

On the Advantages and Existing Problems of Small Class Teaching in Medical Universities Application study of Small-class Teaching in Higher Vocational Colleges

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Abstract

Under the background of information teaching, the application research of "small-class system teaching of local mechanics curriculum in higher vocational colleges" is carried out through the practical teaching experience summary and literature review. The research results show that there are the following advantages and disadvantages of small-class teaching in higher vocational colleges, Advantages: facilitate the harmonious relationship of teachers and students; improve classroom discipline; improve class efficiency; Facilitating the implementation of individualized and personalized teaching. Disadvantages: hinder thinking communication; narrow social circle; weaken competition consciousness. After sufficient teaching practice, in view of the above problems, the following solutions are proposed: realize pre-class preview and test by information teaching means; establish the communication between different classes and different disciplines by information means; cultivate students' sense of competition and cooperation by information means of "learning regardless of classes". Through the implementation of the above countermeasures, the problems in "small class teaching of local mechanics curriculum in higher vocational colleges" can be effectively solved.

Keywords

Informatization, small class teaching, advantages and disadvantages, solution strategy.

1. Introduction

Ten years of trees, a hundred years of people, a hundred years plan is based on education . How to provide education that satisfies the people has naturally become the focus of discussion today. Looking back at the history of education in New China, we have gone through the "Literacy Campaign", "Basic Education", "Nine Year Compulsory Education", and "Twelve Year Compulsory Education Pilot". Today's education aims to cultivate "composite" talents with innovative abilities and application and transformation abilities. In this situation, "small class teaching" has emerged. With the deepening of the socialist modernization process, the Internet industry has also been developing rapidly, and has been widely used in various fields. Big data platforms, cloud computing platforms, unmanned driving platforms, teaching virtual simulation and practical operation platforms have been developed and applied successively. The application of these information platforms greatly saves manpower, material resources, financial resources, and time. In terms of education and teaching, the Ministry of Education has proposed the "Education Informatization 2.0 Action Plan", aiming to promote and strengthen the application of informatization in education and teaching [1,2]. How vocational colleges can carry out small class teaching under the background of informatization needs further research from us.

2. Research Status

Small class teaching is a commonly used teaching method and method in modern teaching. It mainly controls the number of students in the class. In European and American countries, the number of students in the small class system is 20-30. Considering the actual situation in China, the number of teachers in the small class system is about 35. Today, while promoting quality education, vocational education, and information technology education, small class teaching has been piloted in vocational colleges. In 2018, Ye Song[3] et al. conducted a study on the necessity of implementing small class teaching in universities and discussed specific strategies for implementing small class teaching in universities; In 2018, Wu Haixia[4] et al. explored and studied the teaching content, teaching methods, and assessment forms of "small class teaching" in the field of Water Supply and Drainage Science and Engineering; In 2018, Zheng Hongyun [5] used two classes of clinical medicine majors in vocational colleges as experimental research objects, applied "small class teaching" to practical training teaching, and conducted research on this; In 2019, Qin Sen[6] et al. conducted a research on the teaching model of "large class teaching+small class discussion"; In 2019, Peng Min [7] mainly conducted research on small class teaching in vocational colleges from the aspects of enrollment policies, teaching plans, training programs, classroom development, mentor allocation, mentor responsibilities, and teaching evaluation mechanisms; In 2020, Wu Tianli[8] et al. analyzed the challenges and opportunities faced by small class teaching and elaborated on its advantages and disadvantages; In 2020, Liu Haixia [9] conducted research on how to apply "small class teaching" to enhance students' interest in learning ideological and political courses; In 2020, Liu Haiyan [10] conducted a study on the status of small class teaching in ordinary higher education institutions in China, analyzed the constraints of small class teaching in universities, and proposed reform measures for small class teaching in universities.

Since the 1980s, Chinese educators have conducted research on "small class teaching", mainly focusing on its application, advantages and disadvantages, and implementation measures. In terms of research subjects, most of them are abstract courses such as ideological education, drainage, and advanced mathematics, rather than mechanics courses that combine abstract and concrete aspects [11,12]; In terms of research direction, most studies have focused on "small class teaching" under conventional teaching conditions, and there has been no research on the application of "small class teaching under the background of information technology teaching".

3. Research on Small Class Teaching in Two Disciplines

3.1. Research on Small Class Teaching of Literature, History, Arts and Sports

Research on small class teaching in humanities and history majors is mostly focused on the application of small class teaching in middle and high school classrooms [13-14]. By comparing traditional teaching methods, small class teaching mainly improves in aspects such as classroom size, teacher preparation, student differences, and teaching activity design. Through practical application, it is found that implementing small class teaching in humanities and history disciplines helps teachers to control the classroom, facilitate communication between teachers and students, and form core competencies of students in the subject.

3.2. Research on Small Class Teaching in Legal Philosophy Majors

The research on small class teaching in law and philosophy majors is relatively comprehensive, mainly focusing on the definition, teaching methods, teaching concepts, teaching modes, teacher-student interaction methods, and student acceptance. The conclusion is that small class teaching helps to improve learning efficiency, improve teacher-student relationships, and promote the liberation of teaching thinking.

