Cooperative Teaching Model of Flight Technology Major in Colleges and Universities Based on Deep Learning Theory

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Abstract: The development of aviation technology provides more teaching resources for the education field, but also brings new problems and challenges. The traditional classroom is difficult to meet students' learning needs. In order to improve the skills of students majoring in flight, enable students to better grasp the knowledge they have learned and become qualified pilots, this paper intends to improve their teaching mode. Based on the theory and method of deep learning, combined with the current college curriculum, this paper designs a collaborative teaching mode based on knowledge and ability, process and experience. This paper highlights the advantages of collaborative teaching through questionnaire and comparison. The experimental results show that more than 80% of the people think that the collaborative teaching mode is a good way to learn.

1. Introduction

Collaborative teaching is a new educational concept, which takes students as the main body and teachers as the guide to carry out teaching and learning activities. In the traditional classroom, teachers often inculcate knowledge on one level. Students can learn more and higher level professional knowledge through classroom and practical operations. At the same time, this poses a challenge to the traditional lecture-oriented teaching method. The main purpose of the collaborative teaching mode is to cultivate students' professional knowledge and skills. Through the change of teaching methods, students can have a certain level of expertise, innovation ability, independent exploration spirit, and a sense of cooperation and communication.

Although there are few researches on deep learning and cooperative teaching in flight specialty classroom, there are many theoretical achievements in cooperative teaching mode research. For example, some scholars believe that deep learning is a learning method based on in-depth understanding of learning content [1-2]. On the basis of in-depth study, we promote classroom teaching reform. Some scholars have proposed an experimental method of behavior monitoring based on deep learning. This method adopts a target detection algorithm based on depth learning and directly extracts target features through a convolutional neural networks [3-4]. In addition, some scholars introduced the "student-centered" network teaching concept and proposed specific plans and strategies to improve the quality of aviation professional network teaching from three aspects: curriculum design, textbook compilation, and detailed planning [5-6]. Therefore, this paper

is based on modern technology to explore the cooperative teaching mode in the flight technology class. The application of deep learning makes the collaborative teaching model a major advantage.

This paper first studies the flight quality of flight majors and puts forward the importance of collaborative teaching by elaborating the comprehensive quality of pilots. Secondly, the construction of a collaborative teaching mode is discussed. Then, the collaborative learning environment is analyzed and discussed to determine the feasibility of collaborative teaching. Finally, through the form of questionnaire survey, we recognize the advantages of collaborative teaching and draw relevant conclusions.

2. Classroom Collaborative Teaching Mode of Flight Technology Specialty in Colleges and Universities Based on In-Depth Learning

2.1 Flight Quality of Flight Majors

Compared with ordinary students, flight majors have higher vocational requirements and more comprehensive requirements for employment quality. Under the background of the rapid development of civil aviation, it is necessary to strengthen the training of students' flight quality. In the current situation of colleges and universities, the flight quality of flight majors is clearly low. How to comprehensively improve the flight quality of flight trainees has become the most valuable problem for flight training managers and educators [7-8].

The reason for the low flying cultural quality of college students is that it is difficult to guarantee the flying quality of students, which leads to the low cultural quality of students. The flight course is a highly practical course, but in China, the final examination of the course is mainly based on theory, which leads to students' insufficient understanding of the course. Students are forced to learn and have difficult training tasks every day. However, their time and energy are limited, and they cannot devote more energy to the cultivation of cultural qualities. Paramilitary management inhibits students' creativity and positive habits. At the same time, the long-term listening behavior makes students stay in a passive state for a long time, which inhibits their creativity. Air Force cadets have difficulty in learning tasks and lack of time to participate in other activities, which affects their initiative and creativity. In addition, strict examinations were conducted for Air Force trainees at different stages, and a lot of money was spent on completing theoretical learning, which of course did not give full play to the students' initiative [9-10].

