



An Exploratory Study of Blending Smart Classroom in Database Course

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Abstract. Research takes the basic compulsory course “Database” of educational technology major as an example. Based on the current problems in Database classroom teaching: the teaching objectives are not clear, the teaching methods are single, the practical teaching needs to be improved, and the teaching content needs to be optimized. We propose exploratory research on database courses that integrate into the smart classroom, with the aim of achieving fundamental changes in the classroom teaching structure. The research of the paper will reposition the curriculum training objectives, optimize the curriculum content, reform the teaching model, change the traditional classroom teaching structure, and change the traditional “teacher-centered” teaching structure to new teaching structure of “dominant-subject combination” of status. The purpose of the research is to improve the quality of teaching and the level of teaching, and to achieve the goal of practical talent training for the society.

Keywords: Teaching approaches · Course design · Educational reform · Educational theory · Experiments

1 Introduction

The current construction of educational informatization has entered the stage of educational application innovation. Seeking the overall reform of the education system has become a new goal for the development of educational informatization.

This paper takes the basic compulsory course “Database” of the education technology major as an example, and takes the smart growth and cultivation of students as the value orientation. Adhering to the educational philosophy of teaching, educating, and people-oriented, we analyze the problems in the teaching process of the Database. Then the paper repositions the curriculum training objectives, optimizes the curriculum content, reforms the teaching model, and promotes the transformation of classroom teaching structure based on the smart classroom to promote the deep integration of information technology and classroom teaching.

2 The Concept of Smart Classroom and Application Analysis

2.1 The Concept of Smart Classroom

To understand the connotation of the concept of smart classroom, we must first analyze the basic connotation of smart education. Smart education is the education of developing

students' intellectual ability under the support of information technology. Smart Education Through the construction of a smart learning environment, the teacher uses the smart teaching method to promote learners to learn smart and cultivate intelligent talents with high intelligence and creativity. Smart education is a new stage in the development of education informatization. It is necessary to use the smart learning environment as a technical support to enable students to learn smart in a technology-rich environment and achieve student intelligence generation. Smart education needs to build a smart classroom to complete the two-way integration of technology and education to cultivate students' intellectual ability. Therefore, the smart classroom can be defined as: with the support of information technology, by transforming teaching methods and integrating technology into classroom teaching, build A personalized, intelligent, and digital classroom learning environment that effectively promotes a new classroom for the development of intellectual skills. Smart classrooms are the core of smart education.

2.2 Analysis of the Application of Smart Classroom

The application analysis of smart classrooms focuses on building a smart teaching environment through various information technologies and applying them to specific teaching subjects. Researchers built a junior high school mathematics wisdom classroom based on micro-courses, and carried out case design and analysis; For example, based on the network learning space, the primary school mathematics wisdom classroom teaching strategy research is guided by the wisdom education concept, supported by information technology, and analyzes the construction methods and application cases of the smart classroom. It can be seen that the deep integration of information technology and classroom teaching based on smart classrooms is effective for the reform of classroom teaching in the context of smart education. Therefore, this paper proposes the use of database classroom as a case to analyze the application of smart classroom in teaching.

3 The Problems in the Traditional Database Course

In the context of educational informatization, the database is the backbone of various educational information systems. As a subject-based basic course for educational technology, the database course plays a role in laying the foundation of the discipline. The database plays an irreplaceable role in helping students to find employment and social orientation. Colleges and universities attach great importance to the teaching process, but because the content of this course is complex and complicated, it is not easy to be understood and mastered by students. In the traditional teaching mode, There are some problems with the Database course, as shown in Fig. 1:

3.1 The Teaching Objectives Are Not Clear

The goal of the course is to train professionals. Even if the same course faces different majors, the teaching objectives should be targeted and flexible. At present, there are many problems in the classrooms of colleges and universities where the teaching objectives are not clear. The different professional teaching objectives are the same, resulting in