3.3. Research on Small Class Teaching in Science and Engineering Majors

Science and engineering majors are mainly project driven, exploring and researching teaching methods, teaching numbers, and teaching methods [15,16], and obtaining the promotion effect of small class teaching on science and engineering subject teaching.

4. The advantages and Disadvantages of Small Class Teaching in Current Science and Engineering Disciplines and Teaching Practice

Science and engineering disciplines are different from disciplines such as literature, history, art, and philosophy of law. Science and engineering disciplines have characteristics such as strong practicality, foundation, and interdisciplinary nature. Therefore, small class teaching in science and engineering often adopts methods such as projects, cases, and discussions for teaching. This situation helps to improve learning efficiency, improve teacher-student relationships, and promote personalized teaching. However, science and engineering disciplines focus on "collision of thinking" and "exchange of ideas". After implementing small class teaching, the shortcomings of reduced student communication, weakened competitive awareness, and a cold classroom atmosphere have also been highlighted. In the context of informatization, how to use information technology teaching methods to solve the shortcomings of small class teaching in science and engineering is a problem worthy of research.

Soil mechanics is a branch of mechanics that mainly studies the changes in stress and strain of soil under relevant conditions (time, stress, temperature, etc.). It is the foundation of civil engineering, transportation, water conservancy and other engineering projects, and this course is extremely important for civil engineers. Therefore, how teachers can teach soil mechanics well and how students can learn soil mechanics well have become the top priority of teaching in the field of civil engineering.

How can teachers teach soil mechanics well? Taking the daily teaching of "soil mechanics courses" in the 19th, 20th, and 21st grade architectural majors of a vocational and technical college in Nanchong as an example, the school's architectural majors studying "soil mechanics" include water conservancy, construction technology, and road and bridge engineering. The number of students in each class ranges from 30 to 50. Small class teaching is implemented for students majoring in water conservancy and road and bridge (with a controlled number of around 28), while combined class teaching is implemented for students majoring in construction engineering (with a total number of around 82). Through three years of teaching practice, the advantages and disadvantages of small class teaching in soil mechanics courses are summarized and summarized.

5. The Advantages and Disadvantages of Small and Medium Class Teaching in Soil Mechanics Course

The soil mechanics course is a combination of theory and practice, which requires students to have a high level of mathematical foundation and hands-on ability. After teaching practice, the advantages of small class system in soil mechanics teaching in vocational colleges have been summarized:

5.1. Establishing a harmonious teacher-student relationship

Soil mechanics is a course that combines mathematical calculations with hands-on practice. It requires extremely high mathematical skills in chapters such as soil pressure calculation, self weight stress calculation, shear strength calculation, and slope stability calculation. However, vocational college students generally have poor mathematical skills and strong hands-on abilities. Therefore, in the theoretical learning process of soil mechanics courses, many students

are prone to fatigue, negativity, and resistance to learning. At this time, the class size is small, and teachers can accurately identify students who are tired and resistant to learning emotions. In this way, teachers can make timely adjustments based on the real-time situation of the classroom, explain difficult knowledge points to students or provide individual tutoring to help them overcome fatigue, resistance and other emotions, so that they can always maintain a certain level of enthusiasm for the course. This measure can enhance communication between teachers and students, facilitating the establishment of a good teacher-student relationship.

5.2. Improving classroom discipline

The soil mechanics course involves many chapters on calculation, and its computational workload is also significant. When teachers assign in class exercises or explain examples, if students encounter problems they don't understand, they often use the method of "first discussing with each other in a low voice, and then seeking help from the teacher" to solve the problem. Dealing with unclear points in the above way can easily lead to loud discussions, poor classroom discipline, and even affect the normal operation of other classes. In the process of small class teaching, due to the small number of students, the discussion base is also relatively small. At this point, it is better to avoid situations where classroom discipline deteriorates.

5.3. Beneficial for improving course efficiency

The course of "Soil Mechanics" belongs to the "Basic Course" of civil engineering majors, which involves a large number of calculation chapters, a large amount of calculation, and high difficulty. Vocational college students have poor mathematical foundations and encounter the following problems in teaching practice (calculation chapter new lesson explanation): 1. When there are less than 30 students, teachers spend about one-third of the total course time on solving doubts and answering questions; 2. If the number of students is around 80, teachers spend more than half of the total course time on solving questions and answering questions; 3. When encountering difficult chapters, the time for answering questions can even be the entire class. From teaching practice, it can be seen that when calculating chapter explanations, the speed of new course implementation is inversely proportional to the number of students (i.e., the more students there are, the slower the speed of new course implementation). Therefore, when using a small class system for teaching soil mechanics courses, it is beneficial to improve the efficiency of course implementation.