Flight students must have several basic qualities: political quality. It is essential that air force cadets have good political ability and good political background. Civil aviation is basically a service sector with noble morality. Strict discipline and strict work of pilots. Compliance with this order is also essential to ensure the safety of civil aviation. Strict discipline is an important achievement of pilots. Good style pilots are a high-risk industry requiring commitment and diligence. In order to ensure aviation safety, aviation personnel should develop a good lifestyle and lay a foundation for future work [11-12].

2.2 Construction of Collaborative Teaching Mode

The teaching content of a flight courses has an inherent logical relationship or value relationship with the teaching content of other courses, which requires teachers to provide a forward-looking and forward-looking knowledge structure. However, Chinese teachers have been teaching in different subjects for a long time, and their knowledge structure is relatively simple, which means that most teachers do not have the ability to teach flight courses. Only through the cooperative teaching model can we promote the development of flight courses and how to achieve the integration of flight course content. How to divide and cooperate, how to cooperate and interact

between teachers and students, and how to build a teaching model are the main problems that the cooperative teaching model must solve. To solve this problem, we must follow the guiding principles of constructing the cooperative flight course teaching model, including the principles of flexibility, science, and unity. The cooperative teaching model itself is highly flexible and easy to adjust and reorganize. The distribution of students, time, groups or spaces should also be scientific and reasonable, and the concepts and skills should conform to scientific laws. In the cooperative teaching mode of flight courses, teachers pay more attention to the guidance of students' learning methods, the cooperation, and emotional communication with students, and strive to create a classroom atmosphere that combines artistic orientation, real world images and teaching emotions that are compatible with the content of flight courses. Collaborative teaching of flight courses is an organic combination of extracurricular teaching and practice. In the classroom, teachers teach the basic principles and methods of learning. On the one hand, teachers guide students to use the knowledge they have learned to solve various problems in real life and promote the development of intellectual factors. The supporting conditions for the development of cooperative teaching mode of flight courses are mainly the will and attitude of teachers in the cooperative teaching team. Through systematic training, the teaching team can achieve systematic advantages [13-14].

Teachers' cooperation is not spontaneous and random, but organized. As a part of the cooperative teaching mode of flight courses, it is necessary to establish a cooperative flight course team to jointly undertake the development and implementation of flight courses. There are four types of cooperative teacher teams: cooperative teacher team, cooperative teacher team, and cooperative teacher team. A collaborative team composed of teachers of the whole school and other types of teachers. Whether teachers can become real partners depends on various cooperative relationships and factors in the implementation of the cooperative teaching models. The key lies in the balance and professional complementarity of the teacher, team, harmony and democracy, mutual respect for the team environment, courage to work hard, modesty, and friendliness. Tolerance between teachers' personal characteristics, clear goals, and requirements.

The collaborative teaching model of flight courses assumes that the teaching content proposed by teachers is not only the description and understanding of course knowledge, but also the flight content with internal logical links with other subject knowledge to promote knowledge transfer. To enable students to understand the knowledge coherently and truly realize the flight learning in this course. At the same time, according to the needs of flight courses, the design is not limited to formal teaching methods, but diversified teaching methods to promote the learning of flight courses [15-16].

2.3 Collaborative Learning Environment

Information release module includes information sharing of management system, learning task sharing, learning tips, and teacher topic selection tips. Administrators and teachers can only modify information and tasks that have been published as users. Learning task is a text-based real-time learning task, which can be used as a supplement to learning objects.

Examination evaluation refers to the discussion and evaluation of learning materials, student assignments, group assignments, and learning topics by users (including students, teachers, and administrators). You can evaluate the learning materials and learning materials, and the student self-report evaluation is conducted in the student group.

Enclosed heterogeneous interactions allow easy publishing and receiving of e-mail. Students, teachers, and system administrators can send messages to each other as long as they know each other's user name or login name and conduct personal communication. This interaction mode has good confidentiality, and the information sent can only be viewed by the sender and receiver

[17-18].

