Exploration of Teaching Methods for the Course of Introduction to Database Systems under the Mixed Teaching Mode

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Abstract: With the continuous deepening and development of education in the context of new engineering, the teaching models in universities are becoming increasingly diverse. This article takes the blended teaching mode as the starting point to explore the teaching methods of the course "Introduction to Database Systems". Through practice, it has been proven that adopting blended teaching mode can better stimulate students' learning interest, enhance their autonomous learning ability, and also improve teachers' teaching effectiveness and quality. On this basis, we also proposed some teaching strategies and methods for the database introduction course under the mixed teaching mode, aiming to provide valuable ideas and insights for database enthusiasts and educators.

1. Introduction

Database technology is an important branch of information science and technology, which has been widely applied in various fields and has become an indispensable infrastructure in modern information society. The Introduction to Database in Universities is an important course for cultivating students' database technology literacy, and is also one of the core courses in computer science majors. However, in the teaching process, teachers often face problems such as tight time, excessive content, and low student motivation, resulting in poor teaching effectiveness. With the continuous development of information technology, mixed teaching mode has gradually become an important direction of higher education reform. This article will start from the background of the new engineering discipline, combined with the blended teaching mode, in order to explore how to carry out the teaching of database introduction course, and improve teaching effectiveness and cultivate students' practical abilities.

2. Basic concepts of mixed teaching mode

The mixed teaching mode is a teaching method that combines online and offline teaching. It is a product of the combination of traditional education and modern network technology. The purpose of blended teaching mode is to improve students' learning effectiveness and interest, and help them

achieve personalized, autonomous, and interactive learning.

The mixed teaching mode adopts various teaching strategies and tools, including online teaching platforms, online courses, video teaching, group discussions, group projects, and so on. Through these tools, teachers can provide students with more diverse learning resources and teaching methods, enabling them to learn knowledge more flexibly and efficiently.[1]

In the mixed teaching mode, students can learn through online platforms and also participate in traditional face-to-face courses to gain real-time communication and interaction with other classmates and teachers. Students can learn independently within their own time and schedule, as well as engage in effective interaction and discussion in face-to-face classrooms. In addition, the mixed teaching model can also provide students with rich learning resources and diverse teaching methods to meet the learning needs and interests of different students.

In short, mixed learning mode is a new teaching method that combines network technology with traditional education to expand students' learning time and space, improve their personalized learning ability and initiative for autonomous learning, and promote online interaction and communication with teachers and other students, in order to achieve more efficient, flexible, and diverse learning methods.[2]

3. The current situation of the teaching mode of database introduction course in the context of new engineering

3.1. Single course content

In the traditional database introduction course, the teaching method based on relational database system makes many students unable to really realize the application of database technology in different scenarios, and also limits their in-depth understanding of database technology. For example, with the advent of cloud computing and big data era, various emerging database technologies, such as NoSQL database, column-oriented DBMS, and graph database, have developed rapidly, and have gradually received widespread attention and use in practical applications.[3] These new database technologies have obviously not received enough attention and introduction in the traditional database introduction course. At the same time, the relational database system has certain defects in some application scenarios, such as performance bottlenecks and poor scalability in high concurrency and massive data storage, which makes its performance unstable in these application scenarios. Therefore, familiarity with technologies such as NoSQL databases and distributed databases will enable students to have a more comprehensive understanding of the field of database technology and be able to choose appropriate database technologies based on actual needs.

3.2. Single teaching method

The teaching method of traditional database introduction courses is single, mainly relying on theoretical knowledge teaching and simple experimental demonstrations, which cannot truly stimulate students' interest in database technology, nor provide them with opportunities for practical operation and problem-solving.[4] This teaching method is not conducive to cultivating students' practical and applied abilities, and it is more likely to make students without relevant background and practical experience feel difficult. On the contrary, a typical example is the CS145 Database Systems course at Stanford University, which comprehensively enhances students' programming and practical skills, as well as their ability to have a deep understanding of database systems through assignments and experiments. By designing and constructing databases in practical innovative projects, students can better understand database functions and usage scenarios, and cultivate problem-solving abilities. Similar course designs can greatly enhance students' practical application abilities in database

technology.

4. The significance and advantages of mixed teaching mode

The mixed teaching mode is an organic combination of traditional teaching mode and online teaching mode. By integrating online and offline teaching resources, students can more flexibly choose their learning methods, improve learning efficiency and satisfaction. In the teaching of Database Introduction course, the mixed teaching mode can reflect its significance and advantages in the following ways.

4.1. Expanding teaching resources

The mixed teaching mode combines traditional teaching mode with online education mode, providing students with a wider and more convenient learning resource. Through online resources such as online platforms and open course websites, students can access the latest learning materials and information anytime and anywhere to achieve continuous learning. At the same time, teachers can also utilize online teaching resources to provide students with more comprehensive and diverse learning resources to enhance their interest and motivation in learning.

4.2. Increasing interactivity and learning autonomy

The mixed teaching model can enhance students' interaction and learning autonomy to promote their active participation and serious learning. Through online forums, WeChat groups, and other means, students can engage in discussions, exchanges, and share their experiences and opinions. This learning method is not only conducive to mutual learning and reference among students, but also stimulates their interest and motivation in learning, enhancing their autonomy and self-awareness in learning. For example, in the Introduction to Database course, teachers can set up online discussion areas to allow students to freely communicate, discuss, and ask questions during learning to promote interaction and communication between students. This approach can help students better understand and master relevant knowledge points, while also enhancing their learning enthusiasm and motivation.

