot of materials to expand the teaching content. In recent years, many vocational colleges have reformed the traditional teaching mode and introduced various information-based teaching programs to improve the teaching effect. However, from the perspective of the effect of the actual reform, the existing information-based teaching mode has limited effect on the improvement of students' knowledge and skills, and the effect is uneven [2].

**The Design of Information Innovation Teaching Mode**

The "five steps" information innovation teaching mode proposed in this paper is shown in Fig. 1.

![Diagram](image)

Figure 1. "Five Steps" Information Innovation Teaching Mode.

Teaching analysis is the beginning of a good course. It is the analysis of why to put forward this problem before the beginning of the teaching process and the reflection summary after the end. Teaching analysis mainly includes the analysis of the course character, the analysis of learning situation, the analysis of teaching objectives, the analysis of teaching emphasis and the analysis of teaching difficulties. Among them, the analysis of learning situation is particularly important. Learning situation refers to all factors related to students' life and learning, including students' learning attitude, learning foundation, learning habits, learning ability, hobbies, psychological characteristics and other factors [3].

Teaching strategy is a simple integration of teaching mode, teaching method and teaching means in the implementation of teaching process. It is a method mode formed by the processing of thinking
strategy of teaching thinking on the three aspects of motivation. The teaching strategy is a whole plan which is made for the realization of a certain teaching goal and put into practice in the teaching process. It includes the reasonable organization of the teaching process, the selection of specific teaching methods and materials, and the formulation of the teaching behavior procedures that teachers and students abide by. In the process of teaching, in order to achieve the specific goal, according to the subjective and objective conditions of teaching, especially the actual situation of students, the overall consideration of the selected teaching sequence, teaching activity procedure, teaching organization form, teaching method and teaching media, etc. [4].

The whole design of teaching is a very important stage in teaching. The success of the whole design of teaching determines the quality of teaching effect, directly affects the students' mastery of knowledge, and also has a great help to the follow-up teaching. To do a good job in the overall design of teaching tasks in the project, we can grasp the knowledge of the task as a whole, so that teachers can have a very clear understanding of the structure of the knowledge of the whole task, so that students can have a clear understanding of a task With a systematic understanding of the knowledge, students can know the status of this task in the project and the connection with the previous tasks and follow-up tasks, so that they can learn purposefully and understandably.

After the overall design of teaching, it is the implementation of teaching. The overall design of teaching solves the problem of "what to do," and the implementation of teaching solves the problem of "how to do." In the process of teaching implementation, the most important thing is the interaction between teachers and students in the classroom. Teachers use the students' on-site reaction to carry out teaching and promote the teaching process. The implementation of teaching is generated on the spot. It follows the rules of interpersonal communication in the process of interaction between teachers and students. It is generated on the basis of the response of teachers and students to each other's psychology, the exchange of emotions, the inspiration of thinking, the promotion of the whole scene atmosphere, the creation of situations, etc. Teaching implementation is generally divided into three stages: before class, in class and after class [5].

After class reflection diagnosis is an important part of teaching activities. Reflection can rectify the existing problems, explore the problems found in time and accumulate experience. In addition, we should also analyze the whole teaching effect, think about whether the course has characteristic innovation, the interaction between teachers and students, and how to diagnose and change in the future.

**Application of Case and Effect Analysis**

The "five step" teaching mode of information innovation proposed in this paper has been applied in the course of "principle and application of single chip microcomputer." The practical research shows that the "five steps" teaching mode of information innovation has a good effect on improving the ability of higher vocational students.

**Teaching Analysis of Case**

The principle and application of single chip microcomputer is a required course for embedded technology and Application Major in higher vocational education, and it is also a college level ideological and political demonstration course. Under the guidance of national professional catalog and professional teaching standards, the curriculum standards are formulated according to talent training objectives. The supporting teaching materials are the 13th five year plan teaching materials of Mechanical Industry Press. There are 8 projects, 21 tasks and 64 class hours in total. This task is selected from task 2 of item 4. The single-chip microcomputer controls the nixie tube by pressing the key. The teaching object is the first year students of embedded specialty, who are willing to do it. They have a certain understanding of electronic components and programming ability through the study of early courses. However, they still have some defects, such as insufficient system debugging ability, weak skill application, weak sense of standardized operation, and insufficient sense of team. According to the target of talent training and curriculum standard, the knowledge target, ability target and quality target of the task are determined. According to the teaching content and objectives, the
key points of teaching are the preparation of key delay program and the welding of components. According to the analysis of learning situation and the pre class test, the difficulty of teaching is the joint debugging of software and hardware for troubleshooting.

**Teaching Strategy of Case**

According to the key and difficult points of teaching, the following teaching strategies are designed, with the case of digital tube project controlled by single-chip microcomputer as the carrier, with the guidance, learning, practice and evaluation as the main line, and the task driven teaching mode is implemented. The teaching methods are task driven, guidance, case, situation, simulation and group discussion. With Superstar platform as online auxiliary tool, online and offline teaching is adopted, with pre class video learning as task driving, students can learn independently through micro class video, and their self-learning ability is enhanced; they are familiar with operation specifications in advance, and their awareness of standardization is enhanced; they can complete tasks in groups, and their team awareness is enhanced. To achieve the quality goal of personnel training; to use virtual simulation platform, video and other information-based means to assist in solving the skills of joint debugging of system software and hardware, simulation circuit drawing, component welding, etc., to achieve the ability goal of personnel training; to solve the problem that students are difficult to understand the key pressing principle, delay function application and digital tube display principle with the help of video and animation, to achieve personnel training The goal of knowledge cultivation solves all the defects of the students in learning situation analysis. At the same time, through the teacher’s teaching demonstration video, students’ video which recorded by themselves, animation and other information-based means to break through the focus of teaching, through the teacher teaching demonstration video, students’ video which recorded by themselves, virtual simulation platform and other information-based means to solve the difficulties of teaching.

