Construction and Practice of Information Teaching System for Air Crew Specialty in Higher Vocational Colleges under the Background of “Combination of Work and Learning”

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Abstract. The combination of work and study is an important feature of modern vocational education. In recent years, air crew specialty in higher vocational colleges has been developing vigorously. Meanwhile, the contradiction of emphasizing theory teaching instead of practice teaching has been highlighted rapidly, which has become the main factor preventing the air crew specialty from realizing the reform of combining work with study. The reasons include limited training space of traditional cabin, incomplete models and equipment, shortage of teachers and so on. By building a simulation and training platform through the civil aviation CBT system and simulating the real work of the whole process of the cabin with the aid of information-based teaching methods, students’ learning style can be changed, teaching effect can be improved, teaching reform practice can be promoted, and students' theoretical knowledge and practical ability can be improved.

CBT is computer-based training, which is a method to realize students' autonomous learning by taking students' autonomous learning as the main body, teachers' guidance as the auxiliary, and computers and software as the tools. It belongs to the category of computer-aided education CBE [1]. CBT software can provide a non-coercive and interactive learning environment for learners. In the process of teaching and training, the effective introduction of information interactive technology and practical training for learners can not only fully improve learners’ learning efficiency, but also promote the occurrence of effective learning.

The civil aviation CBT system is the main construction element of the information teaching system for the air crew specialty in higher vocational colleges, and it is also an important means to carry on the passenger cabin simulation training. It makes full use of information-based teaching methods and interactive way to simulate the real working process of cabin crew, so that students can choose their own learning content according to their own learning situation, and learn according to the system explanation and demonstration. The vivid demonstration interface and strong interactive function of civil aviation CBT system have improved students' interest in learning, changed their learning style, changed their passive acceptance to active learning, solved the contradiction between emphasizing theoretical teaching and neglecting practical teaching, and provided a perfect training platform for the teaching of air crew specialty. It also expands students' learning and understanding of the structure, equipment and service requirements of various models. This paper takes the application of CBT system in cabin training of air crew major in Chengdu Polytechnic as a case to discuss the construction and practice of the information teaching system of air crew major in higher vocational colleges under the background of “combining work with study”.

The Limitation of the Teaching Mode of Passenger Cabin Training in Traditional Vocational Education

The cabin is too small to accommodate all the students

Take the air crew major of Chengdu Polytechnic as an example. In order to meet the practical teaching needs of students majoring in air crew, our college invested to build a B737/A320 hybrid simulation cabin. The cabin's interior space is basically the same as that of the real aircraft. There are 8 seats in the first class and 36 seats in the economy class. The teaching content includes cabin service training, cabin equipment uses, in-flight medical treatment and rescue training.
A crew of six crew members is required for the B737/A320, so only six students are allowed to attend each flight training, while the others are passengers. It takes about 20-30 minutes for the simulated crew to complete a long-haul service program. With the guidance and comments of teachers, it takes about 30-40 minutes for a team to train. Taking a 40-person class as an example, the whole class is divided into seven groups and trained sequentially. A long-haul service program training program takes about 6-7 classes. In addition, in order to better achieve the training effect, the passenger cabin can only hold 20 people for class at one time. Too many students are not easy to control the order of the classroom, which is likely to cause confusion and affect the training effect [2].

**Cabin Equipment Is Too Expensive to Be Fully Equipped**

Because of the particularity of aviation industry and the need of flight safety, all kinds of equipment in cabin are not only expensive, but also difficult to purchase. Moreover, different types of equipment are different, and the use method is also different. Many colleges can only buy relevant cabin equipment of one or several common types. In addition, with the continuous development of the aviation industry, cabin equipment is constantly updated, old equipment is gradually phased out, new equipment is constantly emerging. Therefore, the construction and update of training equipment cannot keep pace with changes in the industry.

**Limited Teachers, Unable to Master All Courses**

Many higher vocational colleges have a short time to set up the air crew major, and most teachers are transformed from other majors, often through a short period of enterprise training or learning on the job. They can only teach and learn at the same time, and cannot really master many professional skills, even some cabin equipment has not been seen or used. Even if schools recruit teachers by hiring in-service or retired personnel from aviation companies, the number is limited, and these teachers are also unable to cover all positions in the aviation service industry and master all the skills required in the industry. Therefore, the lack of teachers has become one of the bottlenecks in the development of air crew major in higher vocational colleges.

Based on the above problems, the best way for higher vocational colleges to solve the problem of air crew specialty practice teaching is to make use of information teaching methods. By constructing the information-based teaching system of virtual simulation and simulating the whole process of real work, we can improve students’ interest in learning, change students’ learning style, change passive acceptance into active learning, save the cost of teaching investment in colleges and universities, effectively combine classroom theory teaching with practical teaching, and truly realize the combination of work and study.