4.3. Improving learning efficiency and flexibility

The blended teaching mode can improve learning efficiency and flexibility, providing students with more convenient and flexible learning methods. Students can choose appropriate learning methods based on their own time and space arrangements, thereby improving learning efficiency and flexibility. For students with tight schedules and heavy learning tasks, mixed learning can help them complete learning tasks more efficiently. For example, in the Introduction to Database course, teachers can record course videos and upload them to online platforms. Students can choose the time to watch course videos based on their own time and free time, which is no longer limited to traditional classroom teaching. This approach can improve learning efficiency and flexibility, and also help students better grasp relevant knowledge points.

5. Teaching strategies for Database Introduction course under mixed teaching mode

5.1. Adopting online online courses with offline teaching

The teaching mode of combining online and online courses with offline classes usually involves explaining some basic knowledge through online courses, and conducting in-depth exploration and practical operation of these knowledge in face-to-face classes. For example, in the course of

Introduction to Database System, teachers can teach students various database related knowledge through online video, PPT and other forms, such as the historical development of database, components of database management system, data modeling, SQL language, etc. Due to the fact that online online courses are not limited by time and space, students can learn relevant knowledge anytime and anywhere, and can arrange them according to their own learning progress. In face-to-face classes, teachers can provide detailed answers and demonstrations based on the actual situation of students. For example, if students have questions about SQL language, teachers can help them better master SQL language through examples and practical operations. At the same time, teachers can also organize group discussions and case studies for students, allowing them to have a deeper understanding and mastery of relevant knowledge. This teaching model not only provides students with more flexible and autonomous learning methods, but also provides teachers with more teaching tools and means, improving teaching effectiveness and learning quality.

5.2. Conducting practical operations and case analysis

In the teaching of Introduction to Database Systems, practical operations and case analysis are very important links. Through practical data operations and practical experience, students can have a deeper understanding of the relevant knowledge and technology of database systems, and can improve their operational skills and problem-solving abilities. For practical operations, experimental projects and exercise exercises can be designed to allow students to operate database systems in laboratory or home settings. For example, designing a student performance management system requires students to complete database modeling, table design, data import, query, and statistics operations, in order to exercise students' data manipulation and logical thinking abilities. In this way, students can learn very practical scenarios and better understand how databases can be applied in practical scenarios. For case analysis, students can choose some practical business scenarios to analyze and propose corresponding solutions. For example, for an online shopping website, students can analyze the data needs and processing methods of the website, and then propose the corresponding database design scheme. Through case analysis, students can better grasp the application and practical application skills of database systems. In addition, some practical activities can be organized, such as visiting the actual application scenarios of enterprise database systems, or inviting experts in the field of database systems to give lectures, so that students can be exposed to more real scenarios and application cases, stimulate their enthusiasm and interest, and improve the learning effect.

5.3. Adopting flipped classrooms and group discussions

Flipped classroom and group discussion are two common methods of teaching in face-to-face classrooms, both of which can help improve students' learning effectiveness and thinking abilities, and stimulate their enthusiasm for learning. Flipped classroom refers to reversing the arrangement of classroom teaching and homework time, allowing students to preview relevant knowledge through online learning platforms before class, and engage in communication and discussion in the classroom. In this way, students can gain a deeper understanding before class, search for other materials and information through methods such as searching the internet, and gain a more comprehensive and in-depth grasp of the learned content. In the classroom, students can share, communicate, and delve deeper into their own thinking and understanding, deepening mutual understanding and understanding. By flipping the classroom, students can not only expand their knowledge, but also exercise their self-learning and collaborative abilities to promote deep thinking and creative expression. Group discussion is a form of group debate or problem discussion in the classroom, which can be used to encourage students to participate more actively in classroom interaction and thinking.

In group discussions, each group can communicate and collaborate with each other, and focus on analyzing different aspects of specific problems, in order to achieve deeper and broader understanding. At the same time, group discussions can also cultivate students' spirit of cooperation, communication skills, and team awareness, thereby promoting the improvement of students' individual abilities and overall level. For example, in the teaching of Introduction to Database System, students can be grouped to carry out database design. Each group needs to carry out data modeling, table design, query practice and other activities to improve students' design level and practical experience.

6. Conclusion

In the context of the new engineering discipline, the teaching mode of the Introduction to Database Systems course also needs to be constantly updated and improved. This article takes the mixed teaching model as the starting point to explore the teaching methods of this course. Through practice, it has been proven that adopting a blended teaching model can better promote students' autonomous learning and teachers' teaching effectiveness. However, there are also some challenges and problems in the mixed teaching model, such as the supervision and coordination of online courses, which require us to continuously explore and improve. I believe that with the joint efforts of educators and students, the teaching mode of the Introduction to Database Systems course will become more and more perfect, making greater contributions to cultivating more excellent database talents.

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References

[1] Cheng Y, Song Y, Lu G. Teaching Design of Database Application Course Integrating Ideological and Political Elements in Hybrid Teaching Mode [J]. Computer Knowledge and Technology 2022;18(08):133-134. DOI: 10. 14004/j. cnki. ckt. 2022.0508.

[2] Wang K. Exploration of the Teaching Mode of Database System Course in the Background of "New Engineering" [J]. Intelligence 2019;(08):83.

[3] Zhang Y, Zhang C. Exploration of Teaching Methods for the Course of Introduction to Database Systems under the Mixed Teaching Mode [J]. Reading and Writing (Journal of Education and Education) 2018;15(11):79-80. DOI: 10. 16071/j. cnki.cn51-1650/g4.2018.11.062.

[4] Liu F. Research on the Teaching Model of Database Principles and Systems under the Framework of Information Management Professional Curriculum Group [J]. Information and Computer (Theoretical Edition) 2018;(19):247-248+251.