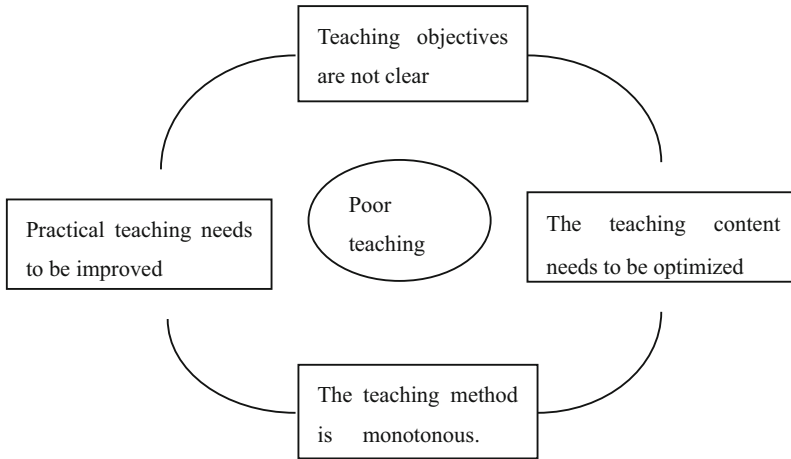


Fig. 1. The problems in the traditional database course

poor students' ability to work and social adaptability. In the face of the application of professional talent training, the database course objectives should pay special attention to practice, stimulate students' interest in learning, improve students' self-learning ability, and cultivate practical talents combining theory and practice.

3.2 The Teaching Content Needs to Be Optimized

The traditional database course content generally includes basic theory, database management system, system design and so on. The theoretical content of the course is too strong and practical. The students generally feel too difficult in the learning process, the interest in learning is not great, and the initiative in learning is not strong. And lack of close ties with professional links, the system is less systematic and scientific, lacking flexibility and pertinence.

3.3 The Teaching Method Is Relatively Monotonous

As a core course of education technology, the Database course has the characteristics of difficult and practical practice. The teaching method of over-reliance on teaching materials may not be suitable. The traditional teacher-centered and crammed teaching mode in the teaching process. Relatively boring and monotonous, students' interest is not great, and the desire to explore is difficult to be stimulated. It is difficult for students to truly understand the use of theoretical knowledge. Although the exam passed, it lacks the ability to solve practical problems.

3.4 Practical Teaching Needs to Be Improved

The traditional "database" teaching method is relatively simple, and the training of students' practical ability and professional ability is not enough. The theory is taught

too much in the teaching process, and it is too far out of the actual demand. The students' practical ability needs to be improved.

These problems will lead to less satisfactory teaching results in the "Database" course. The students' fears are more serious, the learning enthusiasm is not high, and the curriculum reform is not waiting.

4 The Smart Classroom Construction Idea of Database Course

Under the background of the new form of education informatization–intelligence education, how to fully allow students to identify the teaching content and how to make the implementation of the teaching process move towards the smart of students has become the focus of the database teaching.

Based on the existing problems in the actual teaching of Database, this paper proposes the deep integration of information technology and classroom teaching based on smart classroom to realize the transformation of classroom teaching structure. The essence of smart education is to build a learning environment that integrates technology, teachers use effective teaching methods, and cultivate intelligent talents with active practical ability. The essence and foothold of deep integration is to change the traditional classroom teaching structure, and to change the traditional "teacher-centered" teaching structure into a "dominant-subject combination" that can fully exert the leading role of teachers and reflect the main position of teachers. "The new teaching structure." Smart classroom refers to the new classroom that effectively promotes the cultivation of intellectual ability by transforming teaching methods, integrating technology into classroom teaching, and constructing a personalized, intelligent and digital classroom learning environment with the support of information technology. The purpose of smart education is to cultivate students' intellectual ability. It is necessary to realize the deep integration of information technology and classroom teaching through the construction of smart classroom.

For students majoring in education technology, the work related to database knowledge after graduation is a creative intellectual work, which needs to test the students' intellectual ability. Therefore, the Database course is very suitable for teaching in a smart classroom. In the smart classroom, information technology has become a tool for students to conceive and verify. Through effective self-management, students abandon the current situation of passively accepting knowledge in traditional teaching, and turn passive classroom into active constructive classroom. The teacher guides students through the organization of their learning styles and the choice of learning strategies. Through the emotional learning in the process of student learning. The teacher stimulates students' interest, cultivates creative thinking, and helps students complete the internalization of knowledge.

5 The Smart Classroom Construction Strategy of Database Course

The construction of the Database smart classroom includes both macro and micro aspects, as shown in Fig. 2: Macroscopically, the training objectives should be repositioned, the teaching content should be optimized, and the teaching model should be reformed. Microscopically, we should create a situational teaching environment and individualized

guidance in the classroom to promote the cultivation of students' innovative thinking ability.