Open heterogeneous interaction provides a simple forum function. Users can publish and respond to topics, collaborate and communicate, and discuss an open public topic. System users can view published content and user responses. Open real-time interaction realizes the function of simple online chat rooms developed using Java and other technologies. Users from different places can chat and interact in real time here. The user can enter the system for discussion after entering the user name. The chat object can be all online users or specific users. Chat content is public, and all online users can view the chat content. If the user has been silent for more than a period of time, the system will log off with his user name. If users need to chat again, they must reenter their user name to enter the chat room.

3. Questionnaire Survey on Deep Learning and Collaborative Teaching Mode

3.1 Investigation Purpose

Through interviews and questionnaires, a questionnaire survey was conducted among teachers and students of the two schools to understand the problems existing in the current teaching behavior of the head teachers, including teachers' understanding and attitude towards "cooperative learning" teaching. The attitude of students towards cooperative learning teaching and the reform and promotion of cooperative learning teaching.

3.2 Design and Process of the Study

In the process of investigation and data collection, in order to fully understand the current situation and problems of cooperative learning of school teachers, this study not only developed a questionnaire suitable for teachers and a draft teacher questionnaire, but also developed a "feedback form of students' learning experience". Understand the influence of teachers' cooperative learning from the perspective of students. The research process is shown in Figure 1:
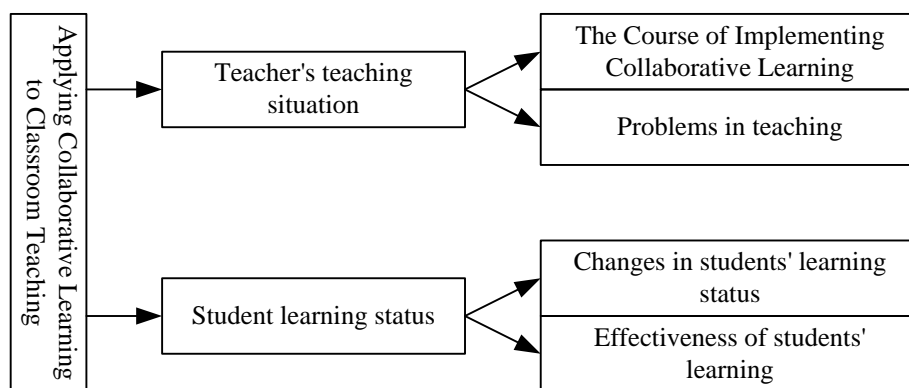

Figure 1: Design and Process of the Study

The school has distributed 200 questionnaires, of which "cooperative learning" teachers mainly participated in the questionnaire survey, but only some teachers who still completed traditional classroom teaching completed the questionnaire survey. In the actual recovery stage, there are 160 valid questionnaires, and the actual recovery rate is 80%.

3.3 Application of Deep Learning in Collaborative Teaching

In the process of teaching the flight technology specialty in colleges and universities based on the deep learning theory, teachers need to make full use of existing resources and transform knowledge points into cognitive forms that students can recognize. According to the principle of user-based collaborative filtering algorithm, we know that to recommend to target users, we must first find users with similar interests. In the collaborative teaching mode, students can be recommended to learn in depth. If the collection of classes that user y likes is represented by Q_y, and the collection of classes that user x likes is represented by Q_x, the similarity between user y and user x can be expressed as follows:

$$S_{xy} = \frac{|Q_x \cap Q_y|}{|Q_x \cup Q_y|} \tag{1}$$

After the similarity calculation between users is completed, the recommendation algorithm will measure the user 's preference for course K:

$$H(\mathrm{a}, K) = \sum_{y \in s(a,L) \cap Q(K)} S_{ab} p_{bK} \tag{2}$$

Wherein a and b represent the interest vectors composed of 0 and 1 calculated for two users, respectively.

Deep learning is a cognitive process in which learners can actively acquire information, process information, connect old and new knowledge, transfer learning and innovate, develop high-level thinking, and reflect activities to the help of educators. This teaching mode is based on the deep learning theory. College teachers carry out targeted training in the three stages of pre-class, classroom, and post class. Through experimental verification, students' knowledge mastery is tested.