5.4. Beneficial for improving academic performance

During the final exam, the same set of questions will be used for the majors of Construction Engineering (large class teaching), Water Conservancy (small class teaching), and Road and Bridge (small class teaching). After analyzing the grades of each class after the exam, it was found that: 1. the average grades of students majoring in water conservancy and road and bridge engineering were higher than those of students majoring in construction engineering; 2. The excellent performance rate of students majoring in water conservancy and road and bridge engineering is higher than that of students majoring in construction engineering; 3. The proportion of construction engineering majors with a score of 90 or above is significantly higher than that of water conservancy majors and road and bridge majors.

In addition to the above advantages, the small class teaching of "soil mechanics course" is also conducive to extending more extracurricular knowledge, promoting individualized teaching, personalized teaching, and classroom ideological and political education. Due to the smaller number of students in small class teaching, the time for answering questions decreases with the decrease in the number of students, allowing more time to be spent on promoting ideological and political education in the classroom.

5.5. Disadvantages of Small and Medium Class Teaching in Soil Mechanics Course

In the practice of "soil mechanics course", small class teaching has the above advantages, but there are also the following drawbacks: 1. the number of class members is small, and there is less communication and discussion among students in the course, which is not conducive to the development of their thinking; 2. A small class size narrows the social circle of classmates within the class, which is not conducive to expanding the circle of friends and classmates; 3. The class size is small, and when participating in certain activities organized by the school, the enthusiasm and number of participants are not up to standard; 4. The number of students in the class is small, and their competitive awareness weakens;

6. Solutions

The application of small class teaching in the teaching of soil mechanics courses has promoted the improvement of classroom discipline, teacher-student relationship, and class efficiency, but it has a negative effect on student communication, expanding student circle of friends, and competitive awareness. With the deepening of socialist modernization, education modernization and digitalization have also been put on the agenda. The Ministry of Education has proposed the "Education Informatization 2.0 Action Plan", aiming to promote and strengthen the application of informatization in education and teaching, and use information teaching methods to address the shortcomings of small class teaching from the following aspects.

6.1. Information support, preview first

With the proposal of the Education Informatization 2.0 Action Plan by the Ministry of Education, teaching methods and teaching informatization have also made significant progress. Teaching informatization aims to promote and strengthen the application of informatization in education and teaching. By utilizing information teaching methods, the shortcomings of small class teaching can be solved from three aspects: pre class preview, in class collection, and post class practice.

Use the information teaching software "Cloud Classroom APP" to distribute learning links or videos of relevant chapters, allowing students to preview relevant content, and publish test questions of relevant preview content 1-2 days before class to understand students' mastery of relevant knowledge and weak points.

adjust teaching focus and difficulties in real time based on pre class test results, and conduct classroom practice. After the course is over, summarize and summarize the learning situation of students in the classroom, and judge their difficulties in the actual classroom.

based on the difficulties faced by students in the classroom, and finally prescribe the right medicine. Use communication software (class WeChat group, QQ group) to publish special explanations on "difficulties in the classroom" content, so that students can continue to learn "difficulties" after class.

6.2. Information sharing and construction of disciplinary difficulty walls

Through the teaching practice of soil mechanics courses in architecture, water conservancy, and road and bridge majors, it was found that the content of soil mechanics courses in different majors is roughly the same, and the key and difficult points are similar, with only some chapters having different levels of knowledge. Based on this characteristic, with teaching informatization as the support, establish a "disciplinary difficulty wall". Students majoring in architecture, water conservancy, and road and bridge engineering can post the difficult points in the "Soil

Mechanics" course on the "Discipline Difficulty Wall", which facilitates communication between different majors in the same course and different classes in the same major.

6.3. Information guidance, separate learning without class division

Through the teaching practice of small class and combined class systems in water conservancy, architecture, and road and bridge majors, it has been found that small class teaching has a small number of students in each class, and they are not actively participating in school activities (the number of students does not meet the standards), and their competitive awareness is weak. To change this situation, "separate learning without separate classes" is proposed. The so-called "separate learning without separate classes" refers to transforming students in large classes into small classes for learning, and participating in exams. When evaluating excellence and participating in various school activities, it still appears in the form of large classes. The application of "dividing learning without dividing classes" can not only leverage the teaching and learning advantages of the small class system, but also avoid situations such as weak competitive awareness and lack of active participation in school activities. Dividing schools without classes can improve learning efficiency while effectively maintaining students' competitive awareness.

7. Conclusion

Through literature review, teaching practice, research and exploration, and questionnaire survey, the application research of the small class teaching system for soil mechanics courses in water conservancy, road and bridge, and architecture majors was conducted. The research results indicate that: 1. Applying "small class teaching" to soil mechanics courses can help improve teacher-student relationships, classroom discipline, and teaching efficiency; 2. "Small class teaching" has many advantages, but due to the small number of students, it is not conducive to improving their ideological exchange, competitive awareness, unity and cooperation awareness, and other aspects; 3. In response to the shortcomings of "small class teaching" in soil mechanics courses, combined with information technology teaching methods, measures such as "information support, preview first", "information sharing, construction of subject difficulty walls", "information guidance, separate learning without separate classes" are proposed to effectively solve the practical problems encountered in "small class teaching" in soil mechanics courses.

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