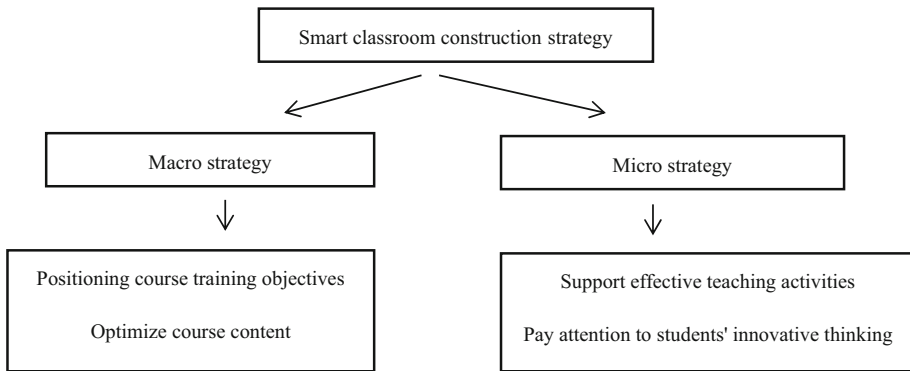


Fig. 2. The smart classroom construction strategy

5.1 Macro Strategy

In view of the confusion in the teaching of the Database course, the educational reform action plan to be implemented on the macro level is as follows:

5.1.1 Repositioning the Course Development Goal

The development goal is the concrete manifestation of the curriculum value. It is the core content of the talent training model. According to the characteristics of the education technology major of our university, the goal of the database curriculum is repositioned, and the curriculum development goal is refined. We consider that most graduates are engaged in teaching design and digital media development in relevant enterprises and institutions. The development goal will be to realize the transformation of curriculum objectives from knowledge-cultivation to innovative practice, and to develop practical talents. Graduates will be more satisfied with the needs of enterprises and institutions. We will help students find jobs, increase the employment rate of graduates, and improve the quality of employment.

5.1.2 Optimizing Course Content

The re-positioning of the curriculum development goal will be decomposed into specific class hours. In the education technology professional training program of our university, the database course hours are 56, of which the theoretical time is 32, and the actual practice time is 24. In the course of teaching, the Database course uses the relational database management system Microsoft SQL Server. The database management system SQL Server can well meet the development goal of practical talents for educational technology students. This course requires the use of SQL Server for database design

and programming. To this end, after scheduling the course content for 2 h of theoretical time, immediately arrange 2 h of practical lessons, and carry out the experiment on the theoretical content of the class to strengthen the students' hands-on programming ability.

5.1.3 Reforming Teaching Mode

After optimizing the teaching content of the Database course, we also need to reform the teaching mode around the teaching objectives. In the process of teaching, The teacher finds that students often have a great fear when they study the course. If they have not started studying, they think that the course is too difficult to learn. Therefore, the teacher must first encourage students to build confidence and cultivate students' interest in learning. The teacher can use the actual development projects in combination with the enterprise, and use teaching modes such as teaching observation, expert lectures, and case teaching to stimulate students' initiative. In order to cultivate students' habit of independent thinking, The teacher can also use the teaching mode of flipping classrooms and micro-curriculum to improve students' innovative ability. Based on a specific problem, we can use interactive lectures and group discussions to form an interactive teaching model that allows students to think positively. In short, adopting a flexible and versatile teaching model to maximize students' willingness to learn, take the initiative to learn, improve their practical ability, and become an excellent practical professional.

5.2 Micro Strategy

5.2.1 Building Perspective

The construction of the smart classroom at the micro level is the key to the realization of smart education. By combing the literature and combining the existing research, this paper believes that the micro-level should be based on the dual perspective of technology-learning to build a smart classroom. First, how to use technology to better complete teaching and learning. Focus on the level of technical support, and second, study how to make students' smart develop. In order to help students become practical talents that meet the needs of society, better and faster to adapt to social development, while learning professional knowledge, cultivate students' diverse smart. Therefore, we must make full use of information technology to build high-quality and efficient smart classrooms. One is to effectively support the implementation of education and teaching activities, and the second is to pay more attention to the cultivation of students' innovative thinking and students' smart.