**The Advantages of Information Teaching System in Air Crew Teaching**

**Not Restricted by Cabin Space**

Based on the characteristics of information teaching system, such as open network, interactive teaching and resource sharing, CBT teaching system of civil aviation solves the problem of waiting in line and practicing one by one due to the space limitation of cabin, improves the efficiency of practical training, saves a lot of practical training costs and reduces the cost of teaching. Students use their cell phones or computers to learn independently and enhance the dominant position of students in the learning process. And in the process of students’ autonomous learning, teachers can guide students according to their own conditions, and even can demonstrate on-the-spot, thus greatly improving the teaching effect and achieving the teaching purpose to the greatest extent possible.

**All Cabin Equipment Can Be Simulated**

System Development Language Flasho Flash, a multimedia network development language, is particularly suited for creating content provided over the Internet because it uses vector graphics and streaming playback techniques that make the generated animation (.swf) files very small by
using key frames and graphics. A few K bytes of animation files has been achieved many thrilling animation effects, and can put the music, animation, sound blend together, therefore can simulate different models of all equipment in the cabin, truly display original equipment and the whole process of equipment operation, to avoid the teaching content and the enterprise runs counter to the actual situation, to lay a solid foundation for the students employment. At the same time, based on the powerful interactive function of information system, it can also choose the learning difficulty and training mode independently according to the acceptance of students, and carry out progressive and repeated exercises, so that students can gradually master the learning content.

**Seamless Cohesion between Teaching and Practice**

The key to measure and investigates whether the school teaching meets the needs of the enterprise depends on whether the teaching goal is consistent with the post requirements of the enterprise, and whether the “teaching” and “using” can be seamlessly connected. Seamless cohesion mechanism consists of two major elements, that is, professional proximity and post integration. The core of seamless cohesion mechanism is the detailed description of work tasks, and the key is the combination of theoretical knowledge and practical knowledge in the work process [3]. The CBT system of civil aviation is developed by professional software developers and the front-line personnel of various positions in the aviation industry. The teaching contents of different posts are formulated by the front-line personnel of the corresponding posts according to the job specifications, job contents, job requirements and long-term accumulated work experience. This not only ensures the practicability and ease of use of the software system, but also maximizes the closeness to the real job demand, so as to truly achieve the seamless cohesion between teaching content and practice, enabling students to apply what they have learned immediately after employment, and avoiding the inadaptability symptoms in the initial employment period.

**The Construction of Information Teaching System for Air Crew Specialty in Higher Vocational Colleges Based on Civil Aviation CBT System**

The civil aviation CBT system has three levels: The first is the integration of network resources, that is, the integration of hardware and software of various network systems; The second is the integration on the level of learning style, which mainly refers to the integration of network resources and learning methods; The third is the integration of information technology, which mainly refers to the integration of network learning and information technology. The integration of three levels also includes the integration of material resources, information resources and human resources [4]. As shown in figure 1:

![Figure 1. Aviation CBT teaching system construction.](image)
Network Resource Integration

The integration of network resources mainly refers to the integration of network hardware and software. According to the requirements of education teaching, a network education software and hardware system meeting the requirements of education teaching is constructed from a technical perspective. Hardware equipment is the material basis and prerequisite for realizing the integration of teaching resources in network education, while software resources are the core of realizing the integration of teaching resources in network education. According to the requirement of education and teaching, the network teaching system is formed after the combination of network software and hardware.

Integration of Network Resources and Learning methods

Inquiry Learning

Inquiry-based learning is a new way of learning based on students' autonomy and explorativeness. It emphasizes students' ability to think independently, learn independently and solve problems when doing things. By changing the traditional way of teaching and learning, teachers and students can jointly establish an equal, democratic, harmonious and mutual aid teaching environment, which can effectively improve students’ ability to analyze and solve problems. Network technology itself is one of the basic means of inquiry-based learning. It requires teachers and students of inquiry-based learning to search, sort out and explore learning information in the learning process, so as to facilitate the smooth progress of their own learning activities and improve learning efficiency.

The integration of network resources and inquiry learning makes both sides fit for the internal needs of the two learning modes, while the development of network education resources suits the internal needs of inquiry learning. In the whole process of inquiry-based learning, including the establishment of inquiry topics, the collection, development and utilization of resources, in-depth study, the display and evaluation of results, all need the support of network education resources. Generally speaking, the implementation of inquiry learning can be divided into three stages: Suppose the problem situation stage, the experiment experience stage and the expression communication stage [5]. Entering the stage of problem situation requires teachers and students to create a certain problem situation together. In this stage, with the help of students and teachers, the network plays an indisputable role in this process by collecting relevant information about the subject, understanding the level of knowledge about inquiry topics, establishing inquiry groups, and collecting possible information. In the stage of experimental experience, expression and communication, the subject of inquiry learning can create problem scenarios and present the inquiry results with the help of the network platform.

