Research on the Teaching Reform Path of Deep Learning Courses in Universities Based on Flipped Classroom Teaching Model

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Abstract: With the advancement of educational reform, higher education and teaching have also ushered in new opportunities for reform. In this context, ways to improve the teaching effectiveness of the Deep Learning course and cultivate students' professional literacy and comprehensive abilities have become one of the teaching difficulties that troubles university teachers. The application of the flipped classroom teaching mode can effectively cultivate students' core competencies and comprehensive abilities, which is crucial for their future learning and development. Therefore, it is necessary for universities to use the flipped classroom teaching model in the teaching of Deep Learning course in order to stimulate students' interest in learning, mobilize their subjective initiative, and improve the effectiveness of classroom teaching. In this regard, this article provides a brief analysis of the teaching reform of the Deep Learning course in universities based on the flipped classroom teaching model, hoping to provide valuable reference and guidance for readers.

Keywords: Deep learning; Universities; Flipped classroom; Teaching model

1. Introduction

This era is all about artificial intelligence, with rapid development of artificial intelligence technology. It is widely used in various fields and plays an important role and value, receiving attention and attention from multiple countries and governments. The course Deep Learning is a course in the field of artificial intelligence and plays an important role in the professional system [1]. College students need to learn and understand various models, enhance their hands-on and practical abilities, and lay a solid foundation for their subsequent professional learning and scientific research through course learning. However, through practical investigation by the author, it was found that in the past, teachers often dominated the teaching process in universities, and the main role of students could not be effectively highlighted [2]. They could only passively receive knowledge indoctrination, and this teaching model was very detrimental to the development of students' personality and creativity. Therefore, in order to improve the effectiveness of classroom teaching, it is necessary to optimize and reform the traditional teaching mode. The flipped classroom teaching mode can fully stimulate students'

interest in learning, effectively mobilize their subjective initiative through the use of modern teaching technology, make students the center of classroom teaching, change their passive learning status, guide them to think independently and analyze, and thus effectively improve the effectiveness of classroom teaching. In this regard, it is necessary for teachers to recognize the significance of the flipped classroom teaching model and flexibly apply it to the teaching of the Deep Learning course, in order to improve the effectiveness of classroom teaching, more effectively cultivate students' professional literacy and comprehensive abilities, and lay a solid foundation for their future development [3].

2. Analysis of the current teaching situation of Deep Learning course in universities

2.1. Fixed and outdated teaching mode

After a practical investigation by the author, it was found that in the teaching process of the "Deep Learning" course in universities, teachers still use traditional and outdated teaching methods and models, treating students as containers for carrying knowledge. Teachers often lead classroom teaching, and the role of students as the main body cannot be highlighted, often only passively receiving knowledge impartation. Classroom teaching gradually becomes a "one-on-one play" for teachers. In classroom teaching, there is little effective interaction and communication between students and teachers, which leads to teachers being unable to understand the needs of students, and students' enthusiasm and initiative cannot be effectively stimulated. This leads to low classroom participation, seriously affecting the improvement of course teaching effectiveness.

2.2. Students have a low interest in learning

Interest is a beneficial friend and mentor for students, as well as a source of motivation for them to participate in learning activities. Only under the stimulation of strong interest can students fully immerse themselves in classroom teaching and learning. This also applies to college students. However, due to the relatively outdated and single teaching methods used by teachers, the classroom atmosphere is dull and cannot stimulate students' interest in learning and mobilize their enthusiasm and initiative, which seriously affects the improvement of classroom teaching effectiveness. In addition, to some extent, high-quality teaching refers to effective interaction and communication between teachers and students. However, in a dry and boring classroom atmosphere, students often have to learn passively and cannot interact and communicate effectively with teachers, which also has a serious impact on the improvement of classroom teaching effectiveness [4].

3. Analysis of the advantages of flipped classroom

3.1. Meeting the learning needs of students and achieving personalized teaching

By using flipped classrooms, teachers can present relevant course-teaching content to students in the form of videos before class. Students can use these auxiliary teaching resources for preview before class. Considering the differences in learning abilities, personality traits, and acceptance abilities among students, coupled with the limited time available for traditional classroom teaching. Often, it is difficult for teachers to teach according to the characteristics of students. The application process of flipped classroom respects the individual differences among students and can achieve layered teaching based on the actual learning situation of students. During the pre-class self-study process, students can choose video content that is more in line with their actual learning situation, rhythmically control time, and grasp learning progress based on their learning situation. Students who learn faster can fast-forward videos, while those who learn slower can repeatedly watch videos to consolidate their important key points. More importantly, students can also communicate and interact with other students or

teachers through social media platforms such as QQ groups and WeChat groups and discuss their own questions or learning experiences during the preview process [5].

3.2. Closer teacher-student relationships and building harmonious teacher-student relationships

In the teaching of Deep Learning, the application of flipped classroom mode can provide teachers and students with a more free and democratic communication platform. In this teaching mode, the student's classroom subject status is fully demonstrated, and they can express their own ideas anytime and anywhere. Teachers also have ample time to truly understand their students, understand their problems in the learning process, understand which students are struggling in their studies, and which students have poor learning abilities. In addition, teachers can also target students' actual learning situations, understand them, track their learning dynamics in real life, and understand their potential problems [6]. The gradual strengthening of connections between teachers and students is conducive to the construction of a harmonious and democratic teacher-student relationship.