5.2.2 Building Path

The traditional teaching mode of the Database course is often that students are highly dependent on teachers and learn first. Students only begin to flip through books after entering the classroom. Students do not have pre-study, no thinking before class, no homework after class, no group discussion, and more. There is no smart and innovative thinking. The database smart classroom for practical talent training must break the traditional classroom teaching mode. The basic process is divided into three parts: pre-class,

in-class and after-class. The process includes teachers and students relying on information technology to complete online and offline. Teaching and learning activities are shown in Fig. 3. In the smart classroom process, before the class, the teacher releases the preparatory tasks through micro-courses, WeChat or Weibo, and constantly updates the teaching resources, including micro-videos, text materials, and so on. Before the class, students should complete the preparatory tasks and upload the completed work materials such as audio and text. When they encounter problems, they will discuss each other, form a discussion group, and enter the class with questions. The teacher uses heuristic teaching in the class to create and guide students through the creation of situational tasks. Students form cooperative groups, and the group explores and discusses specific issues and inspires each other. After class, students share the results of innovative thinking, the teacher timely tutors students, scientifically evaluate students' learning outcomes, expand learning tasks, broaden students' horizons, tap student smart, and consolidate and grow knowledge.

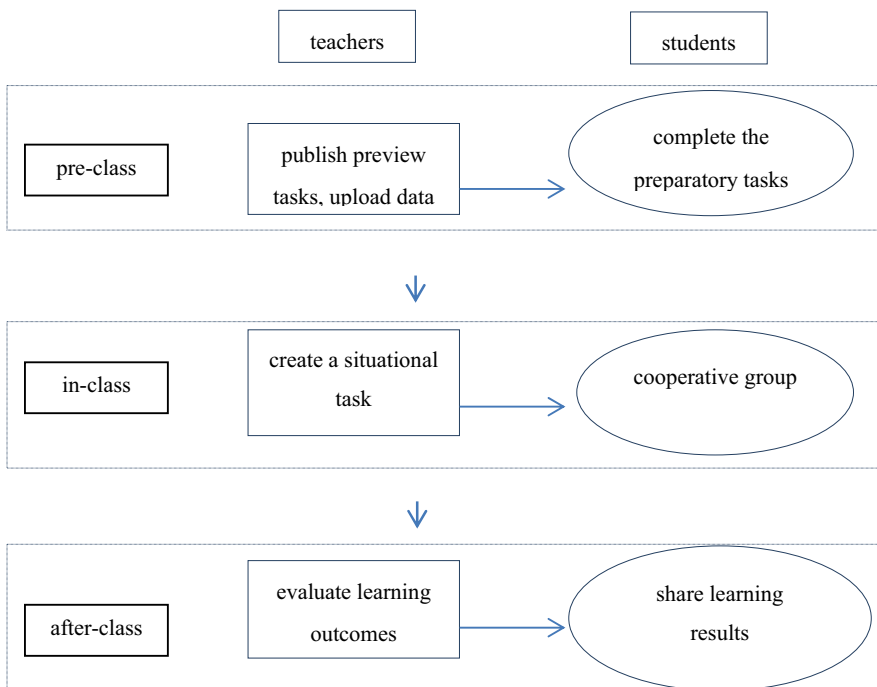


Fig. 3. The path to build a smart classroom

6 Realization of Database Smart Classroom

In this paper, the “Creation of Tables” in the database course is used as a case to realize the smart classroom. The “Database System Principles and Applications (SQL Server

2005)” published by Liu Zhicheng and Ning Yunzhi and the Mechanical Industry Press are used as teaching materials. 45 pages, using T-SQL to create a database as a research case, before the classroom implementation, the teacher first established the “database” course on the network platform, as shown in Fig. 4. In the database teaching for many years, the content of this section has always been a difficult point for students to learn, and it is also the focus. The content of this section is very representative as a smart classroom implementation case.



Fig. 4. Establishing a database course on the web-based learning platform

6.1 The Teacher Arranges Tasks Before Class, and Students Learn Independently

The teacher logs in and publishes the learning task through the network teaching platform of the South-Central University for Nationalities, as shown in Fig. 5:



Fig. 5. Network teaching platform of South-Central University for nationalities

On the network teaching platform, the teacher arranges the learning tasks that the students need to preview in advance according to the content of the teaching, and publishes before the class.

6.1.1 Learn the Basic Format of CREATE DATABASE

```
CREATE DATABASE <database file name>
[ON <data file>]
([NAME=<logical file name>]
FILENAME='<physical file name>'
[,SIZE=<size>]
[, MAXSIZE=<maximum size that can grow>]
[, FILEGROWTH=<growth ratio>])
[LOG ON <log file>]
([NAME=<logical file name>,]
FILENAME='<physical file name>'
[,SIZE=<size>]
[, MAXSIZE=<maximum size that can grow>]
[, FILEGROWTH=<growth ratio>])
```

6.1.2 Pre-class Tasks

Students upload pre-study materials and questions during study, and seek guidance from teachers and help from classmates in the classroom as shown in Fig. 6:



Fig. 6. Pre-class students preparation tasks and question release

One of the questions submitted by one of the classmates is: In the basic format of the statement, why are some statements angle brackets? And some statements are square

brackets? Why do some statements have a comma before them? What is the difference between the various symbols? What conditions apply to each?