Collaborative Learning

Collaborative learning refers to all related behaviors of learners that involve in groups, maximize individual and group learning results under certain incentive mechanism in order to achieve the common learning goals. The organizational form of collaborative learning regards students as a learning resource, creates a good learning situation for learners, and is a reflection of constructivist learning theory.

Web-based collaborative learning refers to the process of using computer network, multimedia and other related technologies to enable multiple learners to interact and cooperate with each other on the same learning content so as to achieve a profound understanding and mastery of the teaching content [6]. Firstly, online collaborative learning provides a lively and rich environment for learners to share learning resources and process. Secondly, teachers and students can discuss problems together on the Internet. Each student can think about problems, express his or her own views, and exchange learning experience and perspective in competitive discussions. Thirdly, everyone should make their own contribution to the learning of others and make an objective analysis of the opinions of others. Learners can not only acquire knowledge from their own thinking process, but also from the perspective of other learners, so as to promote their self-development. The integration of network resources and collaborative learning has the following irreplaceable advantages:
(1) The expansion of textbooks in the network and the co-construction of network resources between teachers and students facilitate the expansion and acquisition of learning resources and information, provide conditions for resource-based learning, and promote learners’ ability to explore the frontier knowledge in the subject and actively read, actively collect information and collate information.

(2) Improve learners' information literacy.

(3) Learners are required to create electronic works and resources, including individual, group learning home pages. This is conducive to the visualization of learning objectives, processes and results, the self-monitoring of objectives, motivation of learning, enhancement of planning and time management, the self-monitoring of learning processes and the self-evaluation and management of learning results. The individualization and innovation of electronic works can promote students' pursuit of perfect individuality, effective learning and creative learning [7].

(4) The use of network resources makes every student have the right to study and the right to choose. Students and teachers can not only have face-to-face communication, but also have free and in-depth multi-directional communication online.

Integration of Network Learning and Information Technology

The integration of network learning and information technology is to create a new learning environment by effectively integrating information technology into the process of network learning. The learning way in network environment must be realized by some information technology means. Therefore, the integration of network learning and information technology is necessary for the construction of civil aviation CBT network environment, which mainly includes the application of IT information retrieval, interactive research and analysis of information.

Teaching Effect and Evaluation

The civil aviation CBT system has been put into use among 2016 and 2017 students majoring in air crew in Chengdu Polytechnic. The results show that the practical training effect is good, and the information teaching mechanism proposed in this paper is feasible, which can greatly promote the improvement of cabin service level and cabin teaching efficiency [8].

Since 2016, the school teaching evaluation of “Practice of flight attendants” course has been above 98 points, the student attendance rate has been above 99%, the completion rate of the practical training report is 100%, and the interview success rate has increased by 30% compared with previous years [9]. Through teaching inspection, supervision and evaluation, student evaluation and airline feedback during the student internship, we really feel that students’ customer service skills and professional quality have been significantly improved.

Epilogue

Under the background of “combination of work and study”, it is an important subject that needs careful research, exploration and practice to study how to improve the contradiction of attaching more importance to theory but less importance to practice in air crew major in higher vocational colleges. With the rapid popularity of the Internet, the introduction of information-based teaching methods will effectively promote the reform of teaching methods, while fully improving the learning efficiency of learners [10]. In particular, the construction of information teaching system is an important means and a necessary exploration to promote the teaching reform, especially in the air crew major with expensive training equipment and rapid update and iteration.

The future research can continue to explore a series of problems such as unreasonable teaching content, uncontrollable classroom discipline and lack of laboratory management personnel in the application of civil aviation CBT system in the experimental teaching of aviation theory. Through demonstration, it is determined whether a new CBT experimental teaching content system can be built, a reasonable allocation of laboratory staff, the infiltration of students' professional accomplishment in experimental teaching and the installation of network real-time monitoring...
system can be carried out and reforms can be made to improve the utilization rate of CBT system and ensure the effect and quality of experimental teaching.

In any case, we should clearly understand that any teaching system should be based on the concept of people-oriented and student-oriented [11]. We should proceed from the teaching law and the requirements of personnel training, further deepen the teaching reform, strengthen teaching research, and attach importance to the training of teaching personnel and system construction.

References


