Research on Multidimensional Teaching Design of Avionics Courses in Higher Vocational Colleges

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Abstract. At present, the teaching reform in domestic vocational and technical colleges is advancing rapidly, and new theories and experiences are constantly emerging. The curriculum teaching design is an important part of the curriculum teaching reform. The scientific teaching design provides a feasible method and a basis for curriculum implementation. It is a necessary means to improve the teaching effectiveness. This article is about from the hybrid teaching method, and proceeds from the teaching ideas, teaching methods, teaching implementation process and other dimensions to the curriculum design of the avionics equipment courses of higher vocational colleges. After many classes, the teachers and students reflect the design. It is scientifically feasible and has great significance for teaching instruction, which greatly improves the teaching effect.

Introduction

The avionics course is a vocational course for avionics students. Such courses are highly targeted and have a huge content system, and have crucial influence on the formation of scientific and excellent maintenance style. Based on the characteristics of the curriculum, the research team relied on the blending teaching concept and carried out a comprehensive reform of such courses from teaching ideas, teaching methods, and teaching implementation process, and a reliable guidance for teaching implementation is provided.

The Basic Concept of Teaching Design

Adhering to the “student-oriented, theoretical and practical combination” teaching ideas and theoretical teaching and practical operation constitute a basic teaching model. Considering the needs of vocations, implement a synthesis system view to highlight the comprehensive training of students' actual maintenance ability. Abandoning the teaching model of “use after learning” in the teaching designs of previous courses and relying on the "hybrid" teaching conception, combine theory with practice, integrate theory teaching, practical operation, and independent learning together to carry out course teaching design. In the course content design, it shows the characteristics of electronic equipment courses, focuses on the systematicness and advancedness of its knowledge content, and highlights the ability of trainees to use professional theoretical knowledge to analyze and solve practical problems.

Integrate Teaching Content According to Teaching Objectives

The purpose of curriculum design is to achieve the teaching objectives of curriculum standard setting. According to the strong orientation of vocational teaching in the higher vocational colleges, the standards expounded the teaching objectives from the three dimensions of knowledge and skills, including processes and methods, and values of emotional attitudes. This not only ensures the logical integrity of the knowledge system, but also strengthens the ability goals and emotion goal.

In order to achieve the goal of 3D teaching, the functional boundaries of equipment are broken for avionics devices courses. Taking the teaching process method application and scientific
implementation as the main considerations, the teaching content is divided into professional basic theory, operating principles, operation and maintenance, and fault analysis and exclusion. The professional basic theoretical dimension mainly includes the basic concepts and theories involved in the equipment. The basic theory involved is not a systematic and comprehensive introduction, but is based on the "enough to use" principle to demonstrate the principle; the operating principle dimension relates to the function of the equipment, composition, cross-linking relationship, and signal processing flow; operation and maintenance dimension describes the operation and usage methods of the equipment, as well as the maintenance timing and steps; failure analysis and troubleshooting is the comprehensive use of the contents of the first three dimensions. According to the failure phenomenon, the failure is analyzed, positioned and excluded. These four dimensions are set out from the requirements of the job, comprehensively introduce the relevant knowledge of avionics equipment, and meet the requirements of teaching objectives.

Choice Teaching Methods Scientifically

For different levels of teaching content, different teaching methods are used. The “Self-study - Tutoring” teaching method is used for professional basic theory section based on the student’s recent development zone. The “functional main line + signal flow” teaching method is adopted in operating principle part to analyze the equipment function. Based on the requirements of the field job responsibilities and the actual training content, the operation and maintenance of equipment section is divided into several operational items, and the “task-driven” teaching method is used. Some appropriate cases are selected from the practice case base for the failure analysis and exclusion section. The "case-style" teaching method is adopted. The entire teaching process intersperses the use of comparative teaching methods, heuristic teaching methods, etc.

(1) "Self-study - Tutoring" pedagogy
The “Self-study-Tutoring” pedagogy is a method for students to learn independently under the guidance of instructors. On the basis of humanism and constructivist ideology, according to the student's “recent development zone”, students are allowed to perform independent learning. Then, according to the specific situation of the each student, instructors provide tutoring. This teaching method can train students' ability to analyze problems and solve problems, help teachers to teach students in accordance with their aptitude, and give their students autonomy in learning.

(2) "Functional main line + signal flow" teaching method
The "Functional Mainline + Signal Flow" teaching method is a method for developing the teaching content around the function of the device. From the analysis of functional requirements of equipment, explain the composition of the equipment. Taking the process of signal transformation in the equipment as traction, explain the working principle of the equipment.

(3) "Task-driven" teaching method
The "task-driven" pedagogy is based on the constructivist teaching theory. With the help of instructors, students are studying focus on tasks. Through proactive use of learning resources, explore and collaborate with each other.

(4) “Case teaching” Theory
Case teaching is a very practical teaching method in equipment teaching. It is usually introduced by fault phenomenon. After discussion, the students can get a variety of possibilities. Then students are guided to verify one by one, and obtain the result finally. As long as the instructors are able to make good use of them, it will be of great benefit to the students to master the equipment failure analysis and judgment procedures.

Implement the Blending Teaching Process

The implementation process of teaching reflects the characteristics of blending, and the teaching process of specific knowledge points can be divided into three phases and four blends. “Three-phase” refers to before-class, during-class and after-class; “four-mix” refers to a mixture of
learning resources, a mixture of online learning and offline learning, a mixture of learning methods, and a mixture of learning processes.

With the intensification of teaching informatization, traditional teaching and digital teaching are combined with complementary advantages, and a blending teaching implementation process is formed. It includes learning resource blending, online and offline learning blending, learning style blending, and learning process blending. Before the class, tasks and learning resources are lay out through the network teaching platform to realize a mixture of learning resources. The students share the online learning results, and instructors explain the key content by micro-curriculum and multimedia resources, that achieve online and offline learning blending. In the course of classroom teaching, students conduct self-learning, group cooperation, discussion and learning. That realizes a mixture of learning methods. Setting assignment by online teaching platform, submitting assignments and interacting with instructors to consolidate knowledge and methods achieve a mix of learning processes.

![Figure 1. Three Phases and Four Blends.](image)

Considering the characteristics of the students, the class size and the limited teaching time, students should be fully encouraged to conduct autonomous learning and conduct more discussions during the teaching process. In terms of teaching methods, methods such as “recent development zone”, “task-driven” and “case teaching” should be adopted, and the proportion of information resources of the course should be greatly increased. To achieve the best teaching results, various information resources and experimental practice conditions can enrich the teaching activities, entertain boring principles, embody abstract theories and simulate the practice environment.

A scientific detailed teaching curriculum design is the premise of implementing effective classroom teaching. According to the characteristics of high vocational colleges, curriculum content is analyzed multi-dimensionally. On the basis of different characteristics of different dimensions of teaching content, choose different teaching methods scientifically. Once the teaching design was used, it played a good response in the classroom teaching practice, and the teaching effectiveness was effectively improved.

References