At the same time, the teachers are grouped according to the students' interests, hobbies and achievements. The group conducts pre-study preparations and prepares for the group discussion in the class.

6.2 In the Class, the Teacher Explained the Guidance, the Students Thought, the Group Discussion

6.2.1 Teachers Explain Knowledge Points and Answer Questions from Students

The teacher's explanation mainly includes: 1 When creating the database, you must determine the name, owner, size of the database and the files and file groups in which the database is stored. The name of the database must follow the rules of the SQL Server identifier. 2 For students' pre-class questions, emphasize that the content in the angle brackets in the basic format of the statement is mandatory, and the square brackets are optional; the comma in the 3 statement indicates that the statement has not been written, and the parameters need to continue to be written; 4 Reminder The specific meaning of the student parameters can be referred to as "SQL Server Books Online" as an after-school knowledge extension.

6.2.2 Teachers Create Scenarios and Guide Students to Learn

After the statement format is explained, the teacher creates situations to guide students and inspire the smart of the students. For undergraduate students, choose a book management system that they are familiar with: If you need to create a book management system, how to create a database? Should I include several data files? How many log files are there? What rules should I follow during the process of writing code? Have the student write the code first, then the teacher explains the correct code:

```
CREATE DATABASE Library
ON
( NAME = Library_dat,
  FILENAME = 'd:\data\Library_dat.mdf',
  SIZE =20,
  MAXSIZE = 60,
  FILEGROWTH = 5 )
LOG ON
( NAME = 'Library_log',
  FILENAME = 'd:\data\Library_log.ldf',
  SIZE = 5MB,
  MAXSIZE = 25MB,
  FILEGROWTH = 5MB )
```

In the process of explaining the code, the teacher reminds the students to refer to the statement format in the process of writing the code, answer the questions raised in the previous question one by one, and then guide the students to think about the following questions: Why do some attributes in the code have a unit MB followed by some attributes? No unit MB? Does it conform to the statement format? Can the path 'd:\data' after the FILENAME attribute be changed? Students take these questions and the students conduct group discussions and inspire each other.

6.2.3 Group Discussion, Mutual Inspiration

The teacher organizes students according to prior groups to guide students to inspire each other. Students use Keynote, online teaching platform and other APPs to conduct collaborative research and complete learning. After the student group discussion, use the iPad to submit group assignments.

6.3 After Class, Teachers Guide Students to Learn and Expand

6.3.1 Teachers Evaluate the Learning Outcomes, Personalize Guidance, and Teach Students in Accordance with Their Aptitude

After the class, the teacher evaluates the assignments submitted by the students, and through the exchange of WeChat and Weibo, it is found that some minority students have to overcome the language barriers in addition to the professional knowledge. Due to the English grammar, the content of this section is more difficult than other students. Teachers immediately apply personalized counseling to minority students, teach students in accordance with their aptitude, first explain the sentence format in Chinese, and slow down the speed of speech, and then explain the content in the class with the easy-to-understand terms as far as possible, until the students fully understand.

6.3.2 Students Learn to Expand and Promote Innovation

Group students expand in after-school learning. For example, a group of students ask questions during the after-school study: If there are two or more data files, how do you build the code? This content has already exceeded the content of the textbook. There are no ready-made examples for reference in the textbook, and it is not within the scope of the teacher's preparation. Therefore, the students first searched through the Internet and found that the answers were not clear enough. Therefore, they are ready to be brought to the classroom to ask the professional teachers as the next class, and the teachers need to demonstrate on the machine.

7 Conclusion

This course promotes the deep integration of information technology and curriculum through smart classrooms. Students deeply feel that this study has expanded the learning space, increased smart, and has no end to learning. By establishing a course on the online platform, the teacher feels that the teacher is always around, which stimulates the

students' interest in learning. The teacher evaluates the student's homework in a timely manner after class, and improves the student's participation and the students' participation. The distance from the students has improved the teaching effect and provided reference for future teaching. In the future teaching, teachers and students must change their concepts, advance with the times, make up for the shortcomings in current teaching, and constantly explore the teaching model based on smart classrooms to achieve the goal of common progress for teachers and students.

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