3.3. Increasing interaction between teachers-students and students-students to create a good learning atmosphere

During the implementation of flipped classroom teaching mode, teachers can clearly feel that the time spent between teachers and students is increasing, especially after the flipped classroom teaching mode, one-on-one communication can be carried out between teachers and students [7]. Teachers can organize students who have difficulties and frequent problems in learning together, and provide concentrated explanations for the common problems they encounter during the preview process. This is an effective space for close communication between teachers and students outside of the classroom. At the same time, the connections between students have become increasingly close. Some of them choose to form small groups to learn together and help each other, which invisibly stimulates students' learning spirit and cultivates their confidence in learning. Over time, flipped classrooms have helped students form an effective learning atmosphere. They no longer simply equate learning with acquiring knowledge but instead view it as a more meaningful activity that promotes personal growth [8].

4. The specific application of flipped classroom mode in the teaching of deep learning courses in universities

4.1. Pre-class session, cultivating preview habits

Firstly, teachers should focus on the teaching content and objectives of the subject of Deep Learning and consider the inherent factor of individual differences among students. Teachers should divide the knowledge points of subject teaching into targeted and hierarchical categories in order to create more comprehensive teaching videos that meet the learning needs of the vast majority of students [9]. In the process of video production, teachers also need to design interactive discussion questions based on specific knowledge points, such as when explaining GAN (Generative Adversarial Network). When referring to the GAN network, teachers can set related questions such as "What are the characteristics of this model?" "What are the advantages and disadvantages of this model compared to other models?" In this way, students can be stimulated to be interested in the topics. In addition, teachers can upload courseware to online platforms and require coorperation from students to preview before class and provide feedback to teachers on any issues that may arise during the preview process. It is necessary for teachers to optimize and reform classroom teaching design in response

to various questions raised by students during the pre-class preview process in order to improve classroom teaching effectiveness [10].

4.2. In class sessions, deepen teaching

In the flipped classroom mode, flipping during class is an extremely important part, and the main goal of this stage is to solve the questions students encounter in the preview stage and help them overcome learning difficulties. Therefore, it is necessary for teachers to use innovative thinking and methods to create a new situation in the teaching of the Deep Learning course. In order to better enhance the effectiveness of flipped classroom teaching, it is necessary for teachers to exert importance to the guidance section. By optimizing the guidance section, students can be aroused to learn, mobilize their enthusiasm and initiative, and thus better improve teaching effectiveness. For example, when learning the Typical Model of Deep Learning, the Multilayer Perceptron (MLP) model has strong advantages in handling classification and regression problems but has certain shortcomings in dealing with complex problems. GAN has been a hot topic in the field of deep learning in recent years. It is widely used in image generation and data augmentation, but there are also some problems, such as pattern collapse and weak stability [11]. In order to improve classroom teaching effectiveness, teachers can integrate these basic models with popular technologies and adjust them for different application scenarios, either through theoretical teaching or various methods such as practical operation. With this, students can better grasp the principles of these models, thereby effectively enhancing their professional literacy and comprehensive abilities.

4.3. Optimizing after-school activities to enhance teaching revenue

4.3.1. Arranging after-class tasks and internalize professional knowledge

The post-class consolidation stage is an extension of classroom teaching. In order to better improve teaching effectiveness and encourage students to internalize professional knowledge, it is necessary for teachers to exert importance to and pay attention to after-school activities, assign relevant learning tasks to college students, and in this way, promote their understanding and mastery of professional knowledge, and enhance their professional literacy [12]. For example, teachers can assign as follows:

(1) Task 1: Master the basic principles and structural characteristics of GAN networks, diffusion models, transformer models, etc., and understand their suitable application scenarios and advantages.
(2) Task 2: Use these task models to complete tasks, such as image generation, natural language, and more.
(3) Task 3: Understand the latest developments and application results of these models in various fields.

4.3.2. Optimizing the evaluation method and cultivating the comprehensive ability

Firstly, teachers need to optimize their evaluation methods. In the traditional university evaluation system, the main evaluation method is paper-based exams, which use scores to evaluate the students. This traditional evaluation method is very unfavorable for the development of the personality of university students. Teachers can combine outcome evaluation and process evaluation, not only evaluating the learning results of students but also evaluating their learning process. Through this method, the effectiveness of evaluation can be improved and the comprehensive development of students can be promoted [13].

Secondly, it is necessary for teachers to optimize and upgrade traditional evaluation content in order to stimulate students' learning motivation. In the context of educational reform, the vast majority of universities have expanded the content of teaching evaluation, such as incorporating late arrivals, early departures, and absences into the evaluation system. However, there are still certain problems that make the evaluation system not scientific enough. In order to improve teaching effectiveness, teachers can incorporate student classroom

performance, group discussions, completion of learning tasks, innovation ability, and exploratory spirit into it, improve the evaluation system, and in this way, better stimulate student learning motivation and enhance teaching effectiveness [14].

Finally, it is necessary for teachers to optimize the evaluation subject. In traditional evaluation systems, teachers mainly evaluate students. The evaluation results are often influenced by multiple factors, resulting in inaccurate situations. Teachers can change the teaching subject and conduct group and student evaluations to enhance the accuracy of the evaluation.

5. Conclusion

In the context of the artificial intelligence era, with the rapid development of artificial intelligence technology, society and enterprises require a huge number of high-quality talents. However, through practical investigation by the author, it has been found that there are some problems in the current professional teaching process in universities, such as low student interest and outdated teaching models, which cannot effectively cultivate students' professional literacy and comprehensive abilities, leading to their inability to meet the needs of society and enterprises for talents. In this regard, it is necessary for universities and their teachers to reform and optimize their teaching concepts, innovate teaching models, and apply the flipped classroom teaching model in the course of Deep Learning. Through this approach, students can be stimulated to learn, their enthusiasm and initiative can be mobilized, and their classroom teaching effectiveness can be improved. This can effectively cultivate students' professional qualities and promote their comprehensive development [15].

Disclosure statement

The author declares no conflict of interest.

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