4. Analysis of Questionnaire Results

4.1 The Influence of Teachers' Teaching Behavior Change on the Learning Effectiveness of Flight Majors

After collecting and counting the feedback sheet of students' learning experience, the students' learning status has improved and their learning effectiveness has also improved to a certain extent. See Table 1 for the comparison between the learning results of students majoring in flight under the collaborative teaching mode and the results under the traditional learning mode:

Table 1: Comparison of Teaching Behavior on Students' Learning Effect

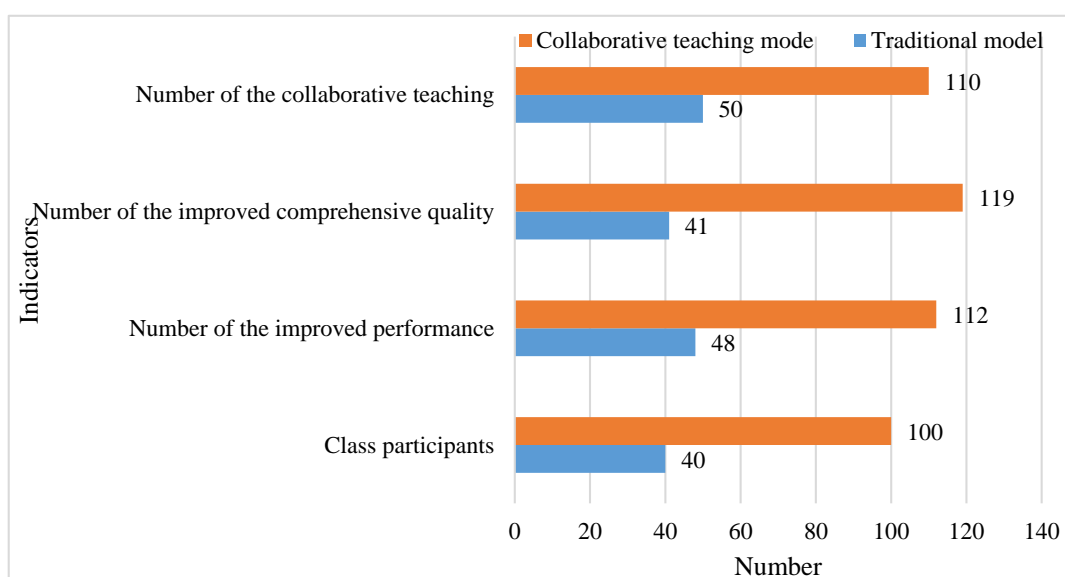|	Traditional model	Collaborative teaching mode
Class participants	40	100
Number of the improved performance	48	112
Number of the improved comprehensive quality	41	119
Number of the collaborative teaching	50	110

Figure 2: Comparison of Teaching Behavior on Students' Learning Effect

As shown in Figure 2, we can see that, compared with the collaborative teaching model, the traditional teaching model has fewer students participating, and fewer students have improved their performance and overall quality. The students in the collaborative teaching mode have better scores, and the comprehensive quality of most students has been improved. This shows that collaborative teaching is more conducive to students' understanding and understanding of flight professional knowledge.

5. Conclusions

With the continuous progress of science and technology, network technology has been increasingly widely used in the teaching process, which has greatly affected the traditional classroom. In this paper, the comparative analysis method is mainly used to discuss the construction of college teacher education network resources based on deep learning theory. Based on the theory of deep learning and the actual teaching situation of teachers and students in colleges and universities in China, this paper proposes two typical teaching methods: assimilative learning in an efficient classroom and traditional classroom teaching based on the in-depth development of the new curriculum system. Through comparison, it is found that the collaborative teaching mode can be more recognized by students and is also conducive to the improvement of students' practical and theoretical achievements.

Acknowledgements

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