**Design of Overall Teaching Case**

The whole teaching design is divided into three stages: before class, during class and after class. The course is divided into four periods: Ideological and political video guidance and explanation, group discussion, teacher demonstration, student practice, group summary and summary comments, which are all run through the "guidance, learning, practice and comments," as shown in Fig. 2.

![Figure 2. During Class of Teaching Overall Design.](image)

**Implementation of Teaching Case**

Before class, the teacher uploads the video learning task on the superstar platform, the students log in to the superstar platform for learning, initially establish the concept of the implementation of the digital tube project controlled by the single-chip microcomputer key, learn and complete the pre class test. In the class, the teacher of Ideological and political course will lead the students to watch the video of Ideological and political guidance, stimulate the students' learning motivation and passion, and create a teaching situation. The ideological and political teacher conducts the ideological class teaching and introduces problems. Professional teachers answer questions for students from a professional point of view and guide group discussion. Finally, the completion of each group's pre class learning task is evaluated and scored. Then enter the four stages of the task implementation of key controlling nixie tube with the single-chip microcomputer, in which the analysis of key and difficult points and the assessment and evaluation are integrated. Stage one, code programming, which requires each student to complete independently. On the platform of code compilation and simulation, students can experience the effect of delay function, and solve the key delay program in teaching. The second part is the construction of simulation circuit. Students complete it independently according to the steps, and load the code written in the first part into the simulation circuit to verify
the correctness of the code, which solves the possible software failure in the joint debugging of the system in the teaching difficulties. The virtual simulation platform will automatically judge the correctness of the code. The teacher will grade stage one according to the judgment results, and grade stage two according to the correctness of the built simulation circuit. After the code is verified to be correct, the third stage is hardware welding, which emphasizes the safe use of electricity and standardized operation, and pays attention to the welding steps and skills. The team members divide the work and carry out welding operation alternately, one for welding operation; one for video recording, which is convenient for review and review at the later stage and teacher's comments; one for supervision of the whole welding process, to remind the welding students to use electricity safely and standardize the operation. Through the third stage, the key components welding in teaching are cracked. Stage four, software and hardware joint debugging, including two steps of program burning and parameter configuration. The team members are required to work reasonably and cooperate with each other to complete the task. One person is responsible for joint debugging of software and hardware, one person is responsible for video recording, and one person is responsible for checking and recording relevant parameters to prepare for group summary. Through the fourth stage, the possible hardware failure in the joint debugging of the system is solved. According to the initial success of the joint debugging, the teacher scores stage three and stage four according to the relevant parameters recorded in the joint debugging. In each of the above four stages, the teacher's teaching video demonstration is used to explain first. If most of the students can't master it well, the teacher will disassemble the operation task on site to demonstrate and adjust the teaching methods in time. After the task is completed, the teacher designates a group of groups with better task completion to come to the stage for summary and report, and the teacher summarizes and evaluates the whole task operation process. After class teachers select students to record better operation videos and upload them to superstar platform for students to consolidate after class. At the same time, each group is required to write a task implementation report and upload it to the superstar platform. Assessment and evaluation is an important part of curriculum teaching. The assessment score of this task consists of six parts, as shown in Fig. 3. There are video learning test scores before class, practical operation results of four stages in the class, task report writing results after class. All the scores will be uploaded to the superstar platform, and the total score will be calculated automatically.

![Figure 3. Composition of Assessment and Evaluation.](image)

**Reflection and Diagnosis of Teaching Case**

Through the implementation of this task, classroom satisfaction of students has been significantly improved. The team consciousness of students is obviously enhanced. Information technology saves class time, and in this task time is reduced from the six class hours to four class hours. And also we reduce the material loss. In terms of characteristic innovation, Students learn somethings more passively. Through the integration of information resources, the traditional teaching mode has been changed. We pay attention to the overall improvement of knowledge, ability and quality, integrate ideological and political elements, and cultivate the craftsman spirit of students. We make rational use of information technology to track and evaluate the whole process. In the aspect of reflection and
diagnosis reform, the operation safety management of electric tools is not in place, the application of
information technology needs to be further improved, some students are afraid of doing practice, and
some students are too willing to do it. Therefore, in the later stage, the management of electric tools
and the application of information technology will be further strengthened. Setting the practical
operation score, students who exceed the score can carry out the practical operation, and students who
do not exceed the practical operation score will continue to carry out simulation training and watch
the operation demonstration video.

Conclusion

According to the current problems of information teaching in China, we did an in-depth analysis.
This paper proposed a "five step" information innovation teaching mode, which is analyzed from
teaching analysis, teaching strategy, design overall teaching, teaching implementation, reflection and
diagnosis reform, etc., and has been applied in practice, and we has received